

UNIVERSITY OF MAINE SYSTEM NEW PROGRAM PROPOSAL

I. Full program title.

B.S. in Climate Change and Culture

II. Program objectives.

A. Narrative description of program rationale.

Climate Change is one of the leading environmental and human problems facing the world today. Melting glaciers and rising oceans with landward-moving shorelines are one side of the issue; shifting temperature and moisture patterns and the responses of earth's biota to these changes add to the dilemma. The other side of the problem is the human dimension, both with regards to impact and response. Humans contribute to global warming and environmental degradation, and humans alone can provide solutions to these problems through successful policy initiatives at local through global scales. A recent publication with numerous contributions from University of Maine faculty describes in detail the challenges facing Maine as our climate continues to change (Maine's Climate Future: An Initial Assessment. 2009. G.L. Jacobson, I.J. Fernandez, P.A. Mayewski, C.V. Schmitt, editors, University of Maine, 74 p.).

Solutions to the many problems arising from climate change will only be found with an understanding of the processes that govern both climate *and* human culture (understood in the broad sense of technological, sociological, and ideological systems). Successful policy decisions to mitigate climate change will be based on solid science and social science related to culture. There is a dire need to direct basic and applied research to understanding the human and natural causes and effects of climate change, as well as the cultural—that is, the international as well as the national—dimensions of these interactions and their consequences.

Basic scientific observations led us to our current understanding of past climate changes and the spectrum of possible future climate scenarios. Our current view of climate change has evolved from a variety of scientific disciplines. Current and future scientific work will provide a better understanding of the nature of changes to come, as well as the implications of these changes for people and ecosystems.

Earth Sciences initially provided us with an understanding of past climate changes by recognizing landforms on the earth's surface that represent climatic processes that are no longer locally prevalent. Modern earth scientists are relating measured changes in the atmosphere to phenomena in the hydrosphere and cryosphere. They are producing powerful models that link the components of the hydrologic cycle and yield predictions ranging from the future level of the ocean and position of shorelines to regional temperature gradients and the response of terrestrial and marine ecosystems.

Social scientists have an extremely important role to play in assisting state, national, and world decision makers in understanding environmental problems and finding solutions to them. Social scientists work with policy makers, conduct research among local populations around the world, and on the basis of this work devise policies that take into account the social and cultural implications of policy decisions from local to international scales.

Anthropology is exceptionally well positioned to address these important dimensions of climate change. Anthropologists draw their data from all known human societies. Social anthropologists conduct extended periods of fieldwork in communities around the world; physical anthropologists and archaeologists reconstruct those of the past. As a result of this work, anthropologists have built up robust models and explanations of similarity and variance across cultures. They are unusually well equipped to investigate and understand responses to climate change by people whose cultural backgrounds may be radically different from those of the western world. They have a detailed knowledge of how environment and climate shapes cultures, and of how cultures shape their environments. And they are able to devise policies that take cultural differences into account in devising and managing climatic solutions.

It is our goal to create a degree program that produces students capable of rising to the challenge of the climate-change issue. UMaine is already widely known for the research conducted by its Climate Change Institute. Institute faculty are jointly appointed and affiliated in academic units, most significantly Earth Sciences and Anthropology. This program will capitalize on the faculty, facilities, research, and graduate programs currently in place by offering an undergraduate B.S. degree in Climate Change and Culture that draws on the existing faculty and infrastructure of the Departments of Anthropology and Earth Sciences.

This degree program will be a signature program for UMaine because: 1) it will be based in an existing program of excellence, 2) the faculty, courses, and infrastructure are largely in place, and 3) no other such program exists in the nation.

By creating an exciting degree program revolving around climate change, we will provide students with a thorough grounding in what is likely to become the most important environmental issue in their lives. Because the program will be unique, moreover, it should attract students both from within and from out-of-state and offer them opportunities to work with faculty on exciting scientific questions in research areas all over the world. It promises also to transform UMaine into the first choice school of many students who would not otherwise apply here.

B. General program goals (limit to 3-5 major items maximum).

1. To provide students with a thorough grounding in what is likely to become the most important environmental issue in their lives.
2. To engage future climate policy makers in the interdisciplinary framework essential to bridge social and environmental sciences.
3. To produce future global citizens who are capable of rising to the challenge of the climate-change issue.
4. To provide UMaine with a signature program based in an existing area of excellence with faculty, courses, and infrastructure largely in place.
5. To increase the number of highly qualified and diverse students for whom UMaine is a first-choice institution.

