The enclosed self-study report was submitted for external review on September 19, 2018 and sent to reviewers on September 24, 2018.
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1.0 Executive Summary

The Department of Geography & Environment is a healthy department with a history dating back to the foundation of the university, and with a generally good balance of faculty expertise to support its academic programs. The mission statement notes that faculty and students analyze the processes, spatial patterns and consequences of human-environment interaction. Studies of physical and biological environments, human societies and their interactions incorporate both natural and social science perspectives at multiple spatial and temporal scales. Academic programs, including two undergraduate and three graduate, are assessed in this self-study along with faculty support and other measures of the department’s status.

Assessments of the undergraduate program focuses on the B.A. Geography, since it’s been in existence for 70 years, allowing for longitudinal views. Looking at the last five years, the six-year graduation rate for the B.A. Geography for either students starting at SFSU or community college transfers is mostly higher than the college and university, and has improved somewhat at least for these transfers. The average GPA for this degree over the last 5 years has also increased from 3.07 to 3.32, while department faculty teaching GE classes have noted no significant change in grades for university students at large.

In an alumni survey, respondents note the department's leadership in applied education and research, significantly including field experience, leading either directly to good careers or a geographic perspective that helped them in other ways. Over 80% of the 125 respondents were B.A. Geography majors, so observations from that survey should largely reflect the undergraduate program, and it is satisfying to see that most felt well prepared for careers, though these were not all in our relevant areas of environmental work, parks, GIS/cartography, and planning – more than a third eventually worked in business or education. And 78% agreed that they would choose the same program if they had to do it again.

A recent accomplishment has been the addition of a B.S. in Environmental Science. The total number of department undergraduate majors (178) is substantially higher what it was in 2014 (104) before the BS was added to the existing B.A. in Geography. With this, enrollment in physical geography / environmental science courses has greatly increased. This degree has also exhibited a higher representation of underrepresented minorities (37%), similar to that of the college and university (39%), as compared with that of the B.A. Geography at 29%, though that is increasing.

While this B.S. program has been a very positive development and should continue to grow, it has also presented challenges such as increased enrollment in required classes already near capacity and a need to better support and advise majors in the lower division, where previously with just the B.A. Geography, most majors signed on as juniors. Another challenge in recent years has been the effect of high housing costs on graduate enrollment, which has dropped across the university; adapting to this as well as attempting to reverse it is one of the goals of the department.

This self-study has led to identifying this and other goals to pursue in the coming years. Most of our priorities relate to the curriculum and academic program directly available to students, but they also include recognition of our increased faculty research productivity and needs to support these; these are also tied to the academic program in that all of it comes back to the classroom as well as graduate
students. Some of our goals are more short-term, some more long-term, and some are more easily accomplished than others. Goals are listed here and spelled out at greater length in Section 4:

1. Continue to plan for increasing numbers by looking at bottleneck classes, high-demand electives, and improved advising.

2. Increase the diversity of students in our degree programs.

3. Enhance our ability to offer and fund field trips.

4. Improve our graduate programs and increase graduate enrollments through targeted revisions, increased resources for grad students, and development of an MS in Environmental Science.

5. Identify suitable existing courses that could work well in general education (GE).

6. Increase the frequency of general methods courses and redesign as needed to support both graduate and undergraduate programs.

7. Improve IT support for lecturers, including provision of capable laptop computers.

8. Enhance faculty instructional and research support.

9. For faculty lines, we need to maintain our currency in the areas we are known for and remain important to our curriculum, and consider areas where unmet demand exists. **Note: we have identified this program review as a way of planning for future faculty lines, and we look forward to getting valuable input from external and campus reviewers.**
2.0 Overview of the Program

The Department of Geography & Environment has two undergraduate and three graduate programs. The B.A. in Geography was established in 1947, though courses in geography and cartography date back to the founding of the university. The B.S. in Environmental Science was initiated in 2015. The M.A. in Geography initiated in 1966, the Concentration in Resource Management and Environmental Planning in 1988, and the M.S. in Geographic Information Science in 2009.

Some defining characteristics of our programs are a healthy balance of physical, human, environmental and methods, and a longstanding applied tradition where students learn methods that prepare students for careers in government and NGO agencies, as well as in business (most recently at Apple and other silicon valley firms incorporating mapping technology). An environmental focus has existed for many years, with one of the first environmental issues courses – Environmental Problems & Solutions – initiated in the 1960s. As the state initiated the environmental scientist job description based on skills we have long taught, we were able to design the B.S. Environmental Science degree which now attracts more than half of our majors.

History of the Department

The origins of the Geography & Environment Department coincided with the founding of the University, making it one of the oldest departments in the CSU System.

Geography instruction began in the first years of the San Francisco State Normal School, when in 1901/02 Walter J. Kenyon offered a 10 week Geography course. Kenyon was a member of the original group of faculty selected for the school by its first President Frederic Burk. Originally hired as Instructor of Manual Methods, Kenyon became the first Supervisor of Geography.

During the early years, the campus was located downtown on Powell Street near Clay, until the 1906 earthquake when it moved to the Waller and Buchanan site where it remained until 1952/53. Faculty positions were referred to as Supervisor or Assistant Supervisor of various subjects. Supervisor positions were typically held by university graduates, such as Allison Ware in 1905, Freedom W. Hoffman (UC Berkeley) in 1912 and Archibald Anderson in 1913, who became acting President when Burk passed away in 1924. In 1916, the geography curriculum consisted of three courses, and by 1923 had expanded to seven, including physical, economic, California resources, human, world regional, and geography teacher preparation.
Section One: Executive Summary

In 1922 Anna Verona Dorris was appointed as the first long-term geography instructor. Educated at the University of California and Columbia University, Dorris's roles were Supervisor of Visual Instruction (cartography and map interpretation) and Assistant Professor of Geography. Her 1928 book *Visual Instruction in the Public Schools* was a pioneer work in visual instruction; For more about her work as a pioneer in visual instruction see Wendell G. Johnson's 2008 article "Anna Verona Dorris and the Visual Instruction Movement, 1918-1928, *Tech Trends* 52(4): 51-58. In the 1920s, Dorris taught such courses as Human Geography, Economic Geography, Geography of the Americas, and The New Point of View in Teaching Geography. Her courses were offered by the Social Sciences unit, which housed Contemporary Civilization, Geography, Economics, History, Sociology and Government courses. Anna Dorris also offered Introduction to Geology and Physiography in the Physical Sciences unit.

**San Francisco State College**

In 1935 the Normal School was reconstituted as San Francisco State College, with a liberal arts curriculum and a Social Science Department offering instruction in the fields of Economics, Geography, Government, History, and Sociology. Walter A. Hacker, (Ph.D. 1931, University of Vienna; dissertation on glacial geomorphology of the Alps) was one a group of refugee geographers convinced to come to the States by Carl Sauer. He left Austria in 1933, frustrated with the growing harassment of intellectuals, to become an instructor in Tientsin (and/or Nanking), China; and was hired by San Francisco State in 1937, teaching courses in physical geography, especially geomorphology, and developed a new course on field work in geography. During the Second World War, Hacker helped the federal government map the coast of northern China, where he had expert knowledge and where plans were being considered to initiate an assault on Japan. Although he was instrumental in establishing Geology and Anthropology programs, originally born as GEOG courses, and served as advisor for the major in Earth Science, Dr. Hacker remained with the field and the Department of Geography until his retirement in 1972.

In the 1938 Bulletin was listed introductory physical and cultural geography, map reading and interpretation, economic geography, geomorphology, climatology & oceanography, regional courses in North America, Latin America, Asia & the Pacific, Africa, northern Europe, and southern & central Europe. By 1943 was added courses in cartography, map projections, a regional course on war zones, and political geography, then in 1945 a field work course was introduced.

The end of the Second World War brought the G.I. Bill, which supported a period of rapid growth in the geography program, the College, and indeed higher education throughout the United States. In 1947/48 the Division of Social Science was created, and the geography major and minor established.

In 1948 Anna Dorris retired and was replaced by Lyle E. Gibson as Assistant Professor of Geography, to teach human and regional geography courses. Gibson also continued the tradition established by Dorris of leading tours on luxury cruises, in his case to Hawai‘i and the Far East. His picture shown here is from a press release announcing one such voyage, from the deck of the SS President Cleveland leaving from San Francisco as the Fifth Annual Summer Adventure Study Cruise, to visit Honolulu, Kobe, Yokohama, Manila and Hong Kong, offering "an opportunity for painless and pleasant education -- and lots of fun."

**Moving to the present campus**

The campus moved to its present Lake Merced site in 1952, allowing a period of physical expansion to begin and for academic programs to continue their development. Geography was housed in what is now
the Business Building from 1952 to 1965. In the 1951 Bulletin were listed one lower division class in regional geography, and upper division classes in field work, maps and map Interpretation, physical geography, economic geography, conservation of natural resources, political geography, regional classes in US & Canada, California, Latin America, Europe, Soviet Union, Eastern Asia, and Southern Asia; and a couple of graduate seminars.

**Alfred R. Sumner** (Ph.D. 1949, Clark University) left Stanford University to join Drs Hacker and Gibson in 1953. Sumner was known for giving inspiring lectures while at Stanford, but was concerned about university policies leading to the purge of several of his progressive colleagues. At SFSU, he was known as a capable instructor, and an expert on geopolitics and East Asia. He also led highly popular field trips by air over portions of California and to Latin America (R. Hough, pers. comm.)

**Walter Olson** (Ph.D. Syracuse) arrived in 1955. His focus was geographic education, and established world regional geography as a required class for education students. He eventually moved into administration as dean at Western Illinois University, and in 1975 became president of CSU Stanislaus.

A fifth faculty member, **Astvaldur Eydal**, joined the program in 1959, having completed the Filosofie licentiat at the University of Stockholm followed up by a Ph.D. at the University of Washington in 1963. He taught physical geography, especially geomorphology and oceanography, with a strong Icelandic accent, was a master chess player, and climbed major volcanic peaks worldwide.

The program became the Department of Geography in 1961/62, with Dr. Gibson as Department Head. That year also saw our first graduate course. Dr Gibson left in 1962, when Walter Hacker became Chair.

**Jean B. Vance** (Ph.D. 1958 Clark University) was hired in 1962, with specialties in economic and urban geography. Jean was one of a small handful of women who earned Geography Ph.D.’s in the country during the 1950’s and early 1960’s. Two others, Eleanor Hanlon (Ph.D. 1953) and Mildred Berman (Ph.D. 1962), were also products of Clark. Jean served as a highly capable and strategic chair of the department from 1980 to 1992.
**Richard F. Hough** (Ph.D. 1963 University of Wisconsin) brought expertise on Japan and east Asia, also developing the Geography of Ethnic Communities course, and was known for his field trips both at professional meetings and with students: including water for the cities in a trans-Sierra crossing; "Fog and Fault", "SF at Night", even a trip to Japan and East Asia, and his favorite, an exploration of the California Delta.

**Robert D. Picker** (Ph.D. University of Washington, Dissertation *Industrial Development in Central Siberia and Northern Kazakhstan*) was hired in 1963, and continued the tradition of geopolitical specialists focusing on Asia, but especially studied the Soviet Union.

Thus seven geographers were listed in the 1964/65 University Catalog, when the old Social Science Division became the School of Behavioral and Social Sciences. At that time, the Department of Geology was established in the School of Natural Science, and the Department of Geography moved to its present location on the second floor of the north wing of the HSS Building.

**Max C. Kirkeberg** (CMS, ABD University of Wisconsin, Madison) was hired in 1965 to replace Sumner. Max’s early specialty from grad school was Africa, and he regularly taught the Geography of Africa. Max taught a host of regional classes. He particularly loved courses on his adopted home and study area -- San Francisco, including a two semester field class called San Francisco on Foot. He became aware of changes in San Francisco and began to document these photographically. Ultimately his slide collection numbered 58,000 just of San Francisco, which he is in the process of digitizing since 2014, coming in to school every day to work on it.

**Burton "Roy" Gordon** (Ph.D. UC Berkeley, 1954), a student of Carl Sauer at Berkeley working on human ecology of tropical areas such as Panama and Colombia, was hired in 1965 after ten years at University of New Mexico where he became chair. At SFSU, he developed local research including the natural history and cultural imprints of the Monterey Bay area, and regularly taught courses at the Moss Landing Marine Lab.

In 1966/67, the Master of Arts in Geography was approved.
Developing the Environmental Curriculum

Though courses in conservation of natural resources had been offered since the early 1950’s, the mid-60’s were notably when the department added significant environmental courses to the curriculum in a joint effort with Biology. Today’s *Our Endangered Planet* (BIOL 318) and *Environmental Problems and Solutions* (GEOG 600) date back to that beginning. The undergraduate program included a focus in environmental management starting in 1970.

**Georg Treichel** (Ph.D. UC Berkeley, and like Roy Gordon a student of Carl Sauer) was initially hired as a joint appointment with Biology, in order to establish an environmental studies program, but eventually moved over to Geography full time. Georg was a specialist in the establishment of national parks and wildlife preserves worldwide, and traveled extensively despite being afflicted with polio.

**Hans J. Meihofer** (Ph.D. University of Washington), was hired away from CSU Northridge in 1968 to bring back the department’s early reputation in cartography, and always maintained a keen eye for good map design. While at SFSU and during a series of sabbaticals, Hans developed international research in agriculture and food supply, and promoted the development of an environmental studies focus, now the BS in Environmental Science. Hans promoted the importance of field work, and made sure that the department curriculum included field experience, even extending to personally buying the department a new van -- the "Hansmobile" -- when he retired.

**John E. Westfall** (Ph.D. George Washington University) also joined the faculty in 1968, and combined expertise in air photo interpretation (see his [air photo atlas of the SFSU campus](#)), field surveying, selenography (his *Atlas of the Lunar Terminator* is a unique approach to mapping the moon), and historical geography. In John's air photo class, students collected air photos out of the window of top-wing Cessna airplanes, with John developing a special mount with mirror for using 50-mm cameras safely out the passenger window of these aircraft.

**Roger Crawford** (Ph.D. University of Washington) was the first planning specialist in the department, hired in 1969, and focused on bay environments and transportation planning. He was a longtime member of the Bay Conservation and Development Commission, and was one of the first group of faculty involved in the establishment of SFSU's Romberg Tiburon Center for Environmental Studies.
Steven Pease (Ph.D. 1978 University of Wisconsin Milwaukee) was hired in 1975, specializing in climatology & remote sensing in 1975. Pease died while on sabbatical in Fall 1984 from an allergic reaction to a malaria prevention drug. His family established the Pease Award in his honor, and this fund provides research support for students every year, with the winner accepting the award at the CoSE Awards Dinner in the fall.


Tenure-track appointments resumed in the 1980s.

First was Nancy Wilkinson (Ph.D. University of Oregon, 1983), hired in 1986, and has focused her research on California, especially water resources, environmental history, and the changing perceptions of flood hazards and dam-building.

Mark Schwartz joined the department for three years (1985-87), to replace Steven Pease in climatology and remote sensing, then took a position at University of Wisconsin Milwaukee.

Jerry Davis (Ph.D., University of Georgia, 1987) brought new expertise in GIS when he was hired in 1988, but focuses most of his research in field-based geomorphology, in karst and fluvial systems.

Chris McGee (ABD, UC Berkeley; human geography, geographic thought) was hired part-time in 1986 and has not only taught many classes in historical and human geography, but has also served in various capacities, including graduate thesis committees.

In 1988, the Concentration in Resource Management and Environmental Planning was added to the Geography M.A.

Geographic Information Science

While courses in cartography date back to at least 1943 and interpretation of aerial photography in 1961, the full breadth of geographic information science was primarily developed in the 1970's and 1980's with courses in remote sensing of environment (1977), computer cartography (1979) and geographic information systems (1987).

A year later the Department became the home of the Multidisciplinary GIS Center, now the Institute for Geographic Information Science, which includes a research program, certificate program and the GIS Specialty Center for the California State University system.
An inevitable surge in retirement of faculty hired during the 1960s started in 1989 with the retirement of Dr. Gordon in 1989, followed by the loss of Jean Vance and retirement of Bob Picker, Rich Hough and Georg Treichel in the mid 1990s. These losses did however lead to new hires during the early 1990's.

Trish Foschi (Ph.D., Oxford) became our new remote sensing specialist in 1990 after a 3-year gap, with research on mixed pixels. She worked with several students on SF Bay delta studies of aquatic plants such as *Egeria densa*, and much of her work was connected with research at the Romberg Tiburon Center.

Barbara Holzman (Ph.D., University of California, Berkeley, 1993) was hired in 1992 to provide expertise in biogeography and natural resource management. Her research has included forest succession from fires at the urban rural fringe at Point Reyes, as well as plant communities on the Farallon Islands. She developed the BS in Environmental Studies: Natural Resource Management & Conservation, and served as Director of Environmental Studies, and initiated an introductory course in environmental science, in the core of the BS in Environmental Science that started in 2015.

Larry Foster, former Dean of the Graduate Division, joined the Department in 1992, and stayed with us for several years until his retirement. Larry followed the tradition of some of his predecessors, including Anna Dorris, Lyle Gibson, and George Treichel, in developing a side career as a lecturer on luxury cruises to exotic ports.

Early in Nancy Wilkinson's tenure as department chair was the next surge, in the early 2000's, with the retirements of Roger Crawford, Max Kirkeberg, John Westfall, and Hans Meihoefer.

Qian Guo (Ph.D., University of Tennessee, Knoxville, 1996) joined the Department in 1998, with expertise in urban, economic and political geography and the regional geography of China, where he has maintained a long-term study of the development of the loess plateau and the Xinjiang province. As an expert in US-China policy and an Associate at the Center for US-China Policy Studies, Dr. Guo is frequently called on by the university to assist in our growing trans-Pacific connections.

Ellen Hines (Ph.D., University of Victoria, 2002) was hired in 2001. Her research addresses community ecology of endangered species, mainly marine mammals, related to local conservation and regional coastal and marine management science; her dissertation research was on dugongs along the Andaman coast of Thailand. Since 1999, she has conducted research on sirenians and cetaceans in Thailand, Vietnam, Cambodia, Myanmar, and Belize. Dr. Hines is an Appointed Expert to the United Nations World Ocean Assessment and on the IUCN Marine Mammal Protected Area Task Force, and an Expert member on the Sirenian Specialist Group (IUCN Species Survival Commission) since 2005.

