

**NEW DEGREE PROGRAM REQUEST
Graduate Certificate in Resilience and Adaptation**

Cover Memorandum

- A. Proposal prepared by:
Lawrence K. Duffy, Department of Chemistry and Biochemistry
Director, Resilience and Adaptation Program
- B. We hereby propose a new graduate certificate in Resilience and Adaptation (RAP) studies, to be offered at the University of Alaska Fairbanks. **This certificate will be available to all accepted graduate students, regardless of discipline. It is a defined series of courses that exposes the students to the concepts of resilience and adaptation. While associated with the RAP program, it is not necessary to be a RAP fellow to earn the certificate.** Courses will advance knowledge and promote social-ecological research in sustainability and resilience. Students working on degrees in the sciences and social sciences will broaden their disciplinary perspective using other disciplines such as economics, ecology, sociology, and culture to gain practical knowledge, training and integrative skill development. This certificate embodies a holistic perspective that recognizes the importance of both the social and biological dimensions of environmental sustainability and resilience. This certificate is offered by the Graduate School's Resilience and Adaptation Program and will meet the needs of students and professionals.

Program Goals

1. To provide graduate level students with a formal credential that documents their efforts to understand, communicate and address issues of sustainability in an integrated fashion.
2. To provide students an interdisciplinary academic and research experience that will better prepare them for leadership roles in academia, government, non-government organizations, education, Native organizations and agency management

Director	_____
Graduate Advisory and Assessment Committee (GAAC)	_____
Dean of Graduate School	_____
Faculty Senate Curriculum Committee Chair	_____
President, Faculty Senate	_____
UAF Chancellor	_____
UA President	_____
Board of Regents, (Chair)	_____

FORMAT 3: Resilience and Adaptation Program Graduate Certificate Application

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II. Identification of the Program

A. Description of the Program

1. Program title: Graduate Certificate in Resilience and Adaptation Studies
2. Credential level: Graduate Certificate (12 credits)
3. Admission requirements and prerequisites

As a post-baccalaureate program, the certificate in Resilience and Adaptation requires admission as a graduate student to an established masters or doctorate program at UAF. A student may receive the certificate without/or prior to completing their graduate degree. This certificate will be available to all accepted graduate students, regardless of discipline. It is a defined series of courses that exposes the students to the concepts of resilience and adaptation. While associated with the RAP program, it is not necessary to be a RAP fellow to earn the certificate. Courses will advance knowledge and promote social-ecological research in sustainability and resilience. Students working on degrees in the sciences and social sciences will broaden their disciplinary perspective using other disciplines such as economics, ecology, sociology, and culture to gain practical knowledge, training and integrative skill development. This certificate embodies a holistic perspective that recognizes the importance of both the social and biological dimensions of environmental sustainability and resilience. This certificate is offered by the Graduate School's Resilience and Adaptation Program and will meet the needs of students and professionals.

4. Students may be admitted throughout the academic year. However, beginning course work fall semester is preferred.
5. Course descriptions of required core courses (6 credits) and approved elective courses (6 credits).

Required Core Courses (6 credits)

Note: All courses have been approved and listed in the catalog. Syllabi can be obtained by contacting the sponsoring department or instructor.

BIOL F616 Natural Science Background for Resilience and Adaptation

1 credit Offered Fall

Provides the natural science background that is necessary for understanding the role of science in complex systems involving interactions among ecological, economic, and social processes. Designed for incoming students of the Resilience and Adaptation Program (RAP), who have not received training in the natural sciences. Prerequisites: Graduate student enrollment or permission of instructor. Cross listed with NRM F616 (1+0)

ANTH F616 Anthropology Background for Resilience and Adaptation

1 credit Offered Fall

Provides the humanities background that is necessary for understanding the role of human culture in complex systems involving interactions among

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ecological, economic, and social processes. Designed for incoming students of the Resilience and Adaptation Program (RAP), who have not received training in the humanities. Prerequisites: Graduate student enrollment or permission of instructor. (1+0)

ECON F616 Economics Background for Resilience and Adaptation

1 credit Offered Fall

Provides the economics background that is necessary for understanding the role of economics in complex systems involving interactions among ecological, economic, and social processes. Designed for incoming students of the Resilience and Adaptation Program (RAP), who have not received training in economics. Prerequisites: Graduate student enrollment or permission of instructor. (1+0)

NRM F667 Resilience Seminar I

1 credit Offered Fall

Provides a forum for students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research that are relevant to sustainability. A considerable portion of the seminar is student-directed, with students assuming leadership in planning seminar activities with the instructor. Graded Pass/Fail. Prerequisites: Must be enrolled in the Resilience and Adaptation graduate program; or permission of instructor. Recommended: ANTH/BIOL/ECON/NRM F647 (taken concurrently). Cross listed with ANTH F667, BIOL 667, ECON 667. (2+0).