C. Specific student outcomes or behavioral objectives.

The program will engage students in a multi-disciplinary framework bridging social and climate sciences in one of the most important scientific and cultural challenges facing the world today. These engaged students will be able to understand the diverse causes and impacts of climate change to better enact successful policy decisions at local, national, and international levels. The program will provide students with skills useful outside as well as within the academic environment. Specific skill sets are both quantitative and qualitative, including: (a) application of analytical tools such as stable isotope analysis to determine the climate record from ice cores, and (b) ethnographic methods and analysis (e.g., participant observation, directed interviewing, statistical analysis of qualitative and quantitative ethnographic data). We envision students finding positions in private business as well as in state, national, and international institutions that deal with policy decisions related to climate management and change.

Learning Outcome Assessments. The centerpiece of the program Learning Outcome and Assessments (LOAs) will be the Climate Change and Culture Seminars (I and II) offered in the student cohort's first and last semester. If the program is approved, we look forward to working with the Center for Excellence in Teaching and Assessment to develop a Learning Outcomes and Assessment strategy that incorporates the two departments in a cohesive assessment program and includes best practices for learning outcomes. Since the courses used for this program are already part of separate departmental LOAs, we envision that developing LOAs for the new program may involve extensive modifications of the current LOAs already in place. We are willing to undertake such modifications if the program is approved.

D. Accountability.

This program will be unique; no other similar program exists. Students will be actively engaged in social science and science training and research based within

the interdisciplinary framework. This program will incorporate largely existing faculty, courses, and resources within the Departments of Anthropology and Earth Sciences. A full external program review will take place after five years. The program itself will conduct internal budgetary and curricular reviews in years two and five as well.

III. Evidence of program need.

Climate Change and Culture. In response to growing awareness of the global climate crisis, we need to train future citizens not only in how the climate system works and why the environment changes through time, but also to comprehend the complexities and intricacies of diverse global cultures and how humans impact climate and ultimately influence policy. We need interdisciplinary analyses to understand the science and social science behind climate change and how to adapt and/or implement policy to help mediate problems and find solutions. Our program in Climate Change and Culture seeks to provide such solutions.

The Climate Change Institute offers an M.S. degree in Quaternary and Climate Studies, incorporating an academic program within a robust research center to produce the one of the best academic/research units focused on global climate change in the world. Graduate students come from all over the world to work with our renowned faculty, faculty who are jointly appointed in diverse academic programs across campus but most significantly in Earth Sciences and Anthropology. Globally, we have a need for a trained workforce who understands the complexity of the issues surrounding climate change and who can incorporate that understanding at all levels of decision making and in all arenas. We need to train not only graduate students, but undergraduates as well, who will find positions in private business as well as in state, national, and international institutions that deal with policy decisions related to climate management and change.

The State of Maine. A recent report on Maine's climate future (Maine's Climate Future: An Initial Assessment. 2009. G.L. Jacobson, I.J. Fernandez, P.A. Mayewski, C.V. Scmitt, editors, University of Maine, 74 p) submitted to the governor, outlines the measured changes that have taken place in Maine's climate and underscores the need to anticipate future changes as well. Warmer and wetter conditions will profoundly affect our economy, shifting vegetation communities, altering fisheries in the Gulf of Maine, possibly harming skiing and maple sugar industries, among other problems. Rising sea level along our coast already threatens whole beach communities, and coastal marshes are at risk of drowning. We are proposing to create a pool of young climate scientists who, armed with an understanding of the science and social science of climate change, will be poised to help our society adapt to the coming changes and possibly thrive by creating new opportunities from climate issues. Owing to the expertise concentrated at the

University of Maine, it is not possible to offer this degree at any other institution, public or private, in the State of Maine.

Strategic directions at the University of Maine. The proposed program will advance a number of goals of the UMaine Strategic Plan. The program aligns well with the *University's Strategic Plan, 2006-2011* to:

- 1) *be a first choice institution for highly qualified and diverse students* (Strategic Goal 1). Our proposed program is unique in the nation and likely to draw exceptional students with interests in climate change.
- 2) *increase research opportunities for undergraduate students, drawing on our strengths as a research university* (Strategic Goal 1.1.1). The undergraduates we attract will share our research experiences as well as opportunities to conduct research with our graduate students, who will serve as co-mentors with faculty on funded projects in Maine and around the world.
- 3) *increase the number and visibility of interdisciplinary programs* (Strategic Goal 1.1.2). This proposed cooperation between Earth Sciences and Anthropology involves faculty and units that already collaborate successfully with each other and with joint graduate students through the Climate Change Institute.
- 4) *develop new programs that maximize existing strengths* (Strategic Goal 1.1.2). The proposed new undergraduate program draws on faculty, facilities, and collaborations already in place in one of UMaine's highly successful graduate programs: the Climate Change Institute.