Two faculty hires stayed with us for a few years until moving on to other universities – Jeff Bury went to UC Santa Cruz and Edna Wangui went to Ohio University.
Section One: Executive Summary

Andrew Oliphant (Ph.D., University of Canterbury, 2001) was hired in 2002 as a climatologist, applies micrometeorological methods to better understand the interactions between ecosystems and the climate system, principally through exchanges of heat, carbon and water. Recent projects include the carbon and water cycle of mountain meadows, the role of vegetation in urban climates, and the impacts of fog on ecosystem microclimate and functioning. His field sites have ranged internationally from Antarctica to Iran, and in the US from mid-western deciduous forests, to Sierra Nevada meadows and urban climates from San Francisco to Black Rock City, Nevada during the Burning Man festival.

Jason Henderson (Ph.D., University of Georgia, 2002) was hired in 2003 to continue the land use planning specialty established by Roger Crawford. Jason’s work focuses especially on transportation, including automobility, but is a dedicated bicyclist and developed a new course in Bicycle Geographies, with the goal of promoting student use of this growing alternative to automotive transportation. His recent research increasingly compares US and European potential for bicycle commuting, with recent field research in Amsterdam and Copenhagen.

XiaoHang Liu (Ph.D., University of California, Santa Barbara) added to the GIS and quantitative methods expertise in the department when she arrived in 2003. Her research has focused on areas ranging from urban population estimation using remote sensing to health research to digital elevation model development and accuracy. With SFSU’s growing significance in health-related research, Dr. Liu is increasingly called upon for geospatial support in NIH-funded research such as SF-BUILD.

Courtney Donovan (Ph.D., University of Washington, 2008), does research at the intersection of health geography, health humanities, and the social determinants of health. She writes on the insights of narrative approaches to health experiences of individuals and communities that experience the burden of marginalization and poor health outcomes. She was recently selected to participate in a digital health pre-accelerator (Project Zygote) and is using a Truth fellowship with the Yerba Buena Center of the Arts to develop a multimedia web platform, StoryBridge, that uses creative submissions by patients, health professionals, and community members to explore and address health disparities in the Bay Area.

Jennifer Blecha (Ph.D., University of Minnesota, 2007) focuses on urban ecology, food systems and sustainable agriculture and urban agriculture. At the other end of the spectrum, Jen also teaches the Geography of Garbage, and in all of these classes students get to learn firsthand about where we get our food and put our wastes. Hired in 2007, her research looks at keeping farm animals such as chickens in the city, including the practice of backyard slaughter.
Leonhard Blesius (Ph.D. University of Iowa, 2002) was also hired in 2007, and is our principal remote sensing specialist who studies landslide susceptibility. He has been developing low-altitude remote sensing methods using unpiloted aerial systems, and has studied the application of hyperspectral methods for vegetation mapping.

The MS in Geographic Information Science accepted its first students in 2009.

Geography & Environmental Science

In 2011, the department moved to the College of Science & Engineering as part of university restructuring into 6 colleges. Soon afterwards, the department name was shortened to Department of Geography & Environment (2013), and a BS in Environmental Science initiated in Fall 2015.

Tendai Chitewere (Ph.D., Binghamton University (SUNY), 2006) joined the department in 2012. Her research focuses on sustainable communities, with a recent addition of floating communities in Richardson Bay and sustainable communities in Berlin, Germany. She was one of the authors of the NIH funded SF BUILD grant. Her work examines social and environmental injustice and political ecology. In addition to teaching the Future Environments class, she teaches the Environmental Impact Analysis class.

Leora Nanus (Ph.D., University of Colorado, Boulder, 2008) was hired in 2014, with a focus on watershed hydrology, water quality and environmental science. Her research looks at the nitrogen cycle and links air and water quality in National Parks and wilderness areas of the western United States. Recent and current research includes understanding controls on spatial and temporal variation in water quality, evaluating ecological effects of air pollution, modeling critical loads of atmospheric nitrogen, and applying stable isotope techniques to distinguish sources of pollutants to watersheds.

Most recently, in fall 2017 Sara Baguskas (Ph.D., University of California Santa Barbara) joined our department, replacing Barbara Holzman as our biogeographer. Sara's dissertation research in the effect of fog on plant ecology and agricultural crops fits well in our local landscapes, and she's also initiated studies of the ecophysiology of mountain meadows to complement existing expertise in the department.

Missing from the History

The narrative presented above is missing a lot of important people who have contributed significantly to the department’s history –lecturers who may have taught many more students than our professors, staff members who keep the place running and are often the face of the department when visitors come by the office, professors who have taken other jobs, and of course the students. While we won't be able to find enough pictures to do this justice, we hope to add at least some of the lecturers and staff members who've been so important to our department, to http://geog.sfsu.edu/content/department-history.
Alumni Survey

In Spring 2018, an alumni survey was conducted and garnered 125 responses, with 1 from as early as 1956 but with more in recent years.

![Alumni Survey Responses by Decade Graduated](image)

The complete survey results are available at [https://sfsu.box.com/v/geogenvt](https://sfsu.box.com/v/geogenvt) or at [https://ql.tc/kLZAy7](https://ql.tc/kLZAy7), but some of the main takeaway messages are:

- Most felt confident in their quantitative reasoning and writing.
- Most (89%) felt it was the right number of required courses in the major.
- Asked about faculty contributions to their education (Q22), most were satisfied or very satisfied with respect to:
  - facilitating their learning (91%)
  - availability / accessibility (83%)
  - providing research or internship experience (71%)
  - appropriate knowledge of trends in the field (74%)
  - assistance in preparing students for career goals (62%)
- 78% of respondents strongly agree (48%) or agree (30%) that they would choose the same program if they had to do it again (Q27).
- Group work was most common high impact practice learned in classes.
- The program was adequately (54%) to very challenging (34%) for alumni (Q28).
- Obstacles to completing the degree (Q15) included needing to work (10%), financial (9%), personal (17%), course availability/scheduling (23%), and issues with advisors (4%), while 36% noted no obstacles.
- Alumni were generally were quite satisfied with their degree, and how it prepared them for their careers, though (Q8) only about half actually found careers in geographical topics such as planning, GIS/cartography, environmental science, parks/tourism. Education and higher education should also be included as careers for which they were prepared by our program,
Section Two: Overview of the Program
Alumni Survey

which would bring the total to over half. For Q10, 54% felt they are working in the field for which they were trained, with 14% responding something like "somewhat", with 32% responding "no."

Figure 2. Alumni Careers
Section Two: Overview of the Program
Alumni Survey

- The most useful courses (Q13) identified were quite diverse but might be summarized by a word cloud created from the responses, after removing words such as "course" and "useful".

![Most Useful Courses Word Cloud](image1)

*Figure 3. Most Useful Courses Word Cloud*

- The most rewarding experience question (Q29) responses also lent itself to a word cloud.

![Most Rewarding Experience Word Cloud](image2)

*Figure 4. Most Rewarding Experience Word Cloud*

Clearly alumni appreciated their field trip experiences.
3.0 Program Indicators

3.1 Program Planning

In charting their future within the discipline and the university, programs maintain effective planning processes that assess their successes, challenges, and opportunities. These processes involve the faculty as a whole and build on evidence of student learning and achievement for continuous improvement.

Mission Statement: The Department of Geography & Environment analyzes the processes, spatial patterns and consequences of human-environment interaction. We study physical and biological environments, human societies and their interactions, using both natural and social science perspectives at multiple spatial and temporal scales. Our degrees prepare students for further academic pursuits or careers as geographers, planners, geospatial analysts, environmental scientists, educators or natural resource managers.

BA Geography: The BA majors receive an education based on a broad foundation in physical geography, human geography, and geographic techniques. The BA program focuses on analyzing the processes, spatial patterns and consequences of human-environment interaction, and addressing issues of sustainability, using maps, field work and geospatial technologies such as GIS to solve real-world problems.

BS Environmental Science: The purpose of the BSES degree is to prepare students for graduate school or for direct entry into a career as an environmental scientist or environmental manager in industry, government, or NGOs.

Reflection on the Mission Statement and undergraduate programs

Development of the BS Environmental Science program, a major focus of this review period, reflected changes in career opportunities for our students, especially the creation of the Environmental Scientist classification at the state level and AP Environmental Science in the high schools. With the addition of one faculty line in environmental science, with a specialization in water quality, and existing offerings in physical geography, environmental/resource management, and methods, as well as an ample suite of lower division courses across the natural sciences, we were able to build a solid environmental science program. One challenge we expected was maintaining the very important community of students, but this has not been an issue – the students have taken care of this, and several are double majors. The 37°N Geography Club became the 37°N Geography & Environmental Science Club completely on their own. We've just graduated the first significant cohort of environmental science students, who responded with their appreciation for the program in our senior seminar survey.

Assessment Reports

Eight assessment reports completed between 2011 and 2018 are available as separate documents, and include assessment results and uses of those findings. Our department holds two full-day retreats each year to consider various curricular needs, and ad-hoc committees have considered issues and made plans to revise and propose curriculum. We have surveyed both current seniors (in the senior seminar), alumni and community stakeholders and employers to guide curriculum development. Graduate representatives attend regular meetings where these changes are discussed. Due to changes at Academic Resources, the regularity and structure of these reports has changed over this period; annual
Section Three: Program Indicators
Program Planning

reporting reinitiated in AY 2016/17. The basic findings and curricular enhancements resulting from each are:

1. **2011 BA Assessment Geog. Table of Student Learning Outcomes for the BA Program.** Questions embedded in various classes were used to identify the need to enforce lower division prerequisites, especially for physical geography courses. Online quizzes via iLearn were used to reinforce key concepts. Geog 107 *World Regions and Interrelationships* was added as an alternative to Geog 102 *The Human Environment* in major core requirements. The senior seminar Geog 690 was being used as our GWAR class. Prerequisite issue identified in 621 *GIS for Environmental Analysis*, addressed by adding 103 (now 205) *Geographic Techniques* as a prerequisite, since not all students with 603 *Intro GIS* had completed its 103(205) prerequisite.

2. **2011 MA Assessment Geog. Table of Student Learning Outcomes for MA Geography.** Threshold GRE Analytical Writing (AW) score raised to 4.5; those below are directed to writing courses. Writing: 70-75% of samples in 801 were grammatical, succinct and well-punctuated; addressed by earlier interventions and directing students to additional writing classes. Review of progress of thesis proposal presentations is improving the quality of thesis planning, possibly resulting in improved graduation rates. Lack of mastery of methods (quantitative and qualitative) noted in many theses.

3. **2011 Resource Management & Environmental Planning (Concentration) Assessment.** Same table and conclusions as with MA above.

4. **2013 BA Assessment GeogEnvt.** Updates SLO table from 2011 with results through Fall 2013. Key findings and curricular changes:
   - (SLO 1B) Because of faculty retirements, there are fewer course offered under the GEOG 501+ level, these were the regional course offerings in the department. Students were required to take at least one course in the 501-599 (regional geography) series. Given the limited offering of regional courses compared to the past, the department redefined this distribution requirement as Human-Environment Interaction, an important subfield in our discipline reflected in the SLOs and covered well in our department, and we included courses that fit this broader definition into this distribution requirement.
   - (SLO 4) Students in GEOG 103 (now 205) were not prepared adequately for statistical analyses in this course. It was determined that Math 124: Probability & Statistics or the equivalent quantitative reasoning course should be implemented as a prerequisite for GEOG 103. This change was made to the major and went into effect in Fall 2013.
   - (SLO 2, GWAR, and capstone class). The department had been using GEOG 690 as our GWAR course (GWAR is the junior level writing class). Upon assessment, it was determined that this course could not work as both junior level GWAR and senior culminating experience course. A new course Geog 500, was created and approved to serve as the junior level GWAR course in Fall 2014. GEOG 690 once again became our culminating experience course. GEOG 500 was added to the BS, effective Fall 2014.
   - A proposal for a BS in Environmental Science initiated at this time, in part to reflect a new population of students taking AP Environmental Science in high school, but also to address relatively low enrollment in physical geography classes that fit well with the proposed degree.

5. **2013 MA Assessment. SLO table.**
   - Re-evaluated AW score on the GRE shows that 4.0 or better is sufficient. Threshold score on AW lowered to 4.0; those below directed to writing courses.
   - Re-evaluation of 897 *Research Project Formulation* in department meetings: Success of 897 not proven, as use of 896 *Directed Readings* and proposal presentations provides
the same benefit without the complexities of an 897 with all students. Also, many 897 assignments (lit review, etc.) are already covered in other classes. 897 not added to the MA requirement, though proposal presentations still required.

- Culminating Experience (895 Research Project/898 Thesis). Discussions among faculty individually and in department meetings about grad student methods preparedness for thesis research, and exit interviews in grad student defenses. Some students remain unprepared in quantitative or qualitative methods, often due to changing topics or committee midstream. Two-year cycling of qualitative and physical field methods makes this challenging. Need to discuss solutions to this at a department meeting, and consider ways of dealing with cycling of methods courses in the context of faculty teaching loads.

6. 2013 RMEP Assessment. Equivalent to above.


- Number of majors analysis for BS Environmental Science, approved in Fall 2015, so the first class of incoming students arrived in Fall 2016. Expected ~70 new BS ES majors, in reality was 60: 23 FTF, 7 FRSH, 5 SOPH, 25 JR, 10 SR.

- Bottleneck classes identified for BS + BA:
  - GEOG 160 Introduction to Environmental Science, with required lab, in core of BS ES and GE (B2 and B3): One lecture + 2 labs insufficient, would create bottleneck for BS students. Expanded to two lectures + 3 labs each, supported by HSS 383 lab but limiting its use for other classes. Can accommodate 148 students a semester, 296 a year, still largely GE.
  - GEOG 205 Geographic Techniques, required for BA Geography and BS ES: Limited to 23 per semester per section, now offer 2 sections to provide 46 per year. We may need to expand offerings to meet demand. Possibly considering evening and online offerings, but both are problematic for this class.
  - GEOG 500 GWAR (required for BA GEOG and BS ES students). Capacity of 1 section of 25 students/semester insufficient given number of majors. Expanded to 2 sections in Sp 2017 to provide for actual total enrollments of 37 (S16), 35 (F17), and 39 (S18).
  - GEOG 603 Intro to GIS: (required for BS ES, BS Environmental Studies NRMC, commonly taken by BA Geog students and students in other majors). Current capacity: 2 sections of 23 students each, in HSS 290. Insufficient to meet demand. We increased capacity by creating 2 separate lab sections of 20 each, with 1 lecture of 40. This may allow us to create 2 lectures of this size, thus doubling capacity, though this will create a scheduling conflict with other classes in HSS 290 and the need to expand GEOG 205 enrollment, described above. Actual enrollment with number of lecture sections: 33 (F15: 1), 32 (S16: 2), 35 (F16: 1), 27 (S17: 1), 30 (F17: 1), 42 (S18: 2), and is lumpy probably due to not having both a MW and TR option when only one lecture section is offered.
  - GEOG 690 Senior Seminar in Geography & Environmental Science: Current capacity 1 section of 25 students/semester, 50/year. Actual enrollment: 22 (F15), 23 (S16), 19 (F16), 23 (S17), 23 (F17), 30 (S18). Since this is a last-semester class, we will see greater pressure in coming years. While it can handle a bit more students than GWAR, we will probably need 3 sections a year (with 2 in spring) starting in AY 2018/19.
Concluding Action Memorandum (CAM) from 5th Cycle

The 5th Cycle Review focused on undergraduate programs, which in our case was our B.A. in Geography. The CAM (2002) from that review is available a separate document, but Table 1 lists all of the action plan items in that document and summarize the major changes the program has undertaken since, or as a result of, the review.

Table 1. 5th Cycle Concluding Action Memo (CAM) Action Items

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Changes the program has undertaken</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRICULUM</strong></td>
<td></td>
</tr>
<tr>
<td>1. Further develop the assessment plans for all degree programs, including not only content assessment but also methodologies for determining to what extent students are achieving learning outcome goals.</td>
<td>Assessment reports shows some of the findings and how we have incorporated these in changing the curriculum, however clearly identifying students' achievement of these learning goals remains elusive. The recent alumni survey however does show that students feel they were well prepared for their careers.</td>
</tr>
<tr>
<td>2. As resources permit, develop a graduate concentration in Geographic Information Science.</td>
<td>The M.S. in Geographic Information Science was created, with the first students accepted for Fall 2009.</td>
</tr>
<tr>
<td><strong>FACULTY</strong></td>
<td></td>
</tr>
<tr>
<td>3. Focus new faculty hiring on emerging disciplinary areas as well as those potentially weakened by impending retirements.</td>
<td>We added a faculty line in environmental science, hiring Leora Nanus in 2014 as a result of that new program.</td>
</tr>
<tr>
<td>4. Increase publications in peer-reviewed journals of articles generated from contract research activities.</td>
<td>Publications in peer-reviewed journals has increased in the department, though little has arisen from contract research activities.</td>
</tr>
<tr>
<td>5. Continue focusing on mentorship of junior faculty members with regard to professional development ideas and opportunities.</td>
<td>This has continued, and has been enhanced by moving to CoSE where junior faculty are given a lighter teaching load.</td>
</tr>
<tr>
<td><strong>STUDENTS</strong></td>
<td></td>
</tr>
<tr>
<td>6. Strengthen efforts to improve the diversity of students.</td>
<td>We have brainstormed ideas on this at faculty retreats, and efforts to reach out to local high schools with diverse populations via AP ES classes may help with this.</td>
</tr>
<tr>
<td><strong>RESOURCES</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 7. Work to expand the base of research funding. | Through a combination of funding generated by the IGISc and moving to CoSE, more departmental research funding is
<table>
<thead>
<tr>
<th>Section Three: Program Indicators</th>
<th>Program Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>available to supplement limited travel funding provided by Faculty Affairs. Additional CSU grant opportunities by COAST and WRPI has also helped.</td>
<td>8. Work with the Library to increase journal subscriptions in support of the graduate program. This has not worked, and in fact journal subscriptions have decreased across the board. However, at the same time, the Library has provided greater access to journals online via ScienceDirect, EBSCO, JSTOR, ResearchGate, university archives, and other networks as well an increase in open access journals.</td>
</tr>
<tr>
<td>9. Work with the College Dean to develop a plan for using the WTUs generated for thesis supervision to create release time for the faculty who earn the WTUs. WTU expectations have decreased in CoSE from 12 to 9 for research active faculty, and we have developed a plan for implementing thesis supervision. In the final version of the 6th cycle self study, we identified the need to grant faculty members a course release for each six completed theses they chair/each 12 on which they serve as a second reader, as possible within the context of department curricular needs.</td>
<td></td>
</tr>
<tr>
<td>10. As resources permit, continue to upgrade the hardware in the Geographic Analysis Teaching Lab. While this was done on a 3-year cycle in BSS as Instructional Equipment Requests, this cycle has increased to 4 or 5 years due to greater equipment longevity. In CoSE we now compete with many more equipment needs. We've supplemented this with IGISc funds from the CEL-based GIS Certificate Program, but this may not be a longterm solution.</td>
<td></td>
</tr>
<tr>
<td>11. As resources permit, continue to provide memory enhancements, software upgrades, and license renewals for the Geographic Analysis Teaching Lab. These are largely provided by the IGISc, and we've been able to maintain sufficiently high quality hardware to support department needs.</td>
<td></td>
</tr>
<tr>
<td>RESOURCE NEEDS (acknowledged by the Dean and Provost)</td>
<td></td>
</tr>
<tr>
<td>1. Year end and/or instructional equipment funding to upgrade the map library and field equipment. We have used a combination of instructional equipment requests and IGISc funds (where equipment also supports GIS Certificate Program courses) to maintain field equipment.</td>
<td>2. An increase in staffing for the Geographical Analysis Teaching Lab from 0.5 to 1.0. We were unsuccessful in doing this, so instead merged a 0.5 time Institute with the 0.5 time Department staff member.</td>
</tr>
<tr>
<td>3. The outfitting of a classroom in the north wing of HSS, adjacent to existing Geography facilities, with tables, wall maps, projection equipment, blackout shades and facilities for map use and storage. After the collapse of the College of BSS, we secured its former computer lab HSS 383 as a department controlled space, and now offer classes of up to 30 students in that space. We reconfigured the anterooms 383A and 383B as wet lab and storage spaces, achieving the goals identified.</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Student Learning and Achievement

This section will consider first the B.A. Geography, then the B.S. Environmental Science. Since the B.S. is new, we inevitably have much more data on the B.A. degree.

