1. UPDATES: Please list all major updates that you made to this document this year.

- Planning for a new undergraduate concentration in Sustainability Studies.
- Planning more formal linkages with the School of Management via undergraduate and graduate degrees.
- Planning an Undergraduate Honor Program for Geography concentrators.

2. GOALS AND PLANNING: With continuing reference to the three preceding sections of this Self-Study, please discuss significant changes, beyond those already documented above, that your unit is planning or that you foresee occurring over the next 10 years, and assess the potential impact of those changes on the scope and quality of academic programs.

A. The Curricular Context:

_How will your unit’s set of commitments and priorities in undergraduate and graduate education evolve (include enrollment projections in cases where you foresee a substantial change in student numbers)?_

Over the last five years, there has been a significant increase in the number of students taking classes offered by the Department of Geography and Environment and concentrating in degrees offered by the Department of Geography and Environment. For example, enrollment in GE classes that serve as ‘gateways’ to our concentrations in environmental science and environmental analysis and policy 386 students, GE 100 (Introduction to Environmental Science) and GE 101 (Natural Environments: The Atmosphere), increased from 386 student during the 2004/2005 academic year to 605 students in academic year 2010-2011. The increase in enrollements has translated into more students graduating with a concentration offered by the department of Geogrpahy and Environoment. As of September 2011, the number of students concentrating in Environmental Science (45) and Environmental Analysis and Policy (98) is greater than many more traditional departments such as philosophy, sociology, or anthropology.

We expect the increase in enrollments and concentrators to continue. But this increasing demand coupled with faculty retirements, faculty departures, and commitments to University-wide initiatives, such as the Clean Energy and Environmental Sustainability
and the Global Development MA programs, has stretched the existing faculty in Department of Geography and Environment so thinly that we can barely cover all of the courses required for undergraduate and graduate degrees.

List any academic programs that you are currently proposing/developing/reviewing/revising or planning to propose/develop/review/revise, either within your department or in collaboration with other units of the College and University.

Undergraduate

As described in last year’s document, faculty in the Department of Geography and Environment will use their highly productive research activities as a guide to develop a concentration in Sustainability Studies. This new concentration will provide a well-rounded education that covers the knowledge and skills needed by citizens to understand the challenges posed by unsustainable behaviors and to sort among the potential solutions. Extending the existing specialized environmental concentrations (Environmental Analysis and Policy and Environmental Science) to students interested in the liberal arts is critical. Sustainability is determined by trillions of every-day decisions—not the actions taken by a few, narrowly trained specialists.

Having developed this overarching vision, the Department of Geography and Environment will now begin the process of developing a new concentration in Sustainability. Consistent with the interdisciplinary nature of the topic, we will actively seek input from faculty in other departments and schools (within Boston University). To demonstrate CAS support for this effort, we will ask Dean Sapiro to convene a meeting of interested CAS faculty to help develop a curriculum in sustainability. We envision a concentration, which is administered by the Department of Geography and Environment, that includes classes from departments across CAS and perhaps other Colleges. In addition to intellectual support, we will ask Dean Sapiro to provide a mechanism that can sustain faculty support from beyond GE. In the past, faculty in other departments who contributed to environmental degree programs were pulled in opposite directions by commitments to their home department and their interest in supporting the environmental concentrations. We hope the Dean will be able to develop some mechanism by which faculty who volunteer to teach courses that contribute to environmental degrees can count those efforts against their commitments to their home department.

Along with partners in the School of Management and the College of Engineering, the faculty members in the Department of Geography have designed and developed a University wide undergraduate minor in Sustainable Energy. The proposal for a new minor in Sustainable Energy is under review by the CAS Academic Policy Committee. The Department of Geography and Environment has taken the lead role within CAS to support the minor. Towards this end, The Department of Geography and Environment


developed a new class, Sustainable Energy: Technology, Resources, Society, and Environment (GE 150) that enrolled 38 students in its second year.

Given the importance of and interest in energy, we are exploring ways to develop a new concentration in Energy and Environmental Management that would be jointly administered with the School of Management (SMG). Although this possibility has been discussed in previous years, significant progress towards this joint effort now is possible. After a year of self study lead by Dean Friedman, energy and the environment is one of the ‘focus areas’ of SMG. The SMG faculty is now looking for ways to strengthen offerings in this area and GE has offered its vision and strength in this area. SMG and GE faculty are now developing ways to implement this joint vision.