A. For 2-year programs, indicate potential employers who have requested the program and their specific employment projections.

NA

B. Detailed survey of similar programs that are offered within the University System, other higher education institutions or other agencies within the State.

There are no similar programs within the state or the nation.

C. Enrollment projections for five years.

The program is cohort based and is projected to attract excellent students from within and out-of-state. Ideally, we would admit 10-20 new incoming students each year for a four-year program total of 40-80 students. Anthropology currently has two active undergraduate degree programs, the B.A. in Anthropology (110 majors OIS; 126 majors ANT) and the B.A. in International Affairs/Anthropology (23 majors OIS; 30 majors ANT), as well as an incoming Ph.D. program in Anthropology and Environmental Policy that will admit students in the Fall, 2011.

Earth Sciences has a B.S./B.A. program in Earth Sciences (52 majors, OIS) as well as two active graduate programs, the M.S. and Ph.D. in Earth Sciences (31 candidates, of whom 17 are Ph. D. students, OIS). Anthropology and Earth Sciences are also actively involved in the M.S. in Quaternary and Climate Studies program through the Climate Change Institute (approx. 12 candidates). We could admit a greater number of incoming students if resources were expanded beyond those stipulated in this proposal, but are presently limited by the size of our upper-level class laboratories and a lack of graduate teaching assistants for those courses.

IV. Program content.

A. Outline of required and/or elective courses (not syllabi):

The program centers on core courses in Anthropology and Earth Sciences and culminate in the Capstone research experience which can be in the field, lab, or through research and writing. Student cohorts will be selected into the program before they start their first year of study. There will be a selection process to limit the numbers of students in the program to help control resource flow within both departments to provide an optimal academic experience.

The program will be overseen by a committee to include the department chairs and a subset of instructors of the required courses. Numbers of majors will be counted in both the Anthropology and Earth Sciences Departments, which could be accomplished in a variety of ways.

Cultural Climate Change Core Courses (21 sch):

- ANT 110 Seminar in Climate Change and Culture I (3)
- ANT 101 Introduction to Anthropology: Human Origins and Prehistory (3)
- ANT 102 Introduction to Anthropology: Diversity of Cultures (3)
- ANT 410 Seminar in Climate Change and Culture II (3)

Three courses from this list:

- ANT 250 Conservation Anthropology: The Socio-Cultural Dimensions of Environmental Issues (3)
- ECO 381 Sustainable Development Principles and Policy (3)
- ANT 4XX Climate Change and Health (3)
- ANT 420 Human Impacts on Ancient Environments (3)
- ANT 435 Human Dimensions of Natural Resource Management (3)

Earth, Oceans, and Atmosphere Climate Change Core Courses (25-26 sch):

One course from this list:

- ERS 101 Introduction to Geology (4)
- ERS 102 Environmental Geology of Maine (4)
- ERS 103 Dynamic Earth (3)
- ERS 108 Beaches and Coasts (3)

SMS 100 Introduction to Ocean Science (3)
ERS 121 Humans and Global Change (3)

ERS 201 Global Environmental Change (4)
ERS 369 Energy Resources and Climate Change (3)
ERS 323 Severe and Hazardous Weather (3)
SMS 402 Oceans and Climate Change (3)
ERS 441 Glaciers and Our Landscape (3)

Capstone Research and/or Laboratory Experience (1-6 sch):

The Capstone will involve one of the following:

- 1) a significant field experience, such as the Field Camp presently required by ERS (ERS 499, 6 sch), or the Archaeological Fieldschool (ANT 477, 4 sch);
- 2) a Research Experience for Undergraduates (REU) field and/or laboratory experience;
- 3) an Honors College research thesis; or
- 4) ANT 492 Capstone (1 sch)

Other Courses (13-16 sch):

1 ecology course (3-4 sch)
1 physics course (4 sch)
1 math course (3-4 sch)
1 chemistry course (3-4 sch)

TOTAL SCH = 61-70 sch

B. Development of new courses and/or what they may displace:

The only new course that needs to be developed for this program is *ANT 110 Seminar in Climate Change and Culture I* that will be the student's introductory, integrative seminar. *ANT 410 Seminar in Climate Change and Culture II* (which will be a new course number but has previously been offered as *ANT 490 Special Topics*) will need to be slightly modified so that there is a cohesive educational and LOA flow from ANT 110 to ANT 410. This course will not displace anything, but will only be offered to the Climate Change and Culture cohort.