B.A. Geography

Program Learning Goals

*Upon completing the B.A. Geography, students will …*

1) ... understand key concepts and themes of physical and human geography and be able to apply them to real-world patterns and problems, having been prepared through lectures, group discussions, lab work and field trips.
2) ... be able to conceptualize a problem, conduct research, and assess findings using geographic concepts and techniques.
3) ... be able to communicate effectively, both orally and in writing, with peers and professionals in their focus area, and with the general public.

These outcomes can be achieved by completing the BA curriculum accompanied by, desirably, internship or similar training experience. The Department implemented Geog 500* The Physical & Human Dimensions of Climate Change (GWAR)* and reconfigured Geog 205 since last program review to enhance skills training in written communications and quantitative and geospatial methods.

*How many undergraduate majors and minors has your department graduated every year over the last five years?*

**Table 2. Number of Graduates and Time to Degree (* not provided yet)**

<table>
<thead>
<tr>
<th>College Year</th>
<th>Degrees Awarded</th>
<th>Average Time to Degree</th>
<th>Average Units Earned</th>
<th>Average GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>27</td>
<td>4.22</td>
<td>133.9</td>
<td>3.17</td>
</tr>
<tr>
<td>2009-10</td>
<td>32</td>
<td>3.96</td>
<td>129.59</td>
<td>3.13</td>
</tr>
<tr>
<td>2010-11</td>
<td>43</td>
<td>6.11</td>
<td>138.59</td>
<td>3.11</td>
</tr>
<tr>
<td>2011-12</td>
<td>45</td>
<td>5.48</td>
<td>141.66</td>
<td>2.98</td>
</tr>
<tr>
<td>2012-13</td>
<td>43</td>
<td>4.13</td>
<td>131.23</td>
<td>3.07</td>
</tr>
<tr>
<td>2013-14</td>
<td>50</td>
<td>4.06</td>
<td>134.41</td>
<td>3</td>
</tr>
<tr>
<td>2014-15</td>
<td>44</td>
<td>5.14</td>
<td>126.89</td>
<td>3.11</td>
</tr>
<tr>
<td>2015-16</td>
<td>40</td>
<td>5.18</td>
<td>132.33</td>
<td>3.17</td>
</tr>
<tr>
<td>2016-17</td>
<td>35</td>
<td>3.5</td>
<td>137.5</td>
<td>3.32</td>
</tr>
<tr>
<td>2017-18</td>
<td>41</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Average</td>
<td>40</td>
<td>4.6</td>
<td>134.01</td>
<td>3.12</td>
</tr>
</tbody>
</table>

Source: Average Time to Degree and Average GPA at Graduation (prepared by Institutional Research, 5/15/2017)

**Table 3. One-year retention rate**

<table>
<thead>
<tr>
<th>BA in Geography Entering Freshmen</th>
<th>One Year Retention Rate (Program)</th>
<th>One Year Retention Rate (College)</th>
<th>One Year Retention Rate (University)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>100.0</td>
<td>77.9</td>
<td>77.4</td>
</tr>
</tbody>
</table>
Section Three: Program Indicators
Student Learning and Achievement: B.A. Geography

<table>
<thead>
<tr>
<th>Year</th>
<th>Four Year Graduation Rates (Program)</th>
<th>Four Year Graduation Rates (College)</th>
<th>Four Year Graduation Rates (University)</th>
<th>Six Year Graduation Rates (Program)</th>
<th>Six Year Graduation Rates (College)</th>
<th>Six Year Graduation Rates (University)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>100.0</td>
<td>91.1</td>
<td>77.1</td>
<td>100.0</td>
<td>91.1</td>
<td>77.1</td>
</tr>
<tr>
<td>2007</td>
<td>92.3</td>
<td>78.1</td>
<td>74.9</td>
<td>92.3</td>
<td>78.1</td>
<td>74.9</td>
</tr>
<tr>
<td>2008</td>
<td>83.3</td>
<td>74.1</td>
<td>74.9</td>
<td>83.3</td>
<td>74.1</td>
<td>74.9</td>
</tr>
<tr>
<td>2009</td>
<td>100.0</td>
<td>79.4</td>
<td>76.7</td>
<td>100.0</td>
<td>79.4</td>
<td>76.7</td>
</tr>
<tr>
<td>2010</td>
<td>100.0</td>
<td>84.2</td>
<td>81.1</td>
<td>100.0</td>
<td>84.2</td>
<td>81.1</td>
</tr>
</tbody>
</table>

BA in Geography
CC Transfer
One Year Retention Rate (Program) | One Year Retention Rate (College) | One Year Retention Rate (University)
---|---|---
2005 | 75.0 | 84.2 | 86.1
2006 | 100.0 | 87.7 | 85.5
2007 | 76.9 | 83.8 | 84.1
2008 | 80.0 | 84.7 | 85.2
2009 | 95.8 | 87.8 | 87.1
2010 | 84.6 | 89.5 | 87.6

What are the four-year and six-year graduation rates of students in the program (compare to college and university rates)?

At SFSU, graduation rates are probably best compared by looking at the six-year rate, especially for students who start at SFSU; the four-year graduation rate varies significantly from year to year, especially for students who start here. The six-year graduation rate for the department for either students starting at SFSU or CC transfers is mostly higher than the college and university, and has improved somewhat at least for CC transfers.

Table 4: Graduation Rates

<table>
<thead>
<tr>
<th>BA in Geography Entering Freshmen</th>
<th>Four Year Graduation Rates (Program)</th>
<th>Four Year Graduation Rates (College)</th>
<th>Four Year Graduation Rates (University)</th>
<th>Six Year Graduation Rates (Program)</th>
<th>Six Year Graduation Rates (College)</th>
<th>Six Year Graduation Rates (University)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>0.0</td>
<td>9.3</td>
<td>12.0</td>
<td>71.4</td>
<td>41.1</td>
<td>46.4</td>
</tr>
<tr>
<td>2006</td>
<td>42.9</td>
<td>13.2</td>
<td>13.4</td>
<td>100</td>
<td>42.9</td>
<td>47.3</td>
</tr>
<tr>
<td>2007</td>
<td>23.1</td>
<td>9.3</td>
<td>12.7</td>
<td>76.9</td>
<td>46.3</td>
<td>35.5</td>
</tr>
<tr>
<td>2008</td>
<td>33.3</td>
<td>9.5</td>
<td>14.9</td>
<td>58.3</td>
<td>45.8</td>
<td>49.7</td>
</tr>
<tr>
<td>2009</td>
<td>27.8</td>
<td>12.3</td>
<td>18.3</td>
<td>72.2</td>
<td>49.4</td>
<td>51.2</td>
</tr>
<tr>
<td>2010</td>
<td>21.1</td>
<td>9.5</td>
<td>18.0</td>
<td>78.9</td>
<td>51.5</td>
<td>53.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BA in Geography CC Transfers</th>
<th>Four Year Graduation Rates (Program)</th>
<th>Four Year Graduation Rates (College)</th>
<th>Four Year Graduation Rates (University)</th>
<th>Six Year Graduation Rates (Program)</th>
<th>Six Year Graduation Rates (College)</th>
<th>Six Year Graduation Rates (University)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>62.5</td>
<td>64.2</td>
<td>69.0</td>
<td>62.5</td>
<td>70.7</td>
<td>74.5</td>
</tr>
<tr>
<td>2006</td>
<td>75.0</td>
<td>67.2</td>
<td>68.8</td>
<td>75.0</td>
<td>75.9</td>
<td>74.2</td>
</tr>
<tr>
<td>2007</td>
<td>53.8</td>
<td>66.2</td>
<td>69.0</td>
<td>76.9</td>
<td>72.6</td>
<td>74.3</td>
</tr>
<tr>
<td>2008</td>
<td>80.0</td>
<td>62.8</td>
<td>70.0</td>
<td>86.7</td>
<td>66.7</td>
<td>74.3</td>
</tr>
<tr>
<td>2009</td>
<td>75.0</td>
<td>66.0</td>
<td>72.3</td>
<td>83.3</td>
<td>73.2</td>
<td>76.5</td>
</tr>
<tr>
<td>2010</td>
<td>69.2</td>
<td>69.9</td>
<td>74.7</td>
<td>84.6</td>
<td>75.6</td>
<td>77.9</td>
</tr>
</tbody>
</table>
B.S. Environmental Science

The B.S. Environmental Science (BSES) degree is a new degree program in the Department of Geography & Environment, having started in Fall 2015. It was developed to ensure a rigorous environmental science degree that meets the standards of academic excellence and alignment with University’s educational goals, and to meet hiring demands of environmental professionals. The degree also aligns with high school and community college Environmental Science programs, and is attracting new students to our department and at an earlier point in their academic career. A unique strength of this program compared to many environmental science programs is in geospatial analytical methods at the introductory and advanced levels.

By the end of the second year (Spring 2017), the degree had 65 students enrolled. The gender balance among these students was very even with 33 females and 32 males. Under-represented minority students (URM) made up 28% of majors, which is significantly lower than the college and university levels (36%) for the same period. By the end of the third year (Spring 2018), the degree had 107 students enrolled, with gender balance of 57 females and 50 males; under-represented minority students (URM) made up 37% of majors, which is lower than the college and university levels of 39%. Therefore, with a robust growth of majors and possibly with our outreach programs, the BS ES major at least has brought our student diversity -- at least in terms of URM% -- more in line with the college and university as a whole. URM% is considered further in the reflections discussion below which looks at the undergraduate majors together.

The overarching Program Learning Objectives (PLO) for the BSES are broken into four areas, the first two related to areas of knowledge and the second two related to methods and skills. Students completing the degree will...

1. ... understand advanced concepts in a set of environmental science specialties selected from atmospheric systems, hydrology, earth surface processes, soils, water quality, and biotic systems, and will be able to relate these systems to one another and to human activities. They will understand the science behind water, soil and air quality, as well as the causes and effects of climate change. They will be able to trace and explain impacts of human activities on the natural world and their influence upon the sustainability of human activities and natural processes on our planet.

2. ... understand concepts of human-environment relations, including resource management, conservation & restoration, and environmental perception, sustainability & justice. Students will know how to apply environmental science principles and analytical methods to environmental management problems, and will be able to interpret these systems in reports to environmental management agencies, such as government agencies, environmental consulting firms or environmental NGOs.

3. ... be able to apply advanced field and geographic information science (GIS and remote sensing from satellite and aerial imagery) methods to research environmental systems, such as land cover change, invasive species, soil and stream channel erosion and sedimentation, watersheds, water quality, coastal and marine processes, or bioclimatic systems. They will be equipped with the mathematical (calculus and statistics) and scientific methods to effectively analyze environmental systems.
Section Three: Program Indicators
Student Learning and Achievement: B.S. Environmental Science

4. ... be able to develop an effective research design applying field, geospatial, and quantitative methods to an environmental science or management research question and to critically evaluate the results, in light of existing theory or observations.

A survey of senior students in the program taken in February 2018 revealed that students felt the learning objectives were being well met by the program. Two aspects of the learning objectives that students felt could be better met were field techniques and GIS. The former probably arises because the main field technique course (Geog602/702) is only offered once every two years and only takes 16 students. This means transfer students may miss it altogether as a possibility or, at least, it can be difficult to schedule. Particularly with the rapidly increasing numbers of students this program attracts, it may be necessary to increase this course offering to once per year. For the GIS classes, students requested both for GIS tutoring to be offered as well as increasing access to programming and cartographic classes.

These program learning objectives were only recently developed and so their ongoing relevance has not been reassessed. However, a recent survey we undertook of Environmental Professionals about the types of skills and educational development demanded by Government, Non-profit and Consulting entities, and these closely reflect the objectives we originally developed for this program. However, field techniques in measurement and monitoring and GIS skills were seen as most highly important to this population and these are skillsets identified by students as needing greater emphasis in the program.

Student numbers in the BSES have increased rapidly since the program began, from 5 to 107 students over the first three years. Since we are still in the early stages, it is difficult to know when the rise in student numbers will stabilize and what the ongoing demand will be that we will need to meet. Due to uncertainty in this growth, we are not in a position to identify changing student needs or how we might change the program to improve student progress, achievement and graduation rates. Although we don’t currently have ‘bottleneck’ classes by definition that might slow a student’s progress to graduation, in the following section, we identify the courses most likely to need attention to ensure available seats for timely graduation.
Reflection on Program Goals: B.A. Geography and B.S. Environmental Science

What evidence does it regularly seek and consult to assure that students are meeting these goals?

Other than reviewing student evaluations, there are three key junctures in a student's progress through both the B.A. Geography and the B.S. Environmental Science. These start with a required methods class generally taken the second or third year of the program (GEOG 205), after they've at least completed GEOG 101 Our Physical Environment as well as GE requirements such as Quantitative Reasoning. In 205, students learn how to put together a research design and analyze data statistically and graphically. The next point, taken typically in the third year is the "writing in the discipline" GWAR class GEOG 500 where students focus on writing skills, using the physical and human dimensions of climate change as a general topic. Finally, during their last semester, students take our capstone class GEOG 690 Senior Seminar in Geography & Environmental Science, where they may complete a short thesis and learn more about planning their careers; an alumni panel has long been used to facilitate the networking increasingly needed in launching successful careers. In 690, we've instituted a survey to gather more information on what students have achieved. We are initiating ePortfolios starting in GEOG 205 and carrying through the program.

Where and how does the program advance high-impact teaching practices and active learning at all levels of instruction? (What are these practices, and what is their impact?)

Some high-impact teaching practices we've explored include early versions of a "first year experience," which in our case has been addressed with field trips in GEOG 101 and 160. We've learned how to create a valuable field experience even with large numbers of GE students. The field experience is then embedded throughout our program and as noted above is one of the most profound parts of many of our students' experience at SFSU. We have also linked many of these with pathways to jobs, exemplified by the highly successful National Parks Service internship program, though our students gain internship experience in many agencies in the Bay Area.

Collaborative assignments and projects form the culmination of many of our upper division courses, and in these students learn how to develop research projects as a team. Team-based projects turns out to be a key mode of many employers, most notably in Silicon Valley where many of our graduates end up working.

A growing number of our students take advantage of study-abroad programs, with good opportunities in Europe, Africa and Asia. We are fortunate that geography and environmental science education is on the rise internationally, and hear back from students who've gained great life and educational experiences. We have long attracted former Peace Corps volunteers, and our program provides a good fit.
Reflect:

How has student demand for the major risen or fallen? Are there any significant trends or present or future challenges that can be discerned from enrollment patterns?

While student numbers have decreased somewhat at the university in the last few years, our majors have remained strong, and based on majors we should see a significant growth overall when looking at the B.S. Environmental Science numbers (see Figures 5 and 6). For a longer perspective (Figure 7), the dip in Geography majors in the last few years is seen to follow a major increase and then peak of majors graduating in 2014. We have no long-term trends yet in Environmental Science as the first real class started in Fall 2016. We can also see in Figure 8 an increase in the percentage of under-represented minorities (URM) over the last 10 years in the BA Geography, though relatively flat the last 6 years and remaining lower (29% in Spring 2018) than the college and university as a whole (39%); the URM% of the BS Environmental Science is closer at 37%.

Figure 5. BA Geography enrollment by student level F2017 and trend through S2018. https://air.sfsu.edu/enrollment_reports.

Figure 6. BS ES enrollment by student level F2017 and trend through S2018. https://air.sfsu.edu/enrollment_reports.
Figure 7. Graduations
Figure 8. Under-Represented Minority % in the BA Geography and BS Environmental Science, as compared with the college and university.
Over the past five years, where has the program been able to improve student progress, achievement, and graduation? Where might it further improve them? What questions do the rates and trends in student enrollment, retention, and graduation raise for your program? How does the program interpret them?

Retention and graduation rates are above the college average, with the exception of transfers for Geography, where increasingly students are transferring in as B.S. Environmental Science majors, owing to trends in that direction related to both A.P. Environmental Science and community college ES programs on the rise.

How do your program’s current pedagogical practices meet students’ learning needs? How does your program support pedagogical innovation? How will the program ensure that its learning goals remain relevant to students’ real needs and levels of achievement?

Geography and environmental science depend a great on visual representations, with cartographic representation one of the key foundations in geography, so use of graphics, maps and imagery benefit greatly from presentation tools that support such, such as PowerPoint and web mapping. It’s not surprising that the founder of SFSU’s audiovisual center, Anna Dorris, came from our department. As maps have increasingly moved to digital forms, our classes have followed suit, with many classes employing web maps such as ArcGIS Online and Google Earth as part of instruction. These are followed up in our geographic information science classes, requiring instructors to incorporate not only theoretical discussion which require maps, imagery and graphics to communicate concepts, but also real-time demonstration of software methods. The right balance of theory and demonstration in these classes requires continuously updating instructional methods.

In a similar way, field experience is critical to our discipline, and instructors, requiring instructors to consider pedagogy in a field setting, and our alumni have noted the critical importance of this to their education. The field experience our students gain ranges from observation and interpretation of landscapes to application of research sampling methods and field experiments. Frequently these field research efforts are tied to faculty research, and the quality assurance required for successful publication provides not only a measure of student learning success, but is also exactly what students need to learn to be successful in their careers.