The Department submitted to the College a proposal for an Undergraduate Honors Program. To gain admission, candidates must have a minimum GPA of 3.3 (B+) at the time of their application. Candidates must also submit a one-page application to the Department that describes their research interests and motivations for pursuit of Honors. To earn the honors designation, Students must complete two classes with a grade of B+ or higher: GE 4XX “Research Methods in Environmental Science and Policy” and GE 4YY “Independent Honor’s Research. GE 4XX will be a new class that will introduce students to the major research themes and methods of faculty in the Department. In GE 4YY the students will execute the research proposed in GE4XX under supervision of a faculty advisor.

Graduate

The National Research Council ranked the PhD program in the Department of Geography and Environment as among the very best (if not best) Geography PhD programs in the US. The Department has worked very hard to generate this top ranking and plans to build on this success by focusing efforts on recruiting the very best graduate student applicants, and by speeding the rate at which PhD students complete their degree. Both of these efforts can be partially addressed in the curricular context.

Both recruitment and completion depend in part on student support. Currently, the department has relatively few (ten) Teaching Fellow (TF) positions that they can offer to incoming PhD students. Instead, faculty members offer potential students Research Assistant (RA) positions on projects supported by extramural funds. While this has allowed the department to attract high caliber students, it has slowed research because new PhD students often are not fully prepared to perform research. Furthermore, it has created road-blocks to placing students in faculty positions because some PhD students earn their degree without having served as TF’s and so have no teaching experience.

To ameliorate these difficulties, we ask for additional TF support. Last year, the Dean’s office allocated GE one additional TF on a one-time basis. The department allocated this
TF to GE 150 and GE 420. As described at the end of this section, the one-time addition needs to be made permanent and there are several other classes that need TF support.

As described previous years, the Department of Geography and Environment hoped to develop two new programs, an MA/MBA and an MS/MBA each of which combines training in economics, public policy, management, and environmental science. The programs would train a new generation of private sector employees whose role is to make decisions about sustainability. These positions include sustainability officers, who measure their firm’s environmental footprint and seek ways to reduce it, to venture capitalists, who must assess the promise of new energy and environmental technologies, to engineers, who must use mechanical and environmental criteria to design products.

While student and employer demand for such an education has increased, we have re-thought the nature of efforts at the MA level. Strong barriers exist to the creation of dual degree programs. These are especially strong in the School of Engineering, where there is strong resistance to allowing credit for non-engineering classes.

Instead, the Department of Geography and Environment will strengthen ties with the School of Management. Last year, we wrote that would would abandon efforts to build formal dual degree programs, in favor of a set of classes that are open to students in CAS and SMG that can be applied to MA degrees offered by the respective schools. We are again thinking of a dual degree program. As described above, the School of Management announced that Energy/Environment/Sustainability issues would be one of its three main areas of emphasis. Consistent with its desire to have specialty areas, the School of Management changed the requirements for its MBA degree such that the core classes could be completed in one semester. This gives MBA students much more flexibility in choosing courses. Given this new opportunity, we are currently working with SMG faculty to explore ways in which GE and SMG could offer a joint degree or contribute formally to the SMG emphasis on Energy/Environment/Sustainability.

Please take advantage of this opportunity not only to think about new initiatives and growth areas, but also to assess the costs and benefits of any degree programs or minors currently offered or staffed by your unit that enroll small numbers of students. List those programs/minors here, and in each case say why the program should be continued as is, strengthened, or discontinued to free up teaching capacity for higher priorities.

Over the last five years, the number of students taking classes in human geography has been fairly stable while the number of concentrators in human geography and physical geography has remained small. Furthermore, recent changes in the GE faculty make it difficult to offer undergraduate and graduate classes in human geography and to support the undergraduate concentration. Over the last four years, Professors Lakshmanan and Chatterjee retired and Professors Walker and Anderson accepted positions at the University of California, Berkeley and The University of Windsor, respectively.
Rather than use the positions opened by their departure to rebuild the human geography program, we plan to replace these faculty members with those who can support the new concentration in Sustainability Studies, MA degree programs that span the Graduate School of Arts and Sciences, The School of Management, and the College of Engineering, and who will foster interdisciplinary research clusters that focus on challenges associated with energy and sustainability.