C. Type of research activity, if any, in program design

Undergraduate student research activity will involve analyzing the intersection between climate change and human affects, and potential avenues of research will be as diverse as the topic itself. An understanding of this climate/culture intersection will be presented, specifically, in the *Climate Change and Culture Seminar* at the beginning of the first year where students will analyze current research on the topic and begin to grapple with the extent of the problem and the intermingled nature of needed solutions. Research, in the form of analytical papers and hands-on field or laboratory data collection, will also be conducted in mid- and upper-level courses and their capstone.

For example, students will be involved in research analysis of the different types of human/environmental relationships that emerge across diverse cultural, socio-economic, and political contexts using case studies around the world in *ANT 250 Conservation Anthropology: The Socio-cultural Dimensions of Environmental Issues*, culminating in an analytical research paper. In *ANT 420 Human Impacts on Ancient Environments* students will critically evaluate the relationship between humans and their environment to assess the local, regional and global impact of humans on our planet. This type of analysis will involve research into human-induced environmental changes through time and how these have and will impact contemporary resource management and environmental policy for the future, again culminating in broad-scale analytical research paper. Students will investigate the global carbon cycle through use of a numerical model in *ERS 201 Global Environmental Change*, and will study renewable energy resources and the role they might play in mitigating anthropogenic climate change in *ERS 369 Energy Resources and Climate Change*.

The Capstone will involve research in many venues, such as the field, lab, or scientific literature. Many students will work on capstone research projects with faculty working on funded projects, often internationally. This year our undergraduates traveled to Peru, Scotland, Antarctica, and Maine among other places to conduct research.

D. Nature of independent study, clinical experience, and/or field practicums employed in curriculum design

N/A

E. Impact of program on existing programs on the campus

We expect this program to attract students to UMaine who would otherwise not apply here, with a disproportionately large number of applications coming from top quality students from out-of-state. Given this probable student demographic, the Climate Change and Culture program will not displace many students from other programs at UMaine. The programs most greatly impacted are expected to be Anthropology and Earth Sciences themselves, which is an important rationale for both of these units being able to count Climate Change and Culture majors in their total yearly major numbers.

Anthropology serves a large number of students in their existing undergraduate programs and courses, and just recently has the additional responsibility of a Ph.D. in Anthropology and Environmental Policy that will serve a small number of graduate students. Earth Sciences has a moderate-sized undergraduate program in addition to a strong graduate program with a large number of students. Serving 40-80 additional students in the new program will not be a problem in our large-sized introductory classes, but will be more problematic in the mid- and upper-level courses where there could become competition for space with Anthropology

and/or Earth Sciences majors. Depending on the size of the three different undergraduate programs, we anticipate having to: (a) offer high-demand courses more frequently as we cannot increase enrollment in these courses (some of these courses are currently offered every other year, and laboratory space in most of the Earth Sciences courses is strictly limited by the physical dimensions of the rooms), or (b) limit enrollment in upper-division courses to students enrolled in a particular major. If demand grows beyond the number for whom we have space, and no new resources are available above those requested in this proposal, then transfer into the program from elsewhere on campus and continuation in the program will need to be limited. A specific plan for these actions will be developed when and if needed.

Because of the constraints we already see, we are requesting one faculty position and two graduate teaching assistants for this program. The faculty position will be a tenure-track Assistant Professor in Anthropology, and the graduate Teaching Assistant positions will be one in Anthropology and one in Earth Sciences. These positions are needed because students admitted into this program will be added to units already teaching large numbers of undergraduate and/or graduate students, and because of physical space constraints on laboratory-based class sizes.

A faculty position is needed in Anthropology, where the number of majors in two undergraduate programs (B.A. in Anthropology and B.A. in International Affairs/Anthropology) has increased by 87% over the past 5 years. Anthropology also teaches the most SCH/FTE of any unit at UMaine (1,115 SCH/FTE for AY 09-10, not including DLL production; data from Office of Institutional Studies). For comparison, the SCH/FTE for all UMaine units is 368.5 SCH/FTE, the College of Liberal Arts and Sciences is 440 SCH/FTE, and the College of Business, Public Policy and Health is 470 SCH/FTE (OIS).

Anthropology's mid- and upper-level courses are taught mainly to its majors using writing intensive, research intensive, and/or laboratory intensive strategies. To mount the Climate Change and Culture Program, we will not only have to maintain these strategies for current majors but also cater to the new Climate Change and Culture program majors. Specifically, the Cultural Climate Change core courses of ANT 410, ANT 250, ANT 4XX, ANT 420, and ANT 435, which are currently offered every other year, will have to be offered more frequently to accommodate the demands of the new major. The requested extra faculty position in anthropology is intended to meet the extra teaching resources needed to accommodate the demands of the new program.