Finally, all of our classes require attention to student success, and we are following the university goals of ensuring that all classes have clearly identified student learning outcome statements. Faculty can take advantage of other university programs such as Center for Equity and Excellence in Teaching & Learning (CEETL) for advice on restructuring, novel ways to assess student learning outcomes, and supporting students with special needs. The Disability Programs and Resource Center (DPRC) is also a resource for the latter, and faculty are learning how to take advantage of their resources as well as meeting their requirements. Academic Technology is also a great resource for improving assessment of student learning, materials more engaging and accessible. We encourage all faculty to take advantage of these resources.
Section Three: Program Indicators
The Curriculum

3.3 The Curriculum

This section covers general education, our undergraduate degree programs and our graduate degree programs.

General Education

*Table 5: General Education Courses in the program*

<table>
<thead>
<tr>
<th>What courses does the program offer in the general education curriculum?</th>
<th>Why were these courses chosen for GE by the department?</th>
<th>How does the program assess their effectiveness?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD-B1 Physical Science</td>
<td>101 Our Physical Environment</td>
<td>As disciplines, geography and environmental science both span across natural and social sciences, and thus our courses fit well in various areas of GE B and D areas.</td>
</tr>
<tr>
<td>LD-B2 Life Science</td>
<td>160 Intro Environmental Science</td>
<td>We use Student Evaluations. In addition to the standard 6 Likert-scale questions provided by the university, we also include 5 open-ended questions that help us gain insight into the effectiveness of GE requirements in the class: 1. Which readings and assignments contributed most to your learning? 2. If applicable, what did you like or dislike about the use of online learning tools in this class? 3. What did the instructor do especially well? 4. What can be done to improve the course and its instructor? 4. What have been the most significant ideas, concepts or skills that you have gained from this course?</td>
</tr>
<tr>
<td>LD-B3 Laboratory</td>
<td>160L</td>
<td></td>
</tr>
<tr>
<td>LD-B4 Quantitative Reasoning</td>
<td>203 Geographic Measurement</td>
<td></td>
</tr>
<tr>
<td>LD-D1 Social Sciences</td>
<td>102 The Human Environment 107 World Regions &amp; Interrelationships</td>
<td></td>
</tr>
<tr>
<td>UD-B</td>
<td>301 Bay Area Environments, 651 Bay Area Environmental Issues</td>
<td></td>
</tr>
<tr>
<td>UD-D</td>
<td>421 Future Environments, 445 Geopolitics, 552 Geog of CA, 600 Env Probs &amp; Sol</td>
<td></td>
</tr>
<tr>
<td>SF State Studies</td>
<td></td>
<td>The SF State Studies are required of all students including our majors, with nearly all including significant environmental sustainability and global perspective foci, and several focusing on social justice.</td>
</tr>
<tr>
<td>Am. Ethnic &amp; Racial Minorities</td>
<td>455, 552</td>
<td></td>
</tr>
<tr>
<td>Environmental Sustainability</td>
<td>101, 102, 107, 160, 301, 421, 427, 430, 432, 552, 600, 651, 666, 667</td>
<td></td>
</tr>
<tr>
<td>Global Perspectives</td>
<td>102, 107, 160, 421, 427, 430, 432, 600, 667</td>
<td></td>
</tr>
<tr>
<td>Social Justice</td>
<td>421, 430, 455, 552, 667</td>
<td></td>
</tr>
</tbody>
</table>
B.A. Geography

Curriculum Map

(Source: Bachelor of Arts in Geography Advising Sheet (for students assigned Bulletin Year 2015-2016 or later. Revised July 2015) *)

Core Courses = 15 Units

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Unit</th>
<th>Semester Taken</th>
<th>Grade</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 101 The Physical Environment</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geog 102 The Human Environment or Geog 107 World Regions and Interrelations</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geog 205 Geographic Techniques</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geog 500 Physical &amp; Human Dimensions of Climate Change GWAR</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geog 690 Senior Seminar in Geography &amp; Environmental Science</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distribution Requirement = 12---15 Units

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Units</th>
<th>Semester Taken</th>
<th>Grade</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Environment 302-399</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Environment 401-499</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human-Environment Interaction in a Regional Context (550, 552, 575, 646, 647, 648, or 651)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographic Techniques or Applied 601 to 668</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Guided Electives = 12 units on advisement

- Human Geography (any combination of 400-level courses)
- Environmental Studies (GEOG 600 req. GEOG 316, 317, 342, 421, 422, 427, 642, 644, 647, 651, 657, 666, 667, 668)
- Physical Environment (GEOG 312, 313, 314, 316, 317, 342; supporting courses GEOG 602, 642, 644, 647, 657)
Section Three: Program Indicators
The Curriculum: B.A. Geography

- Resource Management (GEOG 317, 425, 427, 600, 602, 610, 611, 642, 644, 647, 648, 657, 666)
- Techniques of Geographic Analysis (GEOG 601, 602, 603, 606, 610, 611, 620, 621, 625, 629)
- Focused individual interest: ________________________________

Total for GEOG Major: 39-42 units

Identify how often, when (both in the semester and in the weekly time schedule), and where required courses are offered, including GWAR courses, noting enrollments for the past three years (in matrix form)

Table 6: Identify how often, when, and where required courses are offered, including GWAR courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>How often?</th>
<th>When (Sem)?</th>
<th>When (wkly)?</th>
<th>Where?</th>
<th>Enrollments last 3 yrs</th>
</tr>
</thead>
</table>
| 101    | Every semester + Sum since '16 | Fall, Spr, Sum | MWF, TR, 1/wk | HSS 278 and LLH | 16-17: 401 total (7 sections)
15-16: 562 total (7 sections)
14-15: 393 total (6 sections) |
| 102    | Every semester + Sum since '16 | Fall, Spr, Sum | MW, TR | HSS 278 | 16-17: 219 total (5 sections)
15-16: 299 total (5 sections)
14-15: 322 total (4 sections) |
| 107    | Every semester | Fall, Spr | MW or TR | HSS 278 | 16-17: 64 total (2 sections)
15-16: 161 total (4 sections)
14-15: 181 total (4 sections) |
| 205    | Every semester | Fall, Spr | MW and TR | HSS 290 | 16-17: 86 total (6 sections)
15-16: 136 total (8 sections)
14-15: 114 total (3 sections) |
| 203 in 14-15 | | | | |
| 500    | Every semester (began Spr 15) | Fall, Spr | MW and TR | HSS 287 | 16-17: 43 total (3 sections)
15-16: 37 total (2 sections)
14-15: 10 total (1 section) |
| 690    | Every semester | Fall, Spr | MW or TR | HSS 287 | 16-17: 41 total (2 sections) |
| 690GWAR | Every semester | Fall, Spr | M or W | HSS 287 | 15-16: 43 total (2 sections)
14-15: 54 total (3 sections) |
Section Three: Program Indicators
The Curriculum: B.A. Geography

Identify courses that your program regularly offers that are required by other majors (service courses): who teaches these, how often are these taught, and what is their enrollment?

**Table 7: Identify courses that your program regularly offers that are required by other majors.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Who teaches these?</th>
<th>How often taught?</th>
<th>Enrollment #?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 603 (for Environmental Studies)</td>
<td>Liu, Hines, Clark (lect)</td>
<td>2 sections/semester</td>
<td>20-30/semester</td>
</tr>
<tr>
<td>Geog 658 cross listed &amp; req. by URBS</td>
<td>Co-taught Switch off with URBS?</td>
<td>1 section/semester</td>
<td>20-30/semester</td>
</tr>
</tbody>
</table>

Identify courses that are required in your program but are offered by other departments: who teaches these, how often are these taught, and what is their enrollment? How are your students’ needs communicated to the departments who teach the courses?

**Table 8: Identify courses that are required in your program but are offered by other departments.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Who teaches these?</th>
<th>How often taught?</th>
<th>Enrollment #?</th>
<th>How are our students’ needs communicated to the depts that teach these courses?</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identify bottleneck courses (courses required for graduation that regularly attract more students than can be enrolled), describe why they have become bottlenecks for students and describe the program’s strategies for reducing them.

**Table 9: Identify bottleneck courses (courses required for graduation that regularly attract more students than can be enrolled).**

<table>
<thead>
<tr>
<th>Course</th>
<th>Program’s strategy to reduce bottleneck courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>205</td>
<td>This course is growing (F14 31, S15 31, F15 33, S16 38, F16 35, S17 37, F17 41, S18 42) and could become a bottleneck. Currently we offer 2 sections each semester with a limit of 21 students each. We will either need to add more sections or restructure the class to handle more students.</td>
</tr>
<tr>
<td>500</td>
<td>This GWAR course is growing (F15 18, S16 20, F16 16, S17 37, F17 35, S18 39) and could become a bottleneck in the future. Starting in S17 we went from 1 to 2 sections, so we’re fine for now given the 25-student cap required for GWAR classes.</td>
</tr>
<tr>
<td>690</td>
<td>This course is growing (F15 23, S16 21, F16 19, S17 23, F17 23, S18 30) and could become a bottleneck. We will either need to add more sections or redesign the class a bit to handle more enrollment. We can probably go as high as 38, so we may be ok.</td>
</tr>
</tbody>
</table>
Identify efforts to ease the transition of transfer students through articulated courses, Intersegmental, or Transfer Model Curricula (TMCs) – Obtain from Articulation Officer.

The Chair receives fairly regular communication from the Articulation Officer on courses requested for articulation by community colleges, and evaluates these requests, approving those appropriate for our major. In recent years, transfer model curricula (TMCs) in Geography and Environmental Science have been developed, and these make it easier than the bilateral articulation agreements in providing a more blanket approach.

**Table 10: Articulated and Transfer Model Curricula**

<table>
<thead>
<tr>
<th>Articulated courses</th>
<th>Intersegmental</th>
<th>Transfer Model Curricula (TMCs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>101, 102, 107, 160</td>
<td></td>
<td>Geography</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Science</td>
</tr>
</tbody>
</table>

Identify where in the major students receive instruction in technology appropriate to the major and how their learning is assessed:

Technology is a critical part of geography and environmental science. In GEOG 205, all students are introduced to quantitative and geospatial research methods, including an introduction to GIS. Most majors also take 603, Intro to GIS, as their methodological distribution requirement.

**Reflection:**

*How does the program take General Education into account in its curricular planning and development?*

When the university revised its general-education program, we carefully considered which courses were still appropriate for this, and some course became majors-only classes. This process is not complete, as additional tweaks are needed to get the mix right.

*How do GE courses in the program reach out to non-majors and frame disciplinary methods and knowledge within broader educational contexts? Do they succeed?*

Non-majors in their sophomore or junior year are a major source of Geography majors, and that has been true for many years. This is especially true in the US where quite frankly geographic education in the high schools is very poor, with few students considering advanced study in this field. When they are exposed to the reality of our discipline in college, with good careers, they are often attracted.

*How does the curriculum (both GE and in the major) reflect current and future directions in the discipline?*

By faculty staying current and going to national and international meetings.

*In developing each semester’s schedule, how does the program align course offerings with student need? How does the program attempt to avoid bottlenecks and advance student degree progress? Does it balance core requirements with elective courses, and are these evenly distributed among faculty in the*
program? How does the program assure that required courses are offered frequently enough, and in spaces and times that meet student demand?

The department chair works with faculty and lecturers to organize the course offerings on a regular schedule known in advance to students. In recent years the chair has sought to standardize the portfolio of courses taught by each faculty member so that each one has a balance of lower- and upper-division GE, major elective, and graduate courses.

How does the program plan the curriculum with the faculty as a whole? How are decisions about curriculum made? Do all faculty have the opportunity to review and respond to courses that may not be in their area of expertise, but are part of the curriculum as a whole? How is this feedback taken into account in the curricular development process?

We have a curriculum committee made up of faculty volunteers. The Committee meets periodically to review faculty requests for new or revised courses, as well as changes from the college or university. The Committee generally brings recommendations to the full faculty for approval.

How does the program’s GWAR courses address how writing is done in the field? Has student writing improved as a result of GWAR courses?

Our department’s GWAR course faces the peculiar challenge of bridging natural and social sciences, as well as diverse techniques. GEOG 500 introduces students to a variety of forms of geographical writing all around the theme of climate change.

How does the program make it possible for transfer students to enter upper division coursework without burdening them with excessive pre-requisites?

Many of our upper division courses have no prerequisites other than English 214, so even if a student comes late to the department with no prerequisites, they can begin taking courses immediately. Both GEOG 101 and 102 are readily available at area community colleges, so if a student comes in with those completed, there is only one more course, 205, that is required before most of the Physical geography and GIS and remote sensing courses.

How can the student experience in the degree program(s) be improved?

In the GEOG 690 exit survey Feb 2018, several messages were detected. Courses, experiences, skillsets, or resources students wished for:

- Field work experience/opportunities (x3)
- Field equipment (x3)
- Tutoring for GIS and RS
- Visits from professionals
- Printing (printers in the dept?)
- Hands-on experience with materials we were studying
- Courses: Cartography, field methods, more chemistry, more classes on plants, more ecology/biology experience, more on business side of environmental science (natural commodities trading, energy industry mgmt.)
B.S. Environmental Science

The curriculum for the BSES was developed by the Curriculum Committee in the Dept. of Geography & Environment and in consultation with Chairs of the Departments of Biology, Mathematics, Physics & Astronomy, and Chemistry & Biochemistry, who all provide important lower division foundational courses for the program. The curriculum comprises a core providing a foundation of science and methods courses -- introductory earth systems and environmental science, biology, chemistry, physics and mathematics -- as well as distributed electives in environmental science, environmental management and analytical methods, culminating in a capstone seminar where students pursue a senior thesis or internship. Figure 9 shows the expected path of undergraduate students in the BSES program. This curriculum reflects current foci in the discipline, especially the combination of environmental science knowledge, environmental management and policy, as well as methods to assess environmental health and change. The Geography & Environment courses have been taught by twelve of the thirteen faculty in the department as well as eleven lecturers over the past three years (Table 8).

Figure 9. Diagram showing the course requirements, flow of degree acquirement, including approximate breakdown of the four-year degree completion.

Required courses for this program, as well as their instructors, scheduling and enrollment are presented in Table 11 (Department of Geography & Environment courses) and Table 12 (courses taught in other departments).

Table 11. Identify how often, when and where required courses are offered and enrollment in last 3 years.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Who teaches these?</th>
<th>How often are they taught?</th>
<th>What is their enrollment?</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog101</td>
<td>Blesius, Creed, Maher, Oliphant, Smulyan</td>
<td>Every semester (3 Sections)</td>
<td>Average 249 per semester, STD = 38</td>
<td>HSS278, HSS130, HSS135, Sci 210</td>
</tr>
</tbody>
</table>
In developing the BSES degree, we identified several classes that could produce bottlenecks for students and preemptively increased their offerings, including doubling Geog160, which is a required course and also a popular GE class, and adding a second section of the GWAR class, which can only seat 20 students. Looking ahead, Table 13 identifies the courses that are most likely to produce bottlenecks in the future if we assume a continued rise in BSES students. Currently, we find no major obstacles to graduation for BSES students. Transfer students are usually able to complete most of their lower division requirements at community college and transition into our upper division. The GWAR class for this program was designed and developed from scratch specifically as a GWAR class that focuses on the writing styles of Geography and Environmental Science including, scientific reporting, social science writing styles and
the writing of government planning and policy. This class was developed in parallel with the
development of the BSES, so it is highly relevant to developing effective writing in the field. The
culminating experience class focuses on preparing students to enter the workforce or graduate
programs in Environmental Science as well as Geography. It includes networking with alumni, and other
relevant career-oriented topics.

One area needing some work is learning more about transfer pathways. In contrast to Geography,
Environmental Science is a recent discipline and there is less consistency in what students have taken in
their programs. We are using the Transfer Model Curriculum recently developed for Environmental
Science to help move this process along, however this is a fluid area with new programs appearing at
community colleges and 4-year colleges.

Table 13. Identify bottleneck courses (courses required for graduation that regularly attract more
students than can be enrolled). The courses listed are not currently bottleneck courses by this definition,
but those deemed most likely to meet this criterion in future, along with recommended response.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Program response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 160</td>
<td>Currently close to capacity. Consider restricting to majors? Or use larger lecture halls with only majors taking lab portion.</td>
</tr>
<tr>
<td>Geog 205</td>
<td>This course is growing (F14 31, S15 31, F15 33, S16 38, F16 35, S17 37, F17 41, S18 42) and could become a bottleneck. Currently we offer 2 sections each semester with a limit of 21 students each. We will either need to add more sections or restructure the class to handle more students.</td>
</tr>
<tr>
<td>Geog 500</td>
<td>This GWAR course is growing (F15 18, S16 20, F16 16, S17 37, F17 35, S18 39) and could become a bottleneck in the future. Starting in S17 we went from 1 to 2 sections, so we're fine for now given the 25-student cap required for GWAR classes.</td>
</tr>
<tr>
<td>Geog 603</td>
<td>Also close to capacity, could include larger lecture e.g. 78 students with 3 lab sections, need GTAs.</td>
</tr>
<tr>
<td>Geog 690</td>
<td>This course is growing (F15 23, S16 21, F16 19, S17 23, F17 23, S18 30) and could become a bottleneck. We will either need to add more sections or redesign the class a bit to handle more enrollment. We can probably go as high as 38, so we may be ok.</td>
</tr>
</tbody>
</table>

Describe the culminating experience requirements for undergraduate majors in your program

As students advance through either the BA Geography or BS Environmental Science major, the
department exposes them to a variety of post-college options and opportunities. Geography &
Environment majors are required to take the 690 Senior Seminar in Geography & Environmental Science,
usually during one of their final two semesters. This course itself forms much of students’ culminating
experience. Students prepare a resume, meet with department alumni, learn about graduate school,
and write a research proposal. Many majors also complete internships with public, non-profit, and for-
profit organizations or get involved with faculty research; these frequently include parks (with a major
NPS internship program), local governmental agencies such as planning departments, local
environmental NGOs, and mapping needs at technology firms such as Apple. A few students also gain
insight into college teaching through Geog 685, Geography Teaching Experience.
Graduate Programs

The Department of Geography & Environment has three graduate programs:

- The M.A. in Geography was established in 1966.
- A Concentration in Resource Management and Environmental Planning was established in 1988.
- The M.S. in Geographic Information Science was established in 2009.

M.A. Geography

Current goals and objectives

The Geography MA taps the multidisciplinary social science, physical, and techniques curriculum of the Geography Department and is both seminar-based and research project (thesis)-based.

Mission Statement from 6th Cycle Review:

MA Students develop a **depth** of understanding in the concepts and theories, and the skills within the discipline of Geography and will have been afforded the opportunity to prepare for a career or further academic work following graduation.