LAS 601 Responsible Conduct of Research

2 credits Offered Fall and Spring

Maintaining the trust and respect of fellow scientists requires a clear understanding of the basic principles under which research is conducted and reported. Introduces students to the basic principles and expectations that form the foundation of research integrity. Students will learn to recognize and address ethical dilemmas in research scenarios, thus preparing them for situations that will invariably arise during their career. This course fulfills national Science Foundation and National Institutes of Health requirements. Prerequisites: Senior undergraduate or graduate student standing. Interested post-doctoral fellows and others with terminal degrees are also invited to enroll with permission of the instructor.

Elective Credits (Minimum of 6 credits)

ANTH 428 Ecological Anthropology and Regional Sustainability (a)

3 Credits Offered Spring Even-numbered Years

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Biological, environmental and cultural factors and their interplay in defining the human condition, with examples from the Arctic and other populations.

Prerequisites: ENGL F111X; ENGL F211X or ENGL F213X; junior standing; or permission of instructor. (3+0)

Anth 624 Analytical Techniques

3 Credits Offered Fall Even-numbered Years

Classification, sampling, collection and analysis of anthropological data: parametric and nonparametric significance tests and measures of association, analysis of frequency data, estimating resemblance using multiple variables, computer simulations and analysis. Prerequisites: Graduate standing in Anthropology. Stacked with ANTH F424. (3+0)

ANTH 652 Research Design and Professional Development Seminar

3 Credits Offered Spring

How to develop problem-based research in anthropology and prepare research proposals, grant proposals and publications along with critical evaluations of similar material. Topics include preparation of oral presentations for professional meetings, lectures and seminars; curriculum vitae preparation; and project budgeting. Prerequisites: Upper-division anthropology course or permission of instructor. (3+0)

BIO 476 O Ecosystem Ecology

3 Credits Offered Spring Odd-numbered Years

Focus on the biological and physical principles that govern functioning of terrestrial ecosystems. Emphasis on how plants, animals and microorganisms control the movement of water, carbon and nutrients through ecosystems. Discussion of how changes in these processes have altered global cycles of carbon, water and nutrients and sustainability of the world's ecosystems. Special fees apply. Prerequisites: ENGL F111X; ENGL F211X or F213X; COMM F131X or F141X; BIOL F371; BIOL F239 or permission of instructor. (3+0)

Bio 602 Research Design

3 Credits Offered Fall

An introduction to the philosophy, performance and evaluation of hypothetical/deductive research in the biological sciences, with emphasis on hypothesis formulation and testing. Each student will develop a research proposal. Special fees apply. Prerequisite: Graduate standing or permission of instructor. Cross-listed with WLF F602. (3+0)

BI 604 Scientific Writing, Editing, and Revising in the Biological Sciences

3 Credits Offered Spring

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For students who are ready to produce a manuscript or thesis chapter. Topics include the publishing process (e.g., the role of editors and reviewers), preparing to write (selecting a journal, authorship), the components of the scientific paper, revising and editing manuscripts, and responding to reviews. Students will produce a complete manuscript. Special fees apply. Prerequisites: Graduate standing in Biology, Wildlife, or related discipline and permission of instructor. Cross-listed with WLF F604. (3+0)

BIO 669 Landscape Ecology and Wildlife Habitat

3 Credits Offered As Demand Warrants

A problem based learning and critical thinking approach to modern methods in landscape ecology, including geographic information systems, remote sensing, modeling, software and the Internet. Graduate students are expected to help undergraduates with occurring problems and questions. Special fees apply. Prerequisites: Graduate standing Cross-listed with WLF F669 (2+3)

BIOL 676 Interdisciplinary Modeling of High Latitude Global Change (a)

4 Credits Offered Fall Even-numbered Years

Introduces students to approaches to modeling how regional and global environmental change influences biological and social systems in high latitudes and how the responses of these systems influence the regional and global functioning of the earth system. Special fees apply. Prerequisites: STAT F200X or equivalent; graduate standing; or permission of instructor. Cross-listed with NRM F676. (3+3)

COMM 602 Communication Research Methodologies: Human Science

3 Credits Offered Spring

An introduction to research using a constructionist epistemology and the methodologies of the human science contexture. Includes evaluation and preparation of research using a variety of methodologies and to employ the data collection techniques that are implied by those methodologies. Prerequisites: COMM F601; COMM F625; or permission of the instructor. (3+0)