Anthropology also advises graduate students in the M.S. programs in the Climate Change Institute, Marine Policy, and Environmental and Ecological Sciences. In addition, Anthropology has a new Ph.D. program in Anthropology and Environmental Policy, which was approved in January, 2011 without additional resources. To continue serving its current undergraduate and graduate students, to add new Ph.D. students, and to include new students associated with this program,

Anthropology therefore needs an additional resources in the form of one tenure-track Assistant Professor and one graduate Teaching Assistant. The Teaching Assistant will be a Ph.D. student in the Anthropology and Environmental Policy program and will provide support for both 100- and 200-level anthropology courses that teach large numbers of students and our Climate Change and Culture Seminar sequence.

Earth Science faculty are heavily involved in externally funded research, yet still teach upper-level field- and laboratory-based courses as well as writing-intensive courses with no support from Teaching Assistants. Significant expansion of enrollment in upper-level courses required for the Climate Change and Culture degree (ERS 201, ERS 369, ERS 441), or available as electives for the degree, will compromise faculty research activity unless an additional Teaching Assistant is available to help with those upper level courses. In addition, because of the design of the Bryand Global Sciences Center where these courses must be taught, there are insurmountable class-size limits imposed by the physically available space.

Another program that may be impacted is the Honor's College. We envision that with the research focus and Capstone requirements of the program and the high-quality of the admitted students, many of the students will choose to participate in the Honor's College. Students in our program will also need to take courses in biology, calculus, physics, and chemistry, although there is no specific time-frame for completion of these courses.

V. Program resources.

A. Personnel.

The core of the program is already largely in place. It consists of a group of internationally recognized faculty, extremely active in research and publication in international journals and presses and in securing prestigious grants and scholarships. Most of these faculty are members of the Climate Change Institute or work on climate change research. These faculty are either directly involved in teaching the program courses, will help with advising students, participate in research projects, and provide guest lectures as needed, or are members of the Anthropology or Earth Sciences departments who will be conducting more of the load of maintaining our current programs. Participating faculty, whose vitae are in Appendix I, include in alphabetical order:

James Acheson

Professor of Anthropology and Marine Sciences

Dan Belknap

Professor of Earth Sciences

Cooperating Professor in the Climate Change Institute

Fei Chai

Professor of Oceanography
Cooperating Professor of the Climate Change Institute

Sudarshan Chawathe

Associate Professor of Computer Sciences
Cooperating Professor of the Climate Change Institute

George Denton

Professor of Earth Sciences and Climate Change

James Fastook

Professor of Computer Sciences
Cooperating Professor of the Climate Change Institute

Ivan Fernandez

Professor of Soil Science
Cooperating Professor of the Climate Change Institute

Christopher Gerbi

Assistant Professor of Earth Sciences

Brenda Hall

Associate Professor of Earth Sciences and Quaternary and
Climate Studies

Gordon Hamilton

Associate Professor Earth Sciences and Climate Change

Samuel Hanes

Faculty Associate of Anthropology

Roger Hooke

Research Professor of Earth Sciences
Cooperating Professor of the Climate Change Institute

Stephen Hornsby

Professor of Geography and Canadian Studies
Director, Canadian American Center

Shaleen Jain

Assistant Professor of Civil and Environmental Engineering
Cooperating Professor of the Climate Change Institute

Teresa Johnson

Assistant Professor of Marine Policy
Cooperating Professor of Anthropology

Scott Johnson

Professor of Earth Sciences

Alice Kelley

Research Assistant Professor of Climate Change Institute
Cooperating Professor of Anthropology

Joseph Kelley

Professor of Earth Sciences and Climate Change

Andrei Kurbatov

Assistant Research Professor of Climate Change

Daniel Lux

Professor of Earth Sciences

Peter Koons

Professor of Earth Sciences
Cooperating Professor in the Climate Change Institute

Karl Kreutz

Professor of Earth Sciences and Climate Change
Director, Stable Isotope Lab

Kirk Maasch

Professor of Earth Sciences and Climate Change

Paul Mayewski

Director, Climate Change Institute
Professor of Climate Change

Stephen Norton

Professor Emeritus of Earth Sciences and Climate Change

Lisa Neuman

Associate Professor of Anthropology and Native American Studies

Constanza Ocampo-Raeder

Assistant Professor of Anthropology
Cooperating Professor in the Climate Change Institute