There are three broad program learning goals for students in the MA. Students completing the degree will...

1) ... demonstrate competence in understanding and critically evaluating geographic and related information and literature.

2) ... design and complete an effective graduate level thesis or research project, demonstrating mastery in qualitative or quantitative analysis of a geographic research question.

3) ... be able to communicate effectively with peers and professionals within their field, exhibiting strong analytical writing, visual, and oral presentation skills.
MA Geography Curriculum
Minimum 30-units

- **Prerequisites**: Entering students without previous work in geography are required to take prerequisite courses in physical and human geography, as well as geographic techniques, plus two upper-division courses selected on advisement.

- **Required courses (12-13 units)**
  - Geog 801:Scope and Method in Geography (3-units)
  - One Methods course (3-units)
    - 701: Field methods, human
    - 702: Field methods, physical
    - 705: Geographical Analysis
  - One Physical Geography Seminar (810)
  - One Human Geography Seminar (820)

- **Seminars (6-12 units)**
  - 810 (of different topic than taken as required)
  - 815: GIsScience
  - 820 (of different topic than taken as required)
  - 832: Urban Geography
  - 858: Transportation, Land Use, Environment

- **Thesis courses (6-9 units)**
  - 895: Research Project OR
  - 898: Thesis

- **Thesis/research project requirements**
  - Research Proposal: Present to faculty and peers within a semester of filing the Proposal for Culminating Experience.
  - Master’s Oral Examination: 2-hours
    - Oral presentation of research
    - 895 only: Discussion of 6 foundation works in the discipline selected on individual advisement.
M.A. Geography: Concentration in Resource Management & Environmental Planning

There are three broad program learning goals for students in the Concentration in Resource Management & Environmental Planning. Students completing the degree will...

1. ... demonstrate competence in understanding and critically evaluating geographic and related information and literature.
2. ... design and complete an effective graduate level thesis or research project, demonstrating mastery in qualitative or quantitative analysis of a resource management and environmental planning research question.
3. ... be able to communicate effectively with peers and professionals within their field, exhibiting strong analytical writing, visual, and oral presentation skills.

These outcomes are met throughout the core graduate course curriculum, particularly in core seminars including Geography 801 Scope and Method, Geography 751 Environmental Management, Geography 810 Seminar in Physical Geography, and Geography 820 Seminar in Human and Social Geography and the Geography Methods Seminar. The RMEP concentration curriculum explicitly encourages cross-disciplinary work.
RMEP Curriculum

Minimum 30-units of classes for MA Geography, RMEP*

- **Required courses (15-16 units)**
  - GEOG 751: Environmental Management (3 units, Fall)
  - GEOG 801: Scope and Method in Geography (3 units, Fall)
  - GEOG 810: Seminar in Physical Geography (3 units, Fall and Spring)
  - GEOG 820: Seminar in Human and Social Geography (3 units, Fall and Spring)
  - GEOG Methods Seminar (3-4 units)
    - GEOG 701: Field methods in Human Geography (3 units)
    - GEOG 702: Field methods in Physical Geography (4 units, Fall)
    - GEOG 705: Geographical Analysis (3 units, Spring)

Q: Are required core courses being offered often enough to meet student demand?

- **Additional Graduate Courses (3-7 units)**
  - GEOG 815: GIScience (3 units)
  - GEOG 858: Environmental and Land Use Planning (3 units)
  - GEOG 896 Directed Reading in Geography (3 units)
  - IR/GEOG 735 Global Environmental Policy (3 units)
  - BUS 857: Business Management, Ecology, and Environ. Leadership (3 units)

Q: Updates to this list? ie. GEOG 857

- **Additional Graduate Seminars or Upper Division Courses (4-9 units)**
  - Category 1: RMEP
    - GEOG 422; GEOG 427; GEOG 430; GEOG 644; GEOG 646; GEOG 647; GEOG 652; GEOG 658; ECON 550
    Q: updates to this list ie. GEOG 342?
  - Category 2: Techniques
    - GEOG 702; GEOG 610; GEOG 711; GEOG 720; GEOG 721; GEOG 642; GEOG 644; GEOG 657; GEOG 705
    Q: updates to this list ie. GEOG 785?

- **Culminating Experience (33 units)**
  - GEOG 895: Research Project
  - GEOG 898: Thesis Project

- **Thesis requirements**
  - Master’s Oral Examination: 2-hours
  - Research Proposal: Present to faculty and peers

*From SFSU Bulletin
M.S. Geographic Information Science

The following is based on the proposal approved in 2010 by the Academic Senate:

Program Mission: Each graduate of the MS Program in GIScience will develop a depth of understanding in the concepts and theories, and the skills within the discipline of Geographic Information Science and will have been afforded the opportunity to prepare for a career or further academic work following graduation.

Table 14. Program Learning Objectives, MS GISci.

<table>
<thead>
<tr>
<th>Program Learning Objectives</th>
<th>Place in curriculum</th>
<th>Assessment procedures/Methods/strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>... demonstrate skills</td>
<td>Admissions review</td>
<td>Analytical Writing score on the GRE</td>
</tr>
<tr>
<td>Place in curriculum</td>
<td></td>
<td>must be 4.5 or better or remediation is</td>
</tr>
<tr>
<td>... appropriate to Masters</td>
<td>Upon completion of</td>
<td>required via TPW 400, SCI 560 or a</td>
</tr>
<tr>
<td>level work in Geography</td>
<td>Culminating</td>
<td>comparable course.</td>
</tr>
<tr>
<td></td>
<td>Experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Geography 895/898)</td>
<td></td>
</tr>
<tr>
<td>... understand the use of</td>
<td>GIScience courses</td>
<td>Students learn the scope and methods</td>
</tr>
<tr>
<td>appropriate methods of</td>
<td>(610, 711, 720, 721,</td>
<td>of GIScience research, reviewing</td>
</tr>
<tr>
<td>inquiry in GIScience research</td>
<td>and others) and GEOG</td>
<td>research works produced by specialists</td>
</tr>
<tr>
<td></td>
<td>815</td>
<td>in the field.</td>
</tr>
<tr>
<td>... be able to quantitatively</td>
<td>GEOG 705</td>
<td>Evaluation of coursework.</td>
</tr>
<tr>
<td>analyze a geographic research question</td>
<td></td>
<td></td>
</tr>
<tr>
<td>... be able to develop and</td>
<td>GEOG 789 or 896</td>
<td>Reports from intern sponsors and</td>
</tr>
<tr>
<td>formulate research questions</td>
<td></td>
<td>successful thesis proposal. Faculty</td>
</tr>
<tr>
<td>from literature or internship</td>
<td></td>
<td>will attend thesis proposal presentations for which they were not committee members to review student preparation.</td>
</tr>
<tr>
<td>experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>... be able to use skills</td>
<td>Geog 895/898</td>
<td>Evaluation and acceptance of thesis or</td>
</tr>
<tr>
<td>and knowledge to answer their</td>
<td></td>
<td>research project.</td>
</tr>
<tr>
<td>research questions through a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>thesis or research project</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MS Geographic Information Science Curriculum**

- **Required courses (15-16 units)**
  - GEOG 705: Geographical Analysis (3 units, Spring)
  - GEOG 801: Scope and Method in Geography (3 units, Fall)
  - GEOG 815: Seminar in GiScience (3 units, Fall)
  - GEOG 896: Directed Reading or GEOG 789: GiScience Internship (3 units)

- **Select one of the following on advisement (3 units)**
  - GEOG 751: Environmental Management
  - GEOG 810: Seminar in Physical Geography (any variant: Biogeography, Climatology or Geomorphology)
  - GEOG 820: Human and Social Geography
  - GEOG 832: Seminar in Urban Geography

- **Select 12-16 units on advisement from the following (12-16 units):**
  - GEOG 610: Remote Sensing of the Environment I
  - GEOG 711: Remote Sensing of the Environment II
  - GEOG 720: Geographical Information Systems
  - GEOG 721: GIS for Environmental Analysis
  - Approved courses from among the following on advisement:
    - CSC 667: Internet Application Design and Development
    - CSC 675: Introduction to Database Systems
    - GEOG 606: Cartography
    - GEOG 625: Programming for Geographic Information Science
    - GEOG 629: Coastal and Marine Applications of GIS
    - GEOG 642: Watershed Assessment and Restoration
    - GEOG 657: Natural Resource Management: Biotic Resources
    - GEOG 702: Field Methods in Physical Geography
    - ERTH 702: Quantitative Methods in Geosciences

- **Culminating Experience (33 units)**
  - GEOG 895: Research Project
  - GEOG 898: Thesis Project

- **Thesis requirements**
  - Master’s Oral Examination: 2-hours
  - Research Proposal: Present to faculty and peers
All Graduate Programs 6th Cycle CAM Responses and Discussion

The 6th Cycle focused on the graduate programs. From the Concluding Action Memo (CAM) of 2010, here we will list all of its action plan items and summarize the major changes the program has undertaken since, or as a result of, the review.

Table 15. 6th Cycle CAM Action Items

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Changes the program has undertaken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analyze the diversity of the student population in the department and work to further diversify the graduate program.</td>
<td>See Table below. While we have expanded opportunities for grad student TA positions, and have set pay scales at the maximum allowed, diversity has if anything decreased in recent years: these opportunities are not enough to make any real difference, given tuition hikes, a lack of fee waivers and a dramatically increased cost of housing in San Francisco. Many accepted grad applicants, including many that would increase our diversity, have accepted graduate work at other universities with funding. We continue to press for a fee waiver program at SFSU.</td>
</tr>
<tr>
<td>2. Continue funding for the Map Library graduate assistant positions and GTAs.</td>
<td>The Map Library position was unfortunately cut from two to one half-time positions. We have not been successful in replacing this funding, and support for field equipment has been somewhat shared by staff in the Institute for Geographic Information Science, especially focused on GPS and high-accuracy surveying equipment. Graduate assistant positions have been increased by: (a) the creation of Geog 160 Introduction to Environmental Science (B2), which has 2 lecture sections (B2 GE) and 6 GTA-staffed lab sections (B3 GE); (b) shifting Geog 603 Introduction to GIS to a larger lecture section with two GTA-staffed labs, which decreases the need for faculty support while shifting lab responsibilities to GTAs; and (c) adding student assistants (40 hr/semester) to support larger lecture classes. Funding for all of these is challenging, coming from a mix of grant IDC, Institute for GiSci programs, CEL and augment funding (for high-demand GE).</td>
</tr>
<tr>
<td>3. Review and improve its current website.</td>
<td>We have completely revamped our department website <a href="http://geog.sfsu.edu">http://geog.sfsu.edu</a>. The new web site is based on Drupal, which required a large investment in time up-front, but is easier to maintain than its predecessor. Our site has also been approved for accessibility.</td>
</tr>
<tr>
<td>4. Analyze the average length of time to degree and work to reduce the time it takes graduate students to complete the MA.</td>
<td>Through a combination of efforts by the Grad Division and the increasing cost of living in San Francisco, the median time to complete our grad programs dropped from 4 in 2001-07 to 3.5 in 2013-16. We have also made efforts to provide clear guidelines for completing the degree on our department web page, and have invited Grad Division staff to present at our annual grad student welcome meeting. However, the reality is that while our program is designed to be completed within 2 years, given the need for grad students to also have jobs, it is not usually possibly for them to finish in 2 years.</td>
</tr>
</tbody>
</table>
5. Attempt to develop intangible perks for new faculty in an effort to retain new faculty. Since the move to CoSE, funding to provide a 6 WTU teaching load for junior faculty in CoSE is a very tangible perk, and helps to get research programs off the ground.

6. Work with the Dean and the Provost to resolve the hiring line of Dr. Barbara Holzman, who has moved to the Department of Environmental Studies. With the move of our department to the College of Science & Engineering, while Environmental Studies moved to the School of Public Affairs & Civic Engagement in the College of Health & Social Sciences, Dr. Holzman remained with the department and was no longer involved in the leadership of Environmental Studies. We have continued to offer GEOG 657 Natural Resource Management course that is in the core of the Environmental Studies NRMC degree, and will continue to do so. Dr. Holzman has now retired, and we have hired a new biogeographer, Sara Baguskas.

7. Maintain the refresh schedule for computers. The College of Science & Engineering does not handle Instructional Equipment requests in the same way that was done in the College of Behavioral & Social Sciences, where this funding was only used for computer labs. Instructional equipment in CoSE is much more diverse, and this is one way in which our department has fit well into our new college. So far, we have however been able to maintain current computing hardware in our teaching laboratories.

8. Resolve the vent hood problem in the Physical Geography Laboratory. This is not possible in HSS, but now we have a working vent hood in our O3 lab.

9. Work to increase space for labs and equipment. While we remain the most space constrained department in the college, the addition of the O3 lab is a big help, and in summer 2018 we will be reconfiguring space use in three labs used for faculty research and upper division/grad classes: the Physical Geography lab for field instrumentation configuration, O3 for soil sample processing and field labs, and 383A for water quality analysis.

Table 16. Analysis of Diversity of Grad Students in 2009 Assessment (Fall 2008 data), as compared to all students since. GLBTQ numbers and percentages provided for students since 2010, but were not analyzed in the Fall 2008 data.

<table>
<thead>
<tr>
<th></th>
<th>F2008</th>
<th></th>
<th></th>
<th>2010-2016</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female</td>
<td>male</td>
<td>total</td>
<td>female</td>
<td>male</td>
<td>total</td>
</tr>
<tr>
<td>Hispanic/ Latino</td>
<td>3 5%</td>
<td>4 6%</td>
<td>6 11%</td>
<td>0 0%</td>
<td>3 3%</td>
<td>3 3%</td>
</tr>
<tr>
<td>African or Afr Am</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>2 3%</td>
<td>2 5%</td>
<td>4 7%</td>
</tr>
<tr>
<td>Asian/PacIsl</td>
<td>5 8%</td>
<td>4 6%</td>
<td>9 14%</td>
<td>6 5%</td>
<td>5 4%</td>
<td>11 9%</td>
</tr>
<tr>
<td>Native American</td>
<td>1 2%</td>
<td>0 0%</td>
<td>1 2%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
</tr>
<tr>
<td>White Non-Latino</td>
<td>23 35%</td>
<td>22 33%</td>
<td>45 68%</td>
<td>59 50%</td>
<td>39 33%</td>
<td>98 82%</td>
</tr>
<tr>
<td>All Other</td>
<td>2 3%</td>
<td>0 0%</td>
<td>2 3%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
</tr>
<tr>
<td>Total</td>
<td>34 52%</td>
<td>32 48%</td>
<td>66 100%</td>
<td>67 56%</td>
<td>52 44%</td>
<td>119 100%</td>
</tr>
<tr>
<td>GLBTQ</td>
<td>10 8%</td>
<td>8 7%</td>
<td>18 15%</td>
<td>10 8%</td>
<td>8 7%</td>
<td>18 15%</td>
</tr>
</tbody>
</table>

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Section Three: Program Indicators
Graduate Programs: 6th Cycle Concluding Action Memo Responses

Figure 10. Time to Graduation.
Median 2001-07 = 4 years   2013-15 = 3.5 years

Table 17: Number of All Graduate Program Graduates

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>MA</th>
<th>MA RMEP</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>6</td>
<td>3</td>
<td>0 (first year)</td>
</tr>
<tr>
<td>2012-2013</td>
<td>5</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>2013-2014</td>
<td>1</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>2014-2015</td>
<td>4</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>2015-2016</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2016-2017</td>
<td>4</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>2017-2018 (incomplete)</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Section Three: Program Indicators
Graduate Programs: Discussion

Identify the average number of applicants, admitted students, and enrolled students in graduate programs for the past five years; identify the percentage of applicants admitted and the percentage of admitted students who actually enroll.

Table 18. Enrollment in Program, Retention and Graduation (Fall 2012 – Spring 2017)

<table>
<thead>
<tr>
<th>Program</th>
<th>Applicants/ year</th>
<th>Admitted Students</th>
<th>Enrolled students</th>
<th>% of students admitted</th>
<th>enrollment rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA Geography</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>56%</td>
<td>40%</td>
</tr>
<tr>
<td>Conc. RMEP</td>
<td>17</td>
<td>9</td>
<td>5</td>
<td>54%</td>
<td>59%</td>
</tr>
<tr>
<td>MS GISc</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>50%</td>
<td>68%</td>
</tr>
</tbody>
</table>

What evidence does the program regularly solicit and collect to indicate whether course offerings and schedules address graduate students’ needs?

Grad student representatives attend department meetings and report back to faculty issues related to course offerings and schedules.

How are graduate culminating experiences managed in the program (by topic choice, faculty supervision, WTUs)?

When applicants to our grad programs are being considered, an important consideration is availability of expertise in the faculty to support the interests of the applicant. Accepted grad students are not assigned to a faculty member, though this model has been discussed, but instead we allow for student interests to develop while they are in the program. Some students come in the door ready to work on a particular project, but especially since they come from many prior disciplines, most are learning new methods and developing new questions, so an exploratory model seems to work well.

What mechanisms does the program maintain for tracking, assessing, and responding to graduate students’ goals before graduation and success in meeting them afterwards (i.e., performance on professional exams for licensure or credentials or entry to doctoral programs)? What are the results of this tracking?

Informally, only, but many students find work in government institutions like USGS, private companies like Apple, or environmental consulting companies, and we are in touch with employers. There is little in the way of licensure in our field. Our graduates are competitive in getting into Ph.D. programs; we have former grad students with professorships at many universities and community colleges. For Fall 2018, an admittedly good year, we had 4 students accepted into Ph.D. programs.

How effectively does the program achieve the university’s standards for graduate programs? How well does the program assess the effectiveness of its response? And, in a related question, how do graduate
culminating experiences follow clear and consistent guidelines and represent adequate levels of achievement?

While we do not have a formal assessment, we pay considerable attention to the quality of our program, especially for those skills leading up to the thesis. Increasingly we are following the model used at Ph.D.-granting institutions of preparing students to publish their research in high quality journals. Part of this is getting broader participation in the quality of research proposals. The department requires all graduate students to present a proposal of their research for culminating experience to faculty and peers within a semester of filing the Proposal for Culminating Experience. The object is to provide students with useful feedback in the critical developmental stage of the research experience. Students present a twenty minute synopsis of their research ideas to faculty and fellow graduate students focusing particularly on linking the research to a broader theoretical framework and presenting a methodology design to achieve the specifically stated objectives. This is followed by ten minutes (maximum) for questions and comments. Proposal presentations are scheduled as needed.

Theses ready to defend are provided to all faculty on a shared iLearn page, potentially providing additional quality assurance. This practice was established many years ago in the interest of providing the input of cartographic expertise in the evaluation of thesis figures. However, given the tight faculty schedules at the end of the semester when many theses are defended, this practice is inconsistently applied.