COMM 675 Training and Development Communication

3 Credits Offered Spring

Training and Development Communication offers students practical, current understandings of planned training, development and transformation processes as they are applied in the organizational setting. The information and class projects will help prepare training and development specialists, consultants and others whose interest is in this growing communication field. Prerequisites: Enrollment in MA in Professional Communication degree or permission of instructor. (3+0)

CCS 603 Field Study Research Methods

3 Credits

Focus on techniques for conducting both quantitative and qualitative field research. Particular emphasis on considerations for conducting field research in cross-cultural settings. Prerequisites: Graduate standing or permission of instructor. Cross-listed with ED F603. (3+0)

Documenting Indigenous Knowledge (a)

CCS F604 Documenting Indigenous Knowledge (a)

3 Credits

Offered Fall

A thorough grounding in research methodologies and issues associated with documenting and conveying the depth and breadth of indigenous knowledge systems and their epistemological structures. Includes a survey of oral and literate data-gathering techniques, a review of various modes of analysis and presentation, and a practical experience in a real-life setting. Recommended: Graduate-level survey course in research methods or approval of the instructor. Cross-listed with ED F604. (3+0)

CCS 608 Indigenous Knowledge Systems (a)

3 Credits

Offered Fall

A comparative survey and analysis of the epistemological properties, world views and modes of transmission associated with various indigenous knowledge systems. Emphasis on knowledge systems practiced in Alaska. Prerequisites: Graduate standing or approval of instructor. Cross-listed with RD F608; ED F608; ANL F608. (3+0)

CCS 612 Traditional Ecological Knowledge (a)

3 Credits

Offered Spring

Examines the acquisition and utilization of knowledge associated with long-term inhabitation of particular ecological systems and adaptations that arise from the accumulation of such knowledge. Attention will be given to the contemporary significance of traditional ecological knowledge as a complement to academic fields of study. Prerequisites: Graduate standing or approval of the instructor. Cross-listed with RD F612. (3+0)

CCS656 Sustainable Livelihoods and Community Well-Being

3 Credits

Offered Fall

Review the basic principles that govern the sustainability of systems and look at the cultural practices and individual behaviors that enhance or degrade sustainable livelihoods and community well-being. Emphasis is on understanding the historical context of ideas about sustainability, on

understanding the nature and magnitude of the social, economic and ecological dimensions of contemporary change, and the "best practices" currently in place for communities to respond effectively to change. Prerequisites: Graduate standing or permission of instructor. Cross-listed with NRM F656 and GEOG 656. (3+0)

CCS F690 Seminar in Cross-Cultural Studies

3 Credits Offered As Demand Warrants

Investigation of current issues in cross-cultural contexts. Opportunity for students to synthesize their prior graduate studies and research. Seminar is taken near the terminus of a graduate program. Prerequisites: Advancement to candidacy and permission of student's graduate committee. Cross-listed with ANL F690; ED F690; RD F690. (3+0)

FISH F611 Human Dimensions of Environmental Systems

3 Credits Offered Fall

Study of human-environment relationships and applications to resource management. Draws on a range of social scientific approaches to the study of environmental systems, including: environmental anthropology, environmental history, historical ecology, political ecology, ethnoecology, property theory, and environmental justice. Prerequisites: Graduate standing, or permission of instructor. (3+0)

FISH F613 Human-Environment Research Methods

3 Credits Offered Fall

Overview of qualitative and quantitative social science methods for studying human-environment relationships. Introduction to research ethics, research design, data collection, data analysis and data reporting. Methods and data analysis techniques include interviews, text analysis, surveys, scales, cognitive anthropology and ethnoecology, social networks, behavioral observation, and visual methods. Provides hands-on training in data collection and data analysis software. Prerequisites: Graduate standing or permission of instructor. Cross-listed with ANTH F613. (3+0)

FISH F640 Management of Renewable Marine Resources

3 Credits Offered Spring Even-numbered Years

Principles of fisheries management, along with case studies of successes and failures. Topics include management objectives, relationships of fished species to their environment, fishing methods, human dimensions, fishery data acquisition, harvest strategies, ecosystem effects of fishing, aquaculture and alternative management strategies, including ecosystem-based fishery management. Prerequisites: FISH F427. Recommended: FISH F487. (3+0)