Amanda Olsen

Assistant Professor of Earth Sciences

Brian Olsen

School of Biology and Ecology

Darren Ranco

Associate Professor of Anthropology
Chair, Native American Programs

Andrew Reeve

Professor of Earth Sciences

Brian Robinson

Associate Professor of Anthropology and Climate Change

Paul (Jim) Roscoe

Professor of Anthropology
Cooperating Professor of the Climate Change Institute

Daniel Sandweiss

Professor of Anthropology and Quaternary and Climate Studies
Dean and Associate Provost for Graduate Studies

Jasmine Saros

Associate Professor of Paleoecology and Climate Change

Kristin Sobolik

Professor of Anthropology and Climate Change

Marcella Sorg

Research Associate Professor, Margaret Chase Smith Policy
Center, Climate Change Institute, Department of
Anthropology

Timothy Waring

Assistant Professor of Human Ecology
Cooperating Assistant Professor of Anthropology

Gregory Zaro

Assistant Professor of Anthropology and Climate Change

1. Specific effect on existing programs of faculty assignments to new program.

All of the courses needed for this program are currently in place except for ANT 110 Climate Change and Culture Seminar I. The mid- and upper-level courses currently in place are near or at capacity so would need to be offered more frequently to accommodate more students. Increased enrollment in these courses would decrease our ability to offer a research-intensive experience and is not how we want to conduct this new program. Coverage of the Climate Change and Culture Seminar and for increased enrollment or increased frequency in offering our mid- and upper-level courses will involve faculty reassignment, and faculty and graduate teaching assistant additions.

B. Current library acquisitions available for new programs.

Library holdings are generally adequate in Anthropology and Earth Sciences and in many of the fields that will support this program.

C. New equipment necessary for new program and plan for its acquisition and implementation.

Equipment needs for this program are either in place or can be acquired through normal grant channels.

D. Additional space requirements, if any, including renovations.

This program does not require additional laboratory space. Anthropology has five active research laboratories and Earth Science has 10 active research laboratories.

E. Extent of cooperation with other programs, both on the initiating campus and other campuses.

The Climate Change Institute is one of the best academically-oriented climate change-focused research groups in the nation, and the Institute is supportive of all aspects of this proposal. Most Climate Change faculty are appointed and affiliated in the departments of Earth Sciences and Anthropology, although other academic units house additional faculty whose research and teaching focus on climate change issues. These units include the Department of Computer Science, the School of Marine Sciences, the School of Biology and Ecology, and the Department of Civil and Environmental Engineering (see Section V.A.).

VI. Total financial consideration.

An undergraduate program in Climate Change and Culture will be an opportunity for UMaine to attract students who would not necessarily apply or come to UMaine otherwise. This would be a signature program for UMaine because it would be based in existing units that are nationally and internationally recognized for their leadership in cutting-edge research, the faculty and infrastructure are largely in place, and no other such program exists in the nation.

A. Estimate of anticipated cost and anticipated income of the program for five years.

The anticipated costs of the program are solely in the faculty and graduate teaching assistant positions needed to help teach the courses directly, teach for reassigned faculty, and help with the high enrollments and numbers in our current undergraduate offerings in addition to the students projected for the new program. The tenure-track position would be in Anthropology with an anticipated starting base salary of \$45-47K. That could increase incrementally over five years given AFUM salary increases. We estimate 2.5% salary increases per year, although that has not been the case for faculty over the past few years, for a total 5-year total cost of \$367,281 (Table 1). Two Graduate Teaching Assistantships include a base stipend of \$12,790, plus full-time tuition (9 sch/semester) that ranges from \$8,244 for in-state tuition to \$21,744 for out-of-state tuition, plus ½ of health insurance costs (\$1,183) for a 5-year total cost range of \$222,170 - \$357,170 (Table 2). This brings the estimated anticipated cost of the program over a Five-Year Timeframe to be **\$589,451 – \$724,451**.

Table 1. Estimated Cost of the Program over a 5-Year Timeframe; Assistant Professor Costs

	Salary	Asst. Professor
Year 1	Base/Stipend	\$46,000 ¹
	Benefits ²	\$23,874
Year 2	Base ³	\$47,150
	Benefits	\$24,471
Year 3	Base ³	\$48,329
	Benefits	\$25,083
Year 4	Base ³	\$49,537
	Benefits	\$25,710
Year 5	Base ³	\$50,775
	Benefits	\$26,352
TOTAL		\$367,281
1 = Estimate Base Salary (range \$45-47K)		
2 = Benefit rate is 51.9%		
3 = Estimate 2.5% Salary Increase/Year		

Table 2. Estimated Cost of the Program over a 5-Year Timeframe; Graduate Teaching Assistantship Costs