Faculty advisors are also instrumental to ensuring that grad work is publishable, as they are able to look at students’ work from the eyes of the larger academic audience, leading to higher quality products at the time of the thesis defense. The effectiveness of this approach can be seen in the increase in publications with students listed as first author, illustrated by our publications web page http://geog.sfsu.edu/publications-listing.

What short- or long-term trends affect graduate admission and enrollment? Explain the factors behind these trends. Do trends in the program’s graduate admissions reflect a sustainable level of demand?

The university and our department has seen a significant decrease in graduate enrollment in recent years, not unrelated to the decrease in enrollment after the freshman year; the cost of housing in SF is clearly driving both. Trends are not usually controlled by the University, but economic conditions and housing prices, and these are especially driven by high-wage tech jobs in San Francisco. The ability of graduate students (and faculty) to live in San Francisco has made it impossible for many to join our program. The university is making efforts to address this issue with a small but growing source of fee waiver options, but this will remain a challenge in the years to come.

We are addressing the decreased numbers through some redesign of our grad courses, with increasing numbers of grad seminars shifting to a team-teaching model. This helps to ensure an equitable exposure of faculty expertise among our graduate students, with faculty expecting to teach half of a seminar every other year, though inevitably has produced less frequent offerings.
How are expectations for graduate students set at an appropriate level and distinct from those for undergraduates?

We have five paired graduate/undergraduate courses in the methods area – three of these are GIScience courses in GIS and remote sensing. Each of these is designed as a grad methods course, though allowing undergraduates to take them at their level. For each course, separate student learning outcomes are defined; while inevitably there is overlap in many aspects of the class, grad students have different expectations in the area of planning projects based on advanced literature suitable to the use of these courses as preparation for thesis research. We also generally set higher expectations in oral and written communication for grad students.

How well do course offerings and schedules meet students’ needs (particularly those of students with work or family demands)?

Work and family demands is a major challenge for all students at SFSU, but especially grad students. Our programs are designed to have all, or nearly all, requirements for daytime attendance to be completed in the first year of residence. All seminars are at night.

How does the program manage the supervision of graduate culminating experiences in a way that maintains both their quality and consistency in faculty workload?

Some faculty inevitably attract more graduate students based on the popularity of their specialties or their on-campus schedule availabilities. We do however need to address faculty workload, as noted in our 6th-cycle self-study, though not identified in the CAM: “In concert with Grad Studies and the Academic Senate, pursue compensation for T/TT faculty for WTU overloads caused by thesis advising. The department would like to grant faculty members a course release for each six completed theses they chair/each 12 on which they serve as a second reader, as possible within the context of department curricular needs.” We are starting to initiate this policy and will take it up as part of department bylaws.

How effectively does the program balance the needs of its graduate students and undergraduates in its curriculum development, planning, and resource allocation? Is one being served at the expense of the other? How does the department decide on the appropriate balance?

With the decrease in graduate student enrollment in recent years, some paired courses have shifted their attention to better serve undergraduates. A good example of this is GEOG 702/602 Field Methods in Physical Geography. Along with the decrease in grad students has arisen an increase in undergraduates in the B.S. Environmental Science program, for which this course is a popular elective. As the senior seminar survey showed this year, a loud call has gone out for increasing the frequency of 602 offerings, and plans are underway to moving this course to annual, instead of biennial offerings. This has taken considerable effort by the instructor Andrew Oliphant, but the transition appears to be successful.

How does the program plan to attract and recruit sustainable cohorts of graduate students?

Getting grad student numbers up will remain challenging given the cost of housing in SF, so there’s only so much we can do. However, we are doing as much as possible within our power to address the issue. Some of the methods we are employing:
Section Three: Program Indicators
Graduate Programs: Discussion

a. Shifting the graduate application process to allow rolling admittances after the deadline. While this does put a strain on our faculty, the recently supported digital application process is allowing this to work. We still use a deadline in order to be able to consider the larger number of applications in by that time, but we are able to consider additional applications as they arrive.

b. We are actively recruiting our own undergraduates. Our undergrad programs attract some excellent students, and faculty efforts to identify good candidates has helped to increase our grad numbers somewhat. As part of this effort, the survey of our senior seminar class has identified some changes we need to make in our grad program, in particular a strong call for an MS program in Environmental Science we are now preparing (see Appendix A). Since all of our faculty support all of our grad programs, we have the resources to support this addition.

c. Strongly promoting fee waivers for grad students. Recently limited rollout of fee waivers for GTAs will hopefully reach our department soon. We now have two popular classes – GEOG 160 Intro to Environmental Science and GEOG 603 Intro to GIS – both core for the B.S. Environmental Science program, that have been reconfigured as lecture and lab sections with labs run by GTAs, so there are more opportunities for grad students to take advantage of this. This has only been possible with the move to CoSE where we have been able to secure minimal but sufficient lab spaces.

How will the program adjust the graduate curriculum to meet changes in the discipline and ensure appropriate levels of rigor?

The key to this is to have faculty actively engaged in research and presenting at national and international conferences, and we are doing that. It is by looking outward, not inward, that a department can recognize what our students need to succeed with the most advanced toolkits and critical eye.
All Geography & Environment faculty teach core and/or elective seminars for the Geography graduate program:

- **Baguskas** teaches a core seminar, Geog 810: Seminar in Biogeography in a two-year rotation.
- **Blecha** teaches a core seminar, Geog 820: Seminar in Human Geography in a two-year rotation and may also teach Geog 825: Seminar in Sustainable Development.
- **Blesius** will teach an elective seminar, Geog 815: Seminar in Geographic Techniques, and teams with Davis in a two-year rotation for Geog 810: Seminar in Geomorphology.
- **Chitewere** teaches an elective seminar, GEOG 832.
- **Davis** teaches a core seminar, Geog 810: Seminar in Geomorphology, in a two-year rotation shared with Blesius.
- **Donovan** teaches a core option, Geog 701: Qualitative Methods, and a core seminar, Geog 820: Seminar in Human Geography, each in a two-year rotation.
- **Guo** has taught an elective seminar, Geog 832: Seminar in Urban Geography, and has also taught two core seminars (Geog 801, Geog 820) on an as-needed basis.
- **Henderson** teaches an elective seminar, Geog 858: Land Use Planning.
- **Hines** teaches the RMEP core class (Geog 751: Environmental Management) and has also offered an elective seminar, Geog 815: Seminar in Geographic Techniques.
- **Liu** teaches a core option, Geog 705: Quantitative Methods, as well as Geog 815: Seminar in Geographic Techniques (in rotation).
- **Nanus** teaches the RMEP core class (GEOG 751: Environmental Management).
- **Oliphant** teaches a core option, Geog 702: Field Methods in Physical Geography, as well as a core seminar Geog 810: Seminar in Climatology, each in a two-year rotation.
- **Wilkinson** teaches one core seminar, Geog 801: Scope and Method, and another core seminar in a two-year rotation (Geog 820: Seminar in Human and Social Geography).
3.4 Faculty

Faculty are critical to the success of a program. Excellence in teaching and research or professional practice is essential to SF State’s distinctive commitment to uniting academic quality and broad access. Programs should strive for faculty diversity, workload equity, and an appropriate balance of teaching, research, and service. Programs should consider how teaching, professional activities, and community involvement help the faculty engage with changing directions in the discipline; how the effectiveness of faculty teaching and professional activities are being supported; and how faculty are responding to changes in the university.

What is the distribution of rank, gender, ethnicity and age across the faculty?
- Rank: Assistant Professor (2), Associate Professor (4), Professor (7)
- Gender: Female (8), Male (5)
- Ethnicity: African descent (1), Asian descent (2), European descent (10)

CVs for full-time faculty can be found at https://geog.sfsu.edu/people-listing and publications can be found at https://geog.sfsu.edu/publications-listing. Publications average 9.8 per year for the 13 tenure-track faculty over the last 5 years. Grants are listed in Appendix B.

Outline the distribution of faculty across different disciplines, concentrations or emphases.

There are multiple ways of defining specialties in our department, and faculty tend to align with multiple areas instead of limiting themselves to one. For instance, most faculty have an environmental focus ranging from a more social science (Blecha, Chitewere, Donovan, Henderson, Guo, Liu, Wilkinson) to a natural science focus (Baguskas, Blesius, Davis, Hines, Nanus, Oliphant). Since methods are an important theme in our department, many also specialize in this area for teaching and research, particularly Blesius (remote sensing), Davis (GISci), Donovan (qualitative methods), Hines (GISci), Liu (GISci), Oliphant (field methods), though others also use these tools.

In terms of our programs and degree concentrations, all faculty teach in all degree programs at some level. In undergraduate programs, the B.A. Geography cuts most evenly across the faculty, but all faculty teach at least at the lower division level in the B.S. Environmental Science program. Similarly the M.A. programs cuts most evenly across the faculty, while the lead M.S. advisors are typically (but not exclusively) GIScience faculty; increasingly student interests in GIScience applications in the social sciences such as health and transportation are taking advantage of non-GIScience expertise in those areas, aided by thesis committee members with suitable methodological expertise.

Create a teaching assignment matrix for faculty, including lecturers, that lists the number of graduate and undergraduate students enrolled in each course (on average in the most recent four semesters), and what part each course plays in the major, GE, and GWAR curriculum and requirements.

See Appendix C. In general, most faculty teach a mix of general education and majors classes.

Create a table summarizing faculty service activities. Distinguish between department, college and university committee work and service activities off campus.

See Appendix D. Service activities vary partly by the nature of faculty specializations. For instance, faculty involved in community based research, such as studying social disparities or environmental...
restoration efforts, may also be involved in community organizations pursuing these goals. Other faculty may be more motivated by faculty governance or university research support structures.

**Summarize the department, college and university mechanisms in place to evaluate teaching effectiveness for all faculty teaching in the department.**

All classes are evaluated using Student Evaluations for Teaching Effectiveness (SETE). Faculty at the Assistant and Associate Professor level, as well as Lecturers, are also evaluated by the peer review process, with classroom visits and reports used in the consideration of tenure and promotion. We have a Lecturer Review Committee comprised of full-time tenured faculty.

**Detail the program’s support for new and untenured faculty in assuming the responsibilities of a tenure track position, including any written guidelines for RTP standards that are provided to pre-tenure faculty and any mentorship activities conducted within the department.**

Department RTP Criteria are listed in the SFSU Faculty Affairs web pages: [http://facaffairs.sfsu.edu/sites/default/files/Geography_jun_13.pdf](http://facaffairs.sfsu.edu/sites/default/files/Geography_jun_13.pdf). Informal mentoring is a common practice in our department, especially among faculty with similar research interests. Collaborative research projects aid this process further. Junior faculty (before tenure and promotion to Associate) are able to teach a reduced course load of 6 WTUs / semester, allowing them to develop their research and grant-writing activities. Faculty can also take advantage of internal grant programs provided by the university and CSU, such as the Development of Research and Creativity (DRC), CSU COAST, and WRPI grant programs. Faculty can apply for Faculty Affairs travel awards, and all department full-time faculty are provided with regular research funding to supplement these sources. While the amount fluctuates based on available funding, in 2017/18 $2,000 per faculty was provided by the department.

**Describe any mechanisms or strategies the department uses to support post-tenure faculty.**

Post-tenure faculty can also take advantage of internal and external grant programs, and they receive the same departmental research support as junior faculty. Our department’s Research Budget Committee meets 2-3 times per year to consider proposals for larger amounts that may be needed to initiate a new research agenda. These additional funds derive from Indirect Cost recovery and individual faculty research allocations that are not spent in a given year. We also participate in post-tenure review to identify support needs for tenured faculty.

**Reflect:**

*How does the program maintain a faculty in adequate numbers and balance to teach the curriculum and maintain program quality? If not, what adjustments are necessary? Given the difficulty of adding tenure-line faculty, how might adjustments to the curriculum make best use of existing faculty?*

Most faculty teach at multiple levels within our curriculum. All are encouraged to develop a two-year cycle of courses that includes general education courses, more specialized courses for majors and graduate courses/seminars. Chair interviews with applicants for tenure-track positions stress the importance of developing service courses as well as more focused classes to support our majors and graduate programs. We have also maximized rotational course sharing, team teaching and other methods of building some redundancy into our staffing, such that more than one individual is capable of supporting curricula in most areas.
Section Three: Program Indicators

Faculty

*Are the program’s faculty sufficiently diverse in rank, gender, ethnicity, and stage of professional development?*

In general, our faculty represents a good balance of rank and gender – in fact, we have a greater proportion of female faculty than other US programs of comparable size. We continue to seek to diversify our faculty in terms of ethnicity, nationality and sexual orientation, and this diversity is not necessarily reflected in the University’s data set. For example, our tenure track faculty includes 5 foreign-born individuals and one naturalized citizen of another country. Two of our colleagues are openly GLBTQ.

*Are all faculty engaged in appropriate forms of professional growth and achievement?*

Most faculty are engaged in appropriate forms of professional growth and achievement, including research leading to publication in the form of books, essays and articles in scholarly journals. Even faculty who engage less frequently in research projects of their own design have still participated in guiding and mentoring graduate thesis research, in a number of cases supporting Masters advisees from their earliest forays into academic meetings through their subsequent completion of Ph.D. programs at prestigious universities.

*How is faculty workload balanced, in the ratio of large and small-enrollment courses, required and elective, undergraduate and graduate, lower and upper division? If there is a graduate program, how is the workload balanced across culminating experiences and advising?*

See Appendix C (Teaching Matrix) and Appendix E (Student-Faculty Ratios). The general policy of full-time faculty teaching is one general education class per semester and one grad seminar every other year, with the rest filled out with majors or service classes in the faculty member's specialty areas. Most larger GE classes are in the lower division, though there are also large upper division GE courses such as Geog 301, 552, and 600. Most general education classes are taught in a university classroom (HSS 278) that seats 74 students, not an official large lecture hall (100 or more) but larger than the 38 students that fill HSS 287, otherwise our most commonly used university classroom, or the capacity of 30 each in our department teaching labs or the small teaching space at EOS.

If we look only at faculty and their student numbers, we see considerable differences among faculty, but we must also consider factors that play into this. Buyouts and college/university assigned time also play a part in changing the student load, since it is generally easier to hire a lecturer to teach a more introductory but larger GE class than a more specialized upper-division major's class. Some faculty who specialize in methods will also have a smaller number of students, since these classes require a lot of individual attention.

Perhaps our greatest challenge recently is the reduced number of graduate students and the effect that has had on seminar sizes. Seminars that once carried 15 students may have 5 and occasionally even less. Ensuring that all faculty that wish to teach a grad seminar can offer one every other year has made this difficult. We are now starting to combine seminars as team-taught offerings, producing a reduction in offerings but ensuring that all faculty have the opportunity to offer a grad seminar every other year.
How does the program plan its course offerings to avoid overreliance on lecturers?

All classes are taught on occasion by full-time T/TT faculty, and for all classes taught by both full-time and part-time faculty we share materials and faculty meet as needed to maintain consistent and up-to-date offerings. This has greatly helped us handle situations when a faculty member goes on leave and we need to move another instructor to take the place; we try to maintain a healthy suite of instructors for all larger capacity classes.

How does the program take care to foster, assess, and support teaching quality?

We look at teaching quality in multiple ways – peer review, student evaluations, retention review, tenure review, promotion review, and post-tenure review. The Chair discusses problematic evaluations/student complaints with faculty on occasion, and works to develop effective strategies for addressing these.

How does it support its lecturers and where does it integrate them into the program’s structure?

While lecturers do not have service as part of their job duties, they are invited to attend department retreats and meetings. Some have served on committees related to curriculum and make valuable contributions to honing our core curricula in programs. Lecturers are also encouraged to collaborate with T/TT faculty on course development and execution, as has happened in Geog 101, 160, 205, 500, and 690, all core classes in our majors.

How do the program’s RTP criteria reflect current professional activities and opportunities in the discipline? How do they adequately balance and value the full range of faculty commitments in teaching, research, and service?

Department RTP criteria (see http://facaffairs.sfsu.edu/sites/default/files/Geography_jun_13.pdf) were developed in AY 2012/2013 during faculty meetings and ratified by the CoSE and Faculty Affairs deans, reflecting current professional practices in our discipline and an appropriate balance between teaching, research and service. We will be revising these in AY 2018/19 based in part on discussions developed through this program review self-study and external review.

How will the program recruit and retain faculty to meet its future needs?

This is likely to be the biggest challenge our university will face, and in fact already faces as positions have become difficult to fill. Housing costs in the Bay Area and especially San Francisco have become prohibitive, and this is especially hitting us in attracting faculty and grad students. There is little a department can do, other than creating an environment where faculty want to be despite the housing challenges.

How will the program support faculty at all ranks—tenured, pre-tenure, lecturer, and adjunct—in the areas of teaching, service, and professional development?

In terms of teaching, we have established support policies that are independent of rank – for instance, teaching assistants are assigned primarily based upon the size of the class, and secondarily upon special class needs. For service and professional development, there are contrasting policies for TTR vs part-time lecturer or adjunct faculty in the Collective Bargaining Agreement (CBA): part-time faculty are not tasked with service or professional development activities.
3.5 Resources

Resources are not only financial but also take the form of human resources, time, schedules, facilities, and external resources; it is imperative for programs to steward these resources with care. Programs that balance their resources deliver a sustainable and high-quality curriculum and maintain a supportive and collegial environment; they meet students’ needs through advising, course planning, and scheduling; and they allocate offices, classrooms, laboratories, and other spaces equitably, to create rich learning environments for all.

Provide an inventory of the program’s resources: include general fund and external sources of funding, space, library collections, staff, IT, and other available resources.

As with most departments, by far the greatest source of funding is the general fund going to teaching course sections, and most of that is dedicated to the salaries of tenured and tenure-track faculty. General funds are also allocated to the college to cover additional lecturer-taught course sections, especially to provide additional support for the university's general education program and address bottleneck issues that delay student progress toward graduation. Additional course sections are funded through grant buyouts and special college and university assignments. Grants that generate indirect costs (IDC) provide a small proportion of these to the department, and these funds are managed in a departmental IDC cost recovery special projects fund (what most people would think of as an “account,” however in the BI Finance system, accounts refer to the type of expenditure – such as travel – in the fund); in the case of CSU, university or college internal grants, all of the grant funds other than faculty salaries are managed through this special project fund. The department also has a College of Extended Learning (CEL) fund, which accrues funding from CEL students taking our courses through the Concurrent Enrollment program, and this fund is used to supplement special needs for those classes. Finally, GIS and GPS technology is largely funded by the Institute for Geographic Information Science, which does contracted research and teaches a GIS Certificate Program, both of which brings in outside funding.