**B. Specific Course Needs: In what significant ways will the changes listed in “A” above affect the courses (kind, size, format, offering patterns) you will need to offer?**

**New TF Support**

As described above, the Department of Geography and Environment is requesting six additional TF positions—fourteen, instead of its existing allocation of ten. Here we justify this expansion in terms of benefits to undergraduate/graduate education. The benefits to maintaining the nation’s the top ranked PhD program are described above.

- **GE 100 (1TF)** *GE 100 Introduction to Environmental Science* This class is offered in both the spring and fall semester, currently has discussion sections, and is staffed by two TFs. As described above, enrollments have increased significantly over the five years, with 200 students in Fall, 2011 compared to 159 in fall 2009. Discussions with the Dean’s office generated agreement that the size of discussion sections should be decreased and the number of sections offered should be increased. This will improve the experience of the students, but will also require additional TF’s. This need is based on the hours required to support GE 100 students. Currently, TF’s spend 3 hours a week in lecture, about 2 hours preparing that week’s lesson plan, 4 hours in discussion section, and about an hour of tasks, such as helping to prepare exams, hold office hours, etc. These lesson plans include weekly quizzes and essays that the TF must grade (the grade from the discussion section currently accounts for 25% of a student’s final grade). The current allocation of two TF’s means that each is responsible for about 100 students (enrollment of 200). Assuming that the TF spends about ten minutes on each student’s weekly assignment, responsibility for one hundred students implies about 17 hours of grading effort. Together, this sum comes to 29 hours (100 students implied five sections per week), which is well beyond the 20 hours assumed for TF effort. A third TF will make the work load for TF’s for GE 100 closer to the Department (CAS) average.

- **GE 101 (1TF)** *Natural Environments: The Atmosphere* The hourly requirements for TF’s in the GE 101 lab are even larger. TF’s are expected to attend lecture (3 hours/week), spend about 3 hours preparing that week’s lab lesson plan (labs are a bit more complicated to master than discussion sections), 9 hours a week in lab (3
labs/week*(2 hr/lab + 0.5hr set up + 0.5 clean up). Each week, the TF’s have a lab to grade. Assuming 75 students at about 10 minutes per lab, that is another 12 hours of grading per week. Together, this sum of 27 hours per week, is well beyond the 20 hours assumed for TF effort A third TF will make the work-load for TF’s for GE 101 closer to the Department (CAS) average.

• **GE 150 (0.5TF)** *Sustainable Energy: Technology, Resources, Society, and Environment* This class is offered once a year and its one of the required classes for the new University-wide minor in Energy. When first proposed, the class included discussion sections, in which the students would do ‘hands-on’ quantitative analyses, such as doing energy conversion, calculating incident solar insolation, and so on. The Social Science Curriculum Committee recommended that the discussion sections be eliminated pending enrollments. In its first year, the class has 36 students and we anticipate strong gains in enrollment. Last year, the Dean’s office allocated an additional 0.5 TF to support the discussion sections that were included in the original course proposal. We request that the one-time allocation be made permanent.

• **GE 250, GE 304, and GE 309 (1.5TF)** These classes currently have fifty or more students and no TF support. Discussions with the Dean’s office generated agreement that we should add discussion sections to these classes. During those discussions, the Dean’s office asked that we request TF support for these classes in this document.

• **GE 550/712 (0.5 TF)** *Modeling Environmental and Social Systems/Regional Energy Modelling* These two classes are offered one per year. Despite their ‘high numbers’ these classes include both graduate and undergraduate students. They are both extremely computer-intensive. GE 550 focuses on computer simulation models while GE 712 focuses on applied time series statistical techniques. Both classes hold weekly computer based labs and home works and require original projects that are done largely using specialized computer software (Matlab or RATS). Neither class has a TF. Instead faculty members are forced to play the role of a TF. But neither faculty member can spend 20 hours per week required and so students often feel lost. A TF would clearly alleviate this constraint. Furthermore, both classes are already near their limit of 20 students. A TF would allow the instructors to increase class size and service students from beyond Geography and Environment as part of the Social Science Methods Network. As such, TF support for these classes seems appropriat. Towards this end, we request a single TF be split between these two classes.