Salary per Position		Teaching Asst.
Year 1	Stipend ¹	\$12,790
	Tuition and Fees ²	\$8,244 – \$21,744
	Health Insurance ³	\$1,183
Year 2	Stipend ¹	\$12,790
	Tuition and Fees ²	\$8,244 – \$21,744
	Health Insurance ³	\$1,183
Year 3	Stipend ¹	\$12,790
	Tuition and Fees ²	\$8,244 – \$21,744
	Health Insurance ³	\$1,183
Year 4	Stipend ¹	\$12,790
	Tuition and Fees ²	\$8,244 – \$21,744
	Health Insurance ³	\$1,183
Year 5	Stipend ¹	\$12,790
	Tuition and Fees ²	\$8,244 – \$21,744
	Health Insurance ³	\$1,183
TOTAL		\$111,085 – 178,585
Assistantship (2) TOTAL		\$222,170- 357,170
1 = Minimum stipend set by the Graduate School 2 = Range includes In-State, NEHBE, and Out-of-State Tuition, estimate with no tuition increases 3 = Includes ½ Health Insurance costs, estimates with no cost increases		

Revenue will come in the form of increased tuition dollars from students who would not normally apply or come to UMaine. This is hard to specifically quantify, but we expect a moderate to large percentage of the students who are accepted into the program to be non-Maine residents paying out-of-state tuition. We feel confident in this projection because natural sciences programs at the University of Maine have a significant proportion of out-of state majors, ranging from 20 to greater than 50%. We expect the Climate Change and Culture degree to follow this trend, and we also expect students enrolled in the degree program to be high-achieving individuals who may be awarded academic scholarships. Notably, this new degree will offer an exciting opportunity for students from other New England states because they have the option of paying a decreased out-of-state tuition for a program not offered in their own state (the New England Regional Program, NEHBE). The University of Maine has great strengths in Earth Sciences, Anthropology, and Climate Change in comparison to any of the other New England states.

In AY 2010-11, Maine Residents pay \$267/sch, NEHBE students pay \$401/sch, and non-Maine residents pay \$768/sch. We are estimating and capping the number to 10-20 students in the program per year for a five-year total of 50-100 students. We estimate that ¼ of the students will be Maine Residents, ¼ will be NEHBE students, and ½ will be non-Maine residents (Table 3).

Table 3. Estimated Revenue of the Program over a 5-Year Timeframe

		Low Student Estimate ¹			High Student Estimate ¹		
		Maine Residents	NEHBE	non-Maine Residents	Maine Residents	NEHBE	non-Maine Residents
Year 1	Students	3	2	5	5	5	10
	Tuition	\$24,030	\$24,060	\$115,200	\$40,050	\$60,150	\$230,400
Year 2	Students	5	5	10	10	10	20
	Tuition	\$40,050	\$60,150	\$230,400	\$80,100	\$120,300	\$460,800
Year 3	Students	8	7	15	15	15	30
	Tuition	\$64,080	\$84,310	\$345,600	\$120,150	\$180,450	\$691,200
Year 4	Students	10	10	20	20	20	40
	Tuition	\$80,100	\$120,300	\$460,800	\$160,020	\$240,600	\$921,600
Year 5	Students	10	10	20	20	20	40
	Tuition	\$80,100	\$120,300	\$460,800	\$160,020	\$240,600	\$921,600
TOTAL TUITION²		\$288,360	\$409,120	\$1,612,800	\$560,340	\$842,100	\$3,225,600
		\$2,310,280			\$4,628,040		
1=Estimate of 10-20 students per year; ¼ Maine residents, ¼ NEHBE residents, ½ non-Maine residents							
2=Estimate with no tuition increases. Does not include tuition scholarships.							

Estimated revenue from the program outweighs the costs of the program by a range of \$1,545,819 (for a low student enrollment and high cost estimate) to \$4,038,589 (for a high student enrollment and low cost estimate).

B. Detailed information on first-year costs, including:

1. New personnel requirements (include employee benefits);

One new tenure-track Assistant Professor in Anthropology

Two Graduate Teaching Assistants, one in Anthropology and one in Earth Sciences.

2. First-year revenue and identity of source;

First-year revenue will come in the form of increased tuition dollars from students who would not otherwise apply or come to UMaine.

From Table 3.

		Low Student Estimate ¹			High Student Estimate ¹		
		Maine Residents	NEHBE	non-Maine Residents	Maine Residents	NEHBE	non-Maine Residents
Year 1	Students	3	2	5	5	5	10
	Tuition	\$24,030	\$24,060	\$115,200	\$40,050	\$60,150	\$230,400
First-Year Tuition		\$163,290			\$330,600		
1=Estimate of 10-20 students per year; ¼ Maine residents, ¼ MEHBE residents, ½ non-Maine residents							

3. How operational costs are to be absorbed into current campus operating budget over a 5-year period;

Operational costs, in the form of one assistant professor and two graduate teaching assistant positions, will come directly from the income generated by the program through tuition. Costs will be absorbed into the E&G Budget in the same way that the revenue brought in by the program will be absorbed into the E&G budget.