Non-digital in-house library collections have not changed in any way we would notice in recent years, but digital and access to other external resources have been greatly enhanced through institutional access to subscribed full-text sources that cover a broad swath of journals – BioMedCentral, EBSCOhost, ExLibris, ProQuest, and ScienceDirect – as well as publisher packages subscribed from Elsevier, Springer, Wiley and others. Added to the growing body of open-access journals, open-access articles in traditional journals, free web archives (such as JSTOR and SemanticScholar), and self-archiving web resources at universities, organizations and sites such as ResearchGate, access to journal publications has never been better. That being said, this leaves out a number of important journals, such as many from professional organizations which depend on membership. For books, instant gratification is a bit more limited, but most needs can be met reasonably quickly for in-house collections (the new robotic access system promises books within minutes), or a few days using the inter-library loan system.

Department staff resources are covered later in this document, but IT resources are also important to consider. Given the nature of our discipline, IT is especially critical. We are one of the largest users of IT resources given the needs of geographic information science and technology. Large datasets involving multispectral imagery and massive point clouds for modeling elevation are commonplace in our discipline, and we constantly challenge resources to support this research and education. The most specialized support for this derives from our associated Institute for Geographic Information Science, which provides GIS, remote sensing, GPS, cartographic and spatial...
Section Three: Program Indicators

Resources

Statistics software and support. For desktop support and lab imaging, however, we depend on Academic Technology (AT); our department and two others were the first in the College of Science & Engineering to shift to AT for desktop support.

Conduct a Space Audit of offices, classrooms, meeting areas, laboratories, or other spaces: when are these spaces used? When are they not used? Describe policies for scheduling and allocating spaces.

While the Department of Geography & Environment is the most space-constrained in the College of Science & Engineering, we do make good use of the facilities we have. Most of this space is in the HSS Building, which mostly houses departments in the College of Health & Social Sciences, as well as significant university classroom spaces. Appendix F shows our controlled spaces in HSS, including department office space, faculty office space, teaching labs, and shared research labs. Appendix G is an example of a schedule of classes including department teaching labs HSS 290 and HSS 383.

- Department Office Rooms: HSS 277, 279, 280. HSS 277 is the department chair's office, with a connecting door to the main department office HSS 279, and is occupied most weekdays allowing drop-in administrative needs. The main office is generally open 5 days a week from 9 to 5, and includes the office of the academic office coordinator (AOC) and a part-time work-study student who helps with assorted tasks, including updating the department web page, assisting students looking for advising. HSS 280 is the department office copy and office supplies storage room, but also includes the department's wall map collection; the latter has been significantly reduced to allow space to wedge in one lecturer office at the back.

- Faculty Offices. Faculty share offices in HSS. While the offices are ample in size, sharing does create scheduling issues. We generally try to arrange for officemates to have contrasting schedules, typically MWF vs TuTh, in order to make it possible to do advising meetings without disturbing the officemate.

- Map Library (HSS 289). The map library is the principle meeting room for undergraduate and graduate students, and is intensively used. The space includes a conference room where department or other meetings with up to ~15 people can meet, and is the most popular space for thesis defences, study groups, review sessions, research team meetings, and small seminars to meet. We use a Google Calendar to schedule the use of this space. This library of course houses many maps, though we are reducing storage of maps available digitally, such as many USGS maps. As these are decreasing, we’re steadily adding field equipment, and the responsibilities of the half-time map librarian is increasingly devoted to maintaining and checking out equipment for field-based research and class assignments. See http://geog.sfsu.edu/field-equipment for available field equipment and support documents.

- The Institute for Geographic Information Science http://gis.sfsu.edu is closely associated with the Department of Geography & Environment, and has a computer lab (HSS 272) supporting student/faculty research as well as assignments in GISci classes. This space is used continuously from 9-5 M-F, on a first-come, first-served basis. This lab also includes a large-format plotter for plotting maps and posters for conference presentations. This space is also used for biweekly forum talks and thesis defenses.

- HSS 290 is the Geographic Analysis Teaching Lab, and is the primary space where courses in geographic information science are taught. As can be seen in the Fall 2018 schedule (Appendix G), this space is mostly scheduled out, with very little in the way of open lab hours, making the use of HSS 272 for open lab hours essential. This lab is used all day
Section Three: Program Indicators

Resources

Fridays and Saturdays for the CEL-based GIS Certificate Program, as well as for special workshops and presentations for up to 35-40 participants.

- HSS 383 is the Environmental Science Teaching Lab, and is the primary space where upper-division physical geography/environmental science courses are offered, and all lab sections for Geog 160 Introduction to Environmental Science are offered.
- Faculty share the limited research labs we have, and we have recently developed a space utilization plan for these spaces:
  - HSS 274. Physical Geography Lab. We are focusing field electronic instrumentation configuration for this space: micrometeorological eddy covariance instruments, plant physiological monitoring instruments, data loggers, and unpiloted aircraft systems are some the primary tools this space is focused on, and will be used by Andrew Oliphant, Sara Baguskas, Jerry Davis, and Leonhard Blesius.
  - HSS 383A. Water Quality Lab. This is more of a wet lab to be used to process water samples using new instrumentation from Leora Nanus’s startup funds in 2018.
  - O3 lab (portables). This lab is used for processing soil and sediment samples, and starting in Fall 2018 will also be used by upper division majors classes in soils, field methods and geomorphology. The space includes a vent hood, which will make it possible to extract pollen from sediment samples and do other sample processing.
  - We have secured storage space for larger field equipment items such as flux tower sections in a bunker behind Hensill Hall.
- Finally, a uniquely important resource that many classes depend on are department vehicles, and these come in two forms:
  - We maintain two 12-passenger vans to support field trips extending from the Bay Area to the Sierra Nevada, Cascades (Lassen & Shasta), and Klamath Range. Most field trips are partial to whole days in the Bay Area, but longer trips of up to 3 days involve camping, mostly in national parks and forests, or at the Sierra Nevada Field Campus. These vans are scheduled at department meetings (one each in fall and spring) and on a Google calendar. Drivers must be current in all university requirements, such as Defensive Driving certification.
  - As part of the Global Transportation and Bicycle Geographies classes, we maintain a small fleet of loaner bicycles. While it was open, we used the university Bike Barn, but now maintain these bicycles in the map library and HSS 383B.

Faculty Advising Responsibilities

While none of our programs require mandatory advising, students need advising at various stages in all programs. The only required advising is for students who are already on campus and wish to become a major, as this requires a signed form from the chair, who takes the time to make sure the student understands potential bottlenecks and road maps that can work to make sure that prerequisites are met. Faculty are involved as advisors in various programs as shown in our Advising Page http://geog.sfsu.edu/advisors. Our Department Bylaws (see GeogEnvt_Bylaws_BestPractices.pdf in https://sfsu.box.com/v/geogenvt) specifies that at least 3 hours of posted office hours are required for all faculty.

List university-level resources to which the program directs students to support their academic progress: including library collections, university-level advising, tutoring services, and any others.

We expect the orientation program for new students to make students aware of library collections and similar resources. As for advising, resources come at three levels, program advising (see above),
Section Three: Program Indicators

Resources

general advising at the Advising Center, and a new College of Science & Engineering resource: the Student Success Center [http://cose.sfsu.edu/content/cose-success-center](http://cose.sfsu.edu/content/cose-success-center) in SCI 214 with the mission "to support students in achieving their academic and professional goals. We advise students on general education requirements, refer them to university resources, and aid them in completing their degrees in a timely manner."

List classes that regularly employ information technology or open-source textbooks and other resources, along with other IT that the program uses.

Our programs include quite a few involving specialized information technology, especially those focusing on geographic information science (GIS, cartography, remote sensing, spatial statistics) – GEOG 603, 606, 610, 705, 711/611, 720/620, 721/621, 625, 629, 815), but also many other courses where GISci and other computing technology is an important component, which would include at least GEOG 160, 203, 205, 312, 313, 314, 316, 317, 342, 702/602, 642, 643, 644, and 657). All other courses would at least depend on word processing and presentation software.

List staff and their responsibilities; how is their workload determined? How is their performance assessed and recognized?

Staff resources for the department include a full-time Academic Office Coordinator (AOC), a half-time Map and Equipment Librarian, and half of the responsibilities of the Associate Director of the Institute for Geographic Information Science. The responsibilities of the AOC is similar to that of other similar-sized departments – working with the Chair to plan and execute a wide variety of department needs such as: the course schedule, enrollment management, instructional support, planning events and meetings, maintaining budgets and expenditures, administering space and vehicle usage, and hiring lecturers, graduate teaching associates (GTAs), graduate assistants, student assistants, and work-study office assistants. The Map and Equipment Librarian manages that space, supporting the use of paper and digital map resources and field equipment. As part of her duties, the Associate Director provides GIS lab support in HSS 290 for the program courses (GEOG 205, 313, 603, 606, 610, 642, 705, 711/611, 720/620, 721/621, 625, 629, and 815) that depends on that lab for software access, as well as for supporting grad and faculty research involving lab software. All staff workload and performance assessment follow standard union contract requirements.

How effectively does the program use existing space? (office space, classrooms, meeting areas, laboratories, other) How might it use it more effectively? How is the space maintained? How does the space allow for alternative learning styles/universal design?

Given our limited space resources, we pay careful attention to its use. Shared faculty offices mean that we need to carefully plan teaching schedules to allow faculty to do effective work and advise students without interruptions. Department teaching labs are mostly scheduled out during daytime hours, with increasing use in the evenings and on Saturdays (currently only CEL GIS classes in 290). Maintenance of teaching spaces requires cooperation of department staff and faculty, as well as university custodial staff.

Teaching spaces in our department are designed to support group projects, the mode that many of our students will see when they enter the work force. This requires the ability to arrange seating around tables (often with mounted computers and displays) to facilitate project discussions, and is the same arrangement required for breakout discussions in social geography classes. Larger university classrooms unfortunately do not support this mode, so we've only been able to make
limited use of large lecture halls. The map library provides the only real meeting space for student research teams and study sessions, but the main library does provide other options.

Since essentially all faculty research space is shared and limited, we have seen the need to use an ad-hoc faculty research space committee comprised of the faculty needing to install and use research equipment: Baguskas, Blesius, Davis, Nanus, and Oliphant. This committee was constituted in spring 2018 to plan for changes to take place through summer 2018. The result of that effort is described in the Space Audit above, and is going into effect to be ready for the 2018/19 academic year. We are also exploring other college and university resources for field research support, in cooperation with Engineering (machine and electronic shops, maker space), Biology (greenhouses) and Capital Planning (Landscape Framework and Forest Management) to open doors for planned research on and off campus.

How do the program’s scheduling practices make full use of existing teaching spaces and times in order to meet student demand?

As has been discussed elsewhere, our department-controlled teaching spaces HSS 290 and 383 are mostly scheduled out – see Appendix G. Additional times available for project work and other student work needing those spaces, and these spaces are reserved through the department office using Google Calendar.

How effective is department level academic advising for students?

Based upon surveys and hearing from students, we tend to support major advising pretty well. This has resulted from faculty advisors being available during office hours and the Chair being available during summers and intersessions. That being said, some advisors tend to see more students than others, probably due to suitable office hours, so we may need to do a better job distributing this workload.
Section Three: Program Indicators

Resources

How do faculty use technology effectively to advance student learning?

For classes built around technology such as GIScience, it is critical that they stay current in order to provide students with the best tools. Attending the Esri User Conference is a good way to stay current with the dominant GIS software in our field, and there are other conferences that provide similar technical workshops. The Institute for Geographic Information Science also holds occasional workshops and make its CEL GIS classes available to faculty. In 2017/2018, the IGiSc sponsored training courses in Pix4D (photogrammetry) and R spatial statistics (through the StatCorr university group).

The most widely used technology to support student learning is **iLearn**, the course management system provided and supported by Academic Technology. Based upon a poll of all department faculty and comparing with our offerings, all course sections (n=70) use iLearn in some way or another, with different features used in different amounts: 100% use it for handouts, 96% for readings, 70% for lecture pdfs, 87% for assignments, 50% for discussions, and 39% for grades.

How does the program maintain a supportive and collegial environment for staff? How does it assess and meet staff needs for support and professional development?

Staff are critical to the success of a program, and maintaining a supportive and collegial environment is essential. Defining roles and responsibilities is important; these are articulated in the position description and discussed before and after hiring. Equally important is open communication. Staff are included in faculty meetings and appropriate committees, such as the Techniques Committee. The Chair meets with all staff either individually or as a group at least once a week, or as special needs arise. At the college level, staff in similar roles often meet to talk about approaches and challenges in departmental operations. Finally, the university is increasingly providing professional development opportunities for staff.

Given the program’s existing resources, how might it make best use of them to meet the needs of students, faculty, and staff? What changes will the program undertake (to its curriculum, scheduling, resource allocation, or other) to make best use of existing resources?

The primary challenges we face in terms of resources are space and funding. For space issues, while we can expect shared faculty offices for the foreseeable future, we have developed a very cooperative approach to resolving faculty research lab needs, as described above. Funding is an ongoing challenge, but our use of a research budget committee is making research support more transparent and following a shared governance framework; course funding raises more questions, and the university's new instructional budget model is just now becoming operational. In terms of course scheduling, we're also moving into the first year of a new set of standard time blocks, and its kinks are still being worked out.
4.0 Conclusions, Plans, and Goals

A program review is a challenging but extremely important process. A lot has gone into this self-study, and a lot more is to come with the visit of external reviewers and consideration of recommendations. We take this process very seriously and see the benefit of being able to consider where we are, how we got here, and where we would like to go. We have achieved a great deal in recent years, including a major transition into the College of Science & Engineering, adding a B.S. in Environmental Science, creating a new introductory course in Environmental Science supported by multiple lab sections taught by GTAs, and expanding our department resources to include the Environmental Science Teaching Lab (HSS 383) and the O3 Soils & Geomorphology lab. Our new faculty members have come on board with promising research profiles and we are actively developing interdisciplinary research programs at sites in the Bay Area, northern California coastal areas, Sierra Nevada meadows, and international. With these additions have come the challenges of supporting new research programs with quality research facilities.

At our 24 August 2018 Retreat, department faculty discussed goals that have emerged from this self-study in the areas of Academic Programs and Faculty & Resources. In each we considered which indicators and outcomes provide the best evidence of our strengths, while also considering our most significant challenges, and identified our top priorities for the coming years. These are provided below, organized by section, with some of selected observations from the self-study in each preface.

Academic Programs

This section includes the largest number of priorities as it includes the bulk of what happens in the department. Priorities in this section are then organized into Undergraduate Programs, Graduate Programs, and Courses.

Undergraduate Programs

With the addition of the BS in Environmental Science has come a significant change in the nature of our majors: Geography majors normally start their major as juniors, while Environmental Science majors start as freshmen, and this can readily be seen in the left-hand graphs of figures 5 and 6. This has created a major shift in advising: when once we mainly knew lower-division students as GE students from which we might attract into the major, we are now dealing with advising majors in their lower division classes. We are finding that we need to solve bottleneck classes that serve both majors. We are also listening to our current students and alumni who note, for instance, their appreciation for the field experience as well as courses that prepare them for careers. It's exciting, but does present challenges.

1. Continue to plan for increasing numbers by looking at bottleneck classes, high-demand electives, and improved advising.

As documented in Tables 9 and 13, five courses are either current or potential bottlenecks in our undergraduate programs, primarily as a result of the significant increase in undergraduate majors overall with the addition of the BS ES. For GEOG 205 Geographic Techniques, required for both majors, we will either need to consider redesigning to handle more students or we will need to offer a third section each semester. Table 13 lists other thoughts on bottleneck courses.
We have initiated efforts to coordinate department program advising with the CoSE Student Success Center (CSSC). This center, newly housed in SCI 214 for Fall 2018, is one of a new model of college-level advising centers staffed with expertise specific to our college and more knowledgeable about college programs such as ours.

2. Increase the diversity of students in our degree programs.

There are many reasons for pursuing this, and this is reinforced by research; organizational scientists have long shown that socially diverse groups are more innovative than homogeneous groups, and innovation will be an important departmental response to a changing academic environment. While we have made progress (see Figure 8) and the B.S. Environmental Science is reasonably close (37%) to the college and university (39%), the B.A. Geography is at 29%, about the same as the university was in 2013. Some of the ideas proposed to address this include the following, with some aimed at increasing our visibility in local communities and current SFSU students, where we hope to attract a more diverse group of students. Some of these ideas are already being pursued, and may have helped our URM% rise during the last year.

- Connecting with local high schools & community colleges through their AP and other programs. Some work on this is already underway, through faculty reaching out to schools in their communities and working on articulation agreements with community colleges and model transfer curricula with our articulation officer. A new transfer model curriculum for environmental science has recently rolled out and we are working with that officer to identify programs and courses that align with our curriculum, hopefully making it easier for students at those colleges to more easily transfer to our program. Outreach especially to City College of San Francisco has led to more students from the city learning about our programs, but we need more participation from faculty in attending events (e.g. Earth Day) on that campus.
- Increase internship opportunities that link URM participation in local parks and open space districts. The National Parks Service internship program co-managed by Leora Nanus is one such example, but expanding this to other park districts could greatly increase outreach and also provide opportunities for our students to contribute back to the community.
- Identify ways to involve students in local environmental research, such as sampling programs and studies of the urban environment. Some of this might be included in the above – internships at parks – but could also be linked to faculty research programs or courses. GEOG 101 Our Physical Environment and 160 Introduction to Environmental Science are two GE courses that include environmental sampling, at Ocean Beach and Lake Merced, and these activities may resonate with local students. One thing that may help with research participation would be research funding programs such as NSF’s Research Experience for Undergraduates or local funding sources.
- Increase our visibility at campus events where students learn about our programs. We’ve been attending Sneak Preview every spring and other campus events.
- Create a first-year experience course in sustainability or other relevant topic. A proposal is being considered as we write.

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Section Four: Conclusions, Plans, and Goals

- Define a guided elective focusing on social and environmental justice. (Guided electives are replacing Foci in our B.A. Geography major, as required by CSU policy, and represents sets of suggested course clearly distinct from a concentration.) There are several courses currently offered by the department – GEOG 421 Future Environments; GEOG 423 Geographic Perspectives on Gender, Environment, and Development; GEOG 430 Transforming Food and Agriculture Systems - Local to Global; GEOG 455 Geography of Ethnic Communities; GEOG 552 Geography of California; GEOG 575 Emerging China; GEOG 667 Environmental Justice - Race, Poverty, and the Environment – which are likely candidates to recommend for this guided elective, based upon SF State Studies GE approval for Social Justice or similar suitability for non-GE courses.

- Identify scholarship opportunities specific to our disciplines that may make it easier for disadvantaged students to attend college and start a career as a geographer or environmental scientist.