4. What additional funding is required to support the program (identify the source);

None.

5. Lifetime of outside or independent funding and plan for how and when – becomes part of E&G budget.

N/A

VII. Program evaluation

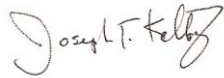
A. A post audit of an approved new program must be made after two years.

The program will undertake a review at the end of the second year as well as a five year review.

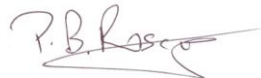
VIII. Submitted By:



Kristin D. Sobolik 12-28-10



Joseph T. Kelley 12-28-10



Paul "Jim" Roscoe 9-29-11



Scott E. Johnson 9-29-11

IX. Approved By:

College of Liberal Arts and Sciences Date

College of Natural Sciences, Forestry, and Agriculture Date

Associate Provost and Dean for Undergraduate Education Date

Provost Date

President Date

APPENDIX I
Vitae of Faculty Involved in the Program
(see V.A.)

James Acheson

Professor of Anthropology and Marine Sciences

Dan Belknap

Professor of Earth Sciences

Cooperating Professor in the Climate Change Institute

Fei Chai

Professor of Oceanography

Cooperating Professor of the Climate Change Institute

Sudarshan Chawathe

Associate Professor of Computer Sciences

Cooperating Professor of the Climate Change Institute

George Denton

Professor of Earth Sciences and Climate Change

James Fastook

Professor of Computer Sciences

Cooperating Professor of the Climate Change Institute

Ivan Fernandez

Professor of Soil Science

Cooperating Professor of the Climate Change Institute

Christopher Gerbi

Assistant Professor of Earth Sciences

Brenda Hall

Associate Professor of Earth Sciences and Quaternary and
Climate Studies

Gordon Hamilton

Associate Professor Earth Sciences and Climate Change

Samuel Hanes

Faculty Associate of Anthropology

Roger Hooke

Research Professor of Earth Sciences

Cooperating Professor of the Climate Change Institute

Stephen Hornsby

Professor of Geography and Canadian Studies

Director, Canadian American Center

Shaleen Jain

Assistant Professor of Civil and Environmental Engineering

Cooperating Professor of the Climate Change Institute

Teresa Johnson

Assistant Professor of Marine Policy

Cooperating Professor of Anthropology

Scott Johnson

Professor of Earth Sciences

Alice Kelley

Research Assistant Professor of Climate Change Institute

Cooperating Professor of Anthropology

Joseph Kelley

Professor of Earth Sciences and Climate Change

Chair, Department of Earth Sciences

Andrei Kurbatov

Assistant Research Professor of Climate Change

Daniel Lux

Professor of Earth Sciences

Peter Koons

Professor of Earth Sciences

Cooperating Professor in the Climate Change Institute

Karl Kreutz

Professor of Earth Sciences and Climate Change

Director, Stable Isotope Lab

Kirk Maasch

Professor of Earth Sciences and Climate Change

Paul Mayewski

Director, Climate Change Institute

Professor of Climate Change

Stephen Norton

Professor Emeritus of Earth Sciences and Climate Change

Lisa Neuman

Associate Professor of Anthropology and Native American Studies

Constanza Ocampo-Raeder

Assistant Professor of Anthropology

Cooperating Professor in the Climate Change Institute

Amanda Olsen

Assistant Professor of Earth Sciences

Brian Olsen

School of Biology and Ecology

Darren Ranco

Associate Professor of Anthropology

Chair, Native American Programs

Andrew Reeve

Professor of Earth Sciences

Brian Robinson

Associate Professor of Anthropology and Climate Change

Paul (Jim) Roscoe

Professor of Anthropology

Cooperating Professor of the Climate Change Institute

Daniel Sandweiss

Professor of Anthropology and Quaternary and Climate Studies
Dean and Associate Provost for Graduate Studies

Jasmine Saros

Associate Professor of Paleoecology and Climate Change

Kristin Sobolik

Professor of Anthropology and Climate Change

Marcella Sorg

Research Associate Professor, Margaret Chase Smith Policy
Center, Climate Change Institute, Department of
Anthropology

Timothy Waring

Assistant Professor of Human Ecology
Cooperating Assistant Professor of Anthropology

Gregory Zaro

Assistant Professor of Anthropology and Climate Change