- Develop a field camp experience at Sierra Nevada Field Campus and make it accessible to more students via scholarship programs. The Sierra Nevada Field Campus is a gem of this university, providing rich field experiences in the northern Sierra Nevada, however it is lacking in diversity, possibly due in part to the cost to attend its classes. We may want to work with Development on this.

- Create an environment of inclusivity by teaching methods, increasing participation & equity. We can take advantage of existing teaching methods resources on campus such as the Center for Equity and Excellence in Teaching and Learning (CEETL) http://ceetl.sfsu.edu.

- Continue to place a high priority on increasing diversity in the faculty. It has long been identified that a diverse faculty leads to recruitment of a more diverse student body, and recent studies also show that graduation rates for underrepresented minority students of all races/ethnicities are positively affected by increased diversity of their faculty.

3. Enhance our ability to offer and fund field trips.
One clear message from alumni and current students is the importance of field experience, and our department has a long and proud tradition in this area. Field trips have however become increasingly challenging to offer due to new risk management policies by the university. At present, we depend on student drivers for much of the transportation, since our department vans can only hold a limited number of students. Field trips for larger classes have increasingly depended on public transit or other modes (even bicycles), but this only works for very local trips, such as the GEOG 101 survey of Ocean Beach that is organized as a coordinated event for groups of 101 students by all of the instructors; students get to the site on their own, made possible by the availability of public transit. For longer trips, we may need to explore renting buses and drivers, or find a suitable and equitable way to support student drivers in private vehicles.

Graduate Programs
The biggest challenge to our graduate programs is a recent decrease in numbers of grad students, reflecting a pattern across the university related to the cost of housing in SF, but we are primarily focused on making improvements to our programs to maintain their high quality.

Section Four: Conclusions, Plans, and Goals

4. Improve our graduate programs and increase graduate enrollments through targeted revisions, increased resources for grad students, and development of an MS in Environmental Science.

One goal is to increase graduate enrollment while maintaining high quality. Some of the approaches we are working on are (a) grooming our best undergraduates; (b) increasing outreach; (c) making sure to promptly and effectively respond to prospective student inquiries; (d) increasing opportunities for grad student support on grants; and (e) lobbying for tuition waivers.

While increasing overall graduate enrollment is only an ancillary effect in this case, the department is actively pursuing Master of Science in Environmental Science. See Appendix A and other sections of the self-study. An ad-hoc committee in the department has been investigating this over the last year, and plans to submit a Prospectus this fall. There is significant demand and if we can be successful, this program could as a side benefit substantially address graduate course enrollment issues. This program would mostly use existing coursework in the department, and we have the faculty to support it. The new Dean of the Graduate School and the Dean of the College of Science & Engineering have expressed strong support for the program, and we are motivated to move forward on this exciting new program.

We are also considering a minor revision of the current grad programs to allow for seminars that bridge physical and human geography, perhaps with an environmental management focus. Other improvements include revising the M.A. programs to require two of three methods classes (701 Field Methods in Human Geography, 702 Field Methods in Human Geography Field Methods (qualitative), 705 Geographical Analysis (quantitative)).

Parallel with the above efforts, in order to deal with the current reality of limited grad enrollment, we are developing alternatives to the structure of our existing graduate offerings to make it possible to effectively staff courses with limited enrollment. One approach we are initiating is moving more toward shared seminars, with two faculty team-teaching required graduate seminars. We've done this with two seminars – the Geomorphology variant of GEOG 810 Seminar in Physical Geography and one variant of GEOG 820 Human and Social Geography – and another is being planned for Spring 2019 – and are working toward expanding this out to all of these offerings so we can provide a schedule (reduced though it will be) of graduate offerings for students to plan on. At the same time, we can identify whether any changes in fall vs spring offerings would help.

While we hear appreciation for our grad programs from alumni, in reality we fall far short of providing resources for their success. We need to improve support for students doing field work and travelling to conferences, for instance. Currently we have the Jean Vance award that is used to provide very limited support for this, using proposals submitted to the Chair, and occasionally faculty have grants that can cover travel.

To support both grad students and undergrads, we could benefit from training and other resources for Graduate Teaching Associates (GTAs). While we have long employed student assistants and graduate assistants as graders and other course support, we have only relatively recently started employing GTAs to be responsible for lab sections of courses, for GEOG 160 Introduction to Environmental Science and GEOG 603 Introduction to Geographic Information Systems. The GTAs work with lecture instructors to coordinate labs with lectures, but otherwise have no training in how to effectively teach a lab. We need to both identify existing resources for general GTA training and create our own materials and provide specific training for our courses.
Courses
While we have discussed course bottlenecks and other issues in the undergraduate and graduate program sections above, there are other areas demanding our attention due to recent changes at the university, such as in general education and methods courses that support both undergraduate and graduate programs.

5. Identify suitable existing courses that could work well in general education (GE).

In the recent revision of GE on campus, we recertified many of our courses that had been part of the old system, but left some out to focus more on their role as majors classes where prerequisites could benefit them. For the most part these decisions were sound, but we may need to reconsider some of these or other courses for GE. What we have also learned is that identifying multiple SF State Studies areas of American Ethnic and Racial Minorities (AERM), Environmental Sustainability (ES), Global Perspectives (GP), and Social Justice (SJ) are often natural fits for our courses, and identifying 2 or 3 of these "overlays" with suitable student learning outcomes already incorporated can make a course very popular, and can attract a broader spectrum of university students to our majors.

6. Increase the frequency of general methods courses and redesign as needed to support both graduate and undergraduate programs.

Three courses – GEOG 701/601 Field Methods in Human Geography, GEOG 702/602 Field Methods in Physical Geography, and GEOG 705 Geographical Analysis are options for grad students in the MA Geography and Concentration in Resource Management & Environmental Planning to meet the methods requirement; 705 is required for the MS Geographic Information Science program as its statistical methods are critical for that program. With the decrease in graduate enrollments, the ratios of undergrads to grads in both 701/601 and 702/602 have increased in recent years. At the same time, the BS ES has greatly increased demand for 602, which points to the need to increase its frequency from once/2 years to an annual offering. While the same cannot be said for 701/601, graduate students needing to learn the qualitative methods it provides also need to have it offered more frequently. GEOG 705 and our undergrad programs could benefit by pairing with an undergrad offering (providing support beyond the more introductory statistics in 205) as GEOG 605, which would be added as an elective to both the BA and BS degrees. These changes are more short-term, but could be considered in coordination with work on redesigning the MA grad programs to require 2 of 3 general methods classes.

Faculty & Resources
With the move to the College of Science & Engineering in 2011, we have been able to make some improvements in support for faculty, especially in the area of research support, as well as lecturers. Assistant Professors are provided a course off (3 WTU) and this is addition to the normal 3 WTU research assigned time for research-active professors in the college. These programs have led to an uptick in research productivity in the department, as can perhaps be seen in lists of faculty publications on our web site, on the page http://geog.sfsu.edu/publications-listing. However, we can do more, and we also need to emphasize the need to support a high quality of teaching.

We have focused on improving both financial and facilities resources in the department over the last several years, and have made some progress. We have increased departmental funding for research,
using a departmental committee to take proposals for exceptional needs. We have been actively working on critical space needs, and now have still limited but effective shared space for faculty research in HSS 383A (water quality lab), the Physical Geography lab (dedicated to relatively clean-room electronics such as data logger and environmental sensor development and drones), and the O3 soils & geomorphology lab (see http://geog.sfsu.edu/content/research-teaching-labs), and continue looking at ways to better support research needs through facilities improvements in these spaces.

7. **Improve IT support for lecturers, including provision of capable laptop computers.**

Academic Technology does provide laptops to lecturers that are reconditioned hardware from TTR faculty computer "refresh" allocations, however many lecturers are working with out-of-date computers and have sometimes opted to purchase their own. Perhaps this model can work better, or we may need to invest in computers for our lecturers.

8. **Enhance faculty instructional and research support.**

This priority is an ongoing project that we have been working on, but still needs attention. For instance, while junior faculty do benefit from the informal mentoring that does occur, this could be improved by a more formal program that is consistently informed by changes at college and university levels.

We hope to continue increasing our research profile and find additional ways to support faculty research. We are employing diverse funding mechanisms, including external grants, departmental sources as well as college, university and CSU programs. With this comes increased need for research budget management. While the Office of Research and Sponsored Programs provides budget management support for truly external grants, internal and CSU programs are administered through the department, and our AOC may need additional training.

We also need to operationalize a program for providing credit for completing grad students on thesis projects. In our 6th Cycle program review concluding in 2011, we identified the need to grant faculty members a course release for each six completed theses they chair/each twelve on which they serve as a second reader. We plan to operationalize that in the coming year, starting with thesis service since the last program review, using funding from IDC and other sources.

As space becomes available, we need to continue working with the college and university to plan for individual faculty offices. Shared faculty offices creates scheduling problems to make sure that office hours can be effective. However, we know this is a very long-term goal, and will need to wait until space is available, possibly after new construction not even fully planned yet.

9. **Use this program review process to identify upcoming faculty needs.**

One guiding principle is maintaining our currency and strength in the areas that support our curriculum, including considering areas where unmet demand exists. We are working on ways to support curriculum currently taught by lecturers, such as cartography and introductory techniques, and may need to consider faculty lines that bolster these, especially with increasing enrollment due to the BS ES. Another guiding principle is to identify areas of expansion in expertise, such as areas of geohumanities, environmental modeling, environmental policy, social & environmental justice, and health, as well as emerging new areas such as geographies & technology, transportation modeling, and data visualization.
In Conclusion
There's a lot to this self-study. We may not be able to accomplish all of our goals in the near-term, though some are already underway and others are easily accomplished. We hope that this self-study is sufficiently well organized and presented as to provide the external reviewers a decent picture of who we are, what we have accomplished, and what we may accomplish. There are major challenges in the current climate, but we have a good team with which to move forward. We greatly appreciate the review, and look forward to campus visits and moving to the next step.
Appendices
Appendix A. Exploratory proposal for a Master of Science in Environmental Science

Vision Statement: Our vision is to provide an interdisciplinary MSES degree that prepares students both for professions in the broader community of environmental sciences, resource management, policy and advocacy, or for advancement to Ph.D. programs elsewhere. We aim to recruit and graduate a diverse community of Environmental Science students and to provide a conduit for them to rewarding professional or academic careers.

MSES Demand: We attribute the demand for an MSES program to two key factors: 1) limited Environmental Science Master’s degree programs in the Bay Area, and 2) an influx in undergraduate enrollment in our B.S. in Environmental Science. There is currently only one MSES in the Bay Area, located at UC-Berkeley. This appears to be aimed towards students en route to Ph.D., and less towards training environmental professionals for jobs in public, non-profit, and private sectors. In contrast to the scarce MSES programs, there are a number of BSES degrees in the Bay Area, including our own new and rapidly growing program in Geography & Environment. Therefore, we presume there is a Bay Area demand for those who want to take their undergraduate studies further. Some of the student demand is met by our existing MA Geography with a Concentration in Resource Management & Environmental Planning and other Master’s degree programs in other departments across the College. However, our growing BSES program is attracting new, environmentally-minded students to CoSE (mostly due to the increase in Environmental Science taught at high schools). Based on this success, it is reasonable to expect that we would attract new potential Masters’ students from the region. In addition, the State of California now designates Environmental Scientist as a career category, so this program would provide a useful conduit to state jobs. We learned from a survey of environmental professionals that there is demand for the skillsets we are proposing in this MSES program, which we presume will be desirable for professionals seeking to earn a Master’s degree to advance their skills or shift focus within their careers. Of the demand in the Bay Area, evidence from our own students and interaction with high school AP Environmental Science classes suggests there is a diverse pool of potential students. Currently, Environmental Science is one of the least diverse fields in the sciences, and we believe there is need to increase diversity of professionals who are responsible for monitoring and managing our relationship with our environment.

Alumni Survey Results: Our survey goal was to find out where environmental professionals worked, the kinds of work they do, and the skillsets highly valued by their employers. We sent the survey to our department’s alumni and other contacts working in environmental science professions. About half of respondents worked for a government agency (at all levels, with State and Federal the highest), while the remaining respondents were mixed between non-profit and for-profit environmental organizations, as well as other universities and colleges. A number worked as independent contractors for many of the above mentioned agencies. Leading job descriptions included environmental or resource management, environmental monitoring and assessment, policy and planning. Skills seen as most important for potential employees were field based measurement and monitoring techniques, followed closely by GIS and knowledge in CEQA and NEPA as well as policy implementation. Specialized skills in: water quality, air quality, ecosystem science, wetlands, water resources, soil quality, other national acts, environmental justice, and climate change were seen as highly desirable. In order to prepare MSES
students to address complex and real-world environmental challenges, our proposed MSES degree would foster these skillsets and expand upon them by offering an interdisciplinary approach to student research projects.

**Program Learning Objectives:** The Program Learning Objectives (PLO) for the MSES are broken into five areas, related to knowledge, methods, and skills. Students completing the degree will:

1. Understand advanced theory and concepts in environmental science specialties including atmospheric systems, hydrology, earth surface processes, soils, water quality, and ecosystems, and will be able to relate these systems to one another and to human activities. For instance, they will understand the science behind water, soil and air quality, resource sustainability, and the causes and effects of climate change. They will also be able to explain impacts of human activities on the natural world and their influence upon the sustainability of human activities and natural processes on our planet.

2. Apply advanced field- and lab-based measurement and monitoring techniques to environmental systems research and observational and analytical skills. Students will be able to produce clear and accurate reports of this work.

3. Develop analytical methods including geographic information science (GIS and remote sensing from satellite and aerial imagery) methods to research environmental systems. They will be equipped with the mathematical and scientific background and methods to effectively analyze and model environmental systems, and be able to work with, manage, and interpret large datasets.

4. Learn advanced theory of human-environment relations and applications for resource management, conservation, restoration, sustainability and environmental justice. Students will apply environmental science principles and analytical methods to environmental management problems, and will be able to interpret these systems in reports to environmental management agencies in the public and private sector. They will develop an understanding of the importance and application of environmental regulations and statutes including CEQA and NEPA.

5. Develop an effective research design applying advanced methods to a well-developed environmental science research question and be able to critically evaluate the results in light of existing theory or observations.

**Course Plan:** We are in the preliminary stages of planning the course structure. However, the degree would utilize existing courses in Geography & Environment for the core (such as Seminar in Environmental Management, Field Methods in Environmental Science, GIS for Environmental Analysis, Environmental Policy). The remaining elective units would be used to develop specialist knowledge/techniques in a particular area for thesis research. These courses would be selected from a list of graduate and upper division classes offered in the department and college.

**Next Steps:** Complete a prospectus of the proposal to submit to Graduate Division by Nov 1st 2018.
Appendix B  Grants
From 2018 Faculty Activity Reports, reflecting last 5 years

Leonhard Blesius
- SFSU DRC $11,048
- Ken Fong $10,000

Tendai Chitewere
- UCSF Neighborhood Health $6500
- CCLS $5,000
- Climate Change Scholars $197,904
- SF BUILD grant $17.04M
- CSU Campus Living Lab $12,000
- CSU ORSP $15,000

Jerry Davis
- CSU GIS $249,289

Courtney Donovan
- Yerba Buena Center for the Arts $5000

Jason Henderson
- CSU Campus Living Lab $18000
- SFSU ORSP $12,500
- CSU DRC $8,000

Ellen Hines
- COAST $24518
- CA Coastal Conservancy $11,500
- Anthropocene Institute $60,000
- NPS $40,400
- Ocean Park Conservancy. Found $15,700
- Soc Sci Hum Res Council (Can) $2.5M
- Indo-Pacific Cetacean Research Conserv Fund $49k

XiaoHang Liu
- CCLS $5000
- Key Personnel NIH HEART & SOUL $323k
- RRT from Nat Inst Allergy & Infect Disease, PI Alexis Martinez $492k

Leora Nanus
- USFS PI $10k
- USFS PI $24,723
- CSU WRPI PI $5,067
- Japan Ministry of Education, Research Institute Humans and Nature Co-I $150k
- USFS PI $15k
- NPS PI $23k

Andrew Oliphant
- NSF Collaborative $28,764
- NASA subaward $51,074
- NSF MRI $418,484
## Appendix C Teaching Matrix

<table>
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<tr>
<th>Faculty</th>
<th>Courses</th>
<th>Avg Enrollment</th>
<th>Purpose of Course</th>
<th>Term Taught</th>
<th>Sections perTerm</th>
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Appendix D  Faculty Service Activities
From 2018 Faculty Activity Reports

**Department Service: Committees**

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### College/University Service

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Off-Campus Service

Sara Baguskas
- California Native Plant Society
- Nature in the City
- Peer review for 5 journals

Jennifer Blecha
- Building & Grounds Manager at church
- Mills Community Farm
- Peer review for 3 journals

Leonhard Blesius
- Peer review for 11 journals

Tendai Chitewere
- Program Reviewer
- Editorial Board: *Environmental Research Letters*.
- Fairview Park Neighborhood CORE, Night Out Committee; workshop convener; Earth Team Board of Directors
- Peer Review for 4 journals;
- NSF Science Education Resource Center, Carleton College, workshop convener.

Jerry Davis
- Program Reviewer
- Watershed Coalition Board
- Peer Review for 3 journals

Courtney Donovan
- Peer review: 8 journals
- Volunteer doula
- Veterans Creative Arts steering committee

Qian Guo
- Associate, Center for US-China Policy Studies
- Editorial Board: *J Env Sci & Studies*
- textbook reviewer for 2 books

Jason Henderson
- Co-Chair: Market and Octavia Community Advisory Committee
- Chair: Transportation & Planning Committee, Hayes Valley Neighborhood Association
- Peer review for 4-6 articles/year; book proposal review 2/year

Ellen Hines
- Expert, Marine Mammal Bycatch
- Global Ocean Biodiversity Initiative
- Sci Council, Global Ocean Refuge
- Editor. Reviewer for 8 journals

XiaoHang Liu
- Mentor to UCSF post-doc
- GIS Advisor on lead study, Fruitvale
• GIS journal peer review 2/year

Leora Nanus
• AGU judge, outstanding student paper awards
• peer review of journals

Andrew Oliphant
• AP Env Sci, SFUSD.
• Cal Acad Sci greenroof
• Geography Compass editor
• 4 peer reviews/year

Nancy Wilkinson
• San Pedro Creek Watershed Coalition
• Association of Pacific Coast Geographers meeting organizer
### Appendix E  Student-Faculty Ratios

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81
Appendix F  Geography & Environment spaces in HSS

Department spaces in blue.

Not shown: O3 lab.
Appendix G  Room Scheduling Fall 2018

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