FISH F642 Bayesian Decision Theory for Resource Management

4 Credits Offered Spring Even-numbered Years

Application of decision theory to problems in natural resources management. Students will learn to perform Bayesian calculations and uncomplicated decision analysis themselves. Special fees apply. Prerequisites: FISH F621 or FISH F630 or permission of instructor. Cross-listed with STAT F642. (2+2)

FISH F675 Political Ecology

3 Credits Offered Fall Odd-Numbered Years

Introduction to the field of political ecology. Topics include the sociology of scientific knowledge, traditional and local ecological knowledge, politics of resource management, processes of enclosure and privatization, environmental values, conservation, environmental justice, and colonialism and economic development. Prerequisites: Graduate standing or permission of instructor. Cross-listed with ANTH F675. (3+0)

NRM 647 Global to Local Sustainability

3 credits Offered Fall

Explores the basic principles that govern resilience and change of ecological and social systems. Principles are applied across a range of scales from local communities to the globe. Working within and across each of these scales, students address the processes that influence ecological, cultural and economic sustainability, with an emphasis on northern examples. **Prerequisites:** *Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF; and permission of instructor.* Cross listed with ANTH F647, BIOL 647, ECON 647. (3+0)

BIOL 649 Integrated Assessment and Adaptive Management

3 Credits Offered Spring

Interdisciplinary exploration of theoretical and practical considerations of integrated assessment and adaptive management. Concepts important in understanding societal and professional-level decision-making. Students work as individuals and as a team to undertake case studies with relevance to integrated assessment and adaptive management. Collectively, the class builds a portfolio of cases and conducts an integrated assessment. **Prerequisites:** *Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF; and permission of instructor. The course is designed to fit into the sequence of the Resilience and Adaptation program's core courses. It is open to other graduate students interested in and prepared to conduct interdisciplinary studies relating to sustainability. Recommended: ANTH/BIOL/ECON/NRM F647 and ANTH/BIOL/ECON/NRM F667 (previously or*

concurrently). In case of enrollment limits, priority will be given to graduate students in the Resilience and Adaptation program in order for them to be able to meet their core requirements. Cross listed with ANTH F649, BIOL 649, ECON 649. (3+0).

NRM 668 Resilience Seminar II

1 credit Offered Spring

Provides a forum for students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research that are relevant to sustainability. The seminar provides support to each student planning his/her summer internship and preparing and presenting a thesis research prospectus. Graded Pass/Fail. ***Prerequisites: ANTH/BIOL/ECON/NRM F647; ANTH/BIO/ECON/NRM F667; or permission of the instructor. Cross listed with ANTH F668, BIOL 668, ECON 668. (2+0)***

NRM F613 Resilience Internship

2 credits Offered Fall

Students of the Resilience and Adaptation Program may participate in internships to broaden their interdisciplinary training, develop new research tools and build expertise outside their home disciplines. Internships are a full time commitment of four to 10 weeks. Students typically meet fall semester to discuss their internship experiences and make public presentations.

NORS 484 Seminar in Northern Studies

3 credits Offered Fall

An interdisciplinary seminar focusing on topics relating to the North with emphasis on the physical sciences, the peoples, and the socioeconomic and political aspects of the area. Specialists in the various fields will assign readings and conduct discussions. Prerequisites: ENGL F111X; ENGL F211X or ENGL F213X; junior standing; or permission of instructor. (3+0)

NORS F600 Perspectives on the North

3 credits

Basic knowledge of the circumpolar North - the social, economic, political and scientific facets of northern life. Consideration of major cultural groups of the North and their histories, the environmental settings and patterns of settlement and development in northern regions and systems of governance in different northern countries. Broad overview of the major policy issues of the North in education, justice, healthcare, and environmental and wildlife protection. Course is also available on-line. Cross-listed with HIST F600. (3+0)

NORS F601 Research Methods and Sources in the North

3 credits Offered Fall

Development of students' research skills so they can engage in their own research on northern issues. Includes techniques of interviewing, conducting surveys, and sampling; qualitative and quantitative methods of research design; and familiarity with library sources and archival records. Each student will develop a research project. Course is also available on-line. (3+0)

NORS 603 Public Policy (a)

3 Credits Offered Spring Even-numbered Years

The processes of policy development, implementation and change are analyzed along with major policy frameworks and models used in contemporary political science. These frameworks and models will be applied to environmental sustainability and other social policy issues. Students will develop expertise in a specific policy area and skills in research design preparing them to analyze public policy. Prerequisites: Graduate Standing. Cross-listed with PS F603. (3+0)

NORS 610 Northern Indigenous People and Contemporary Issues (a)

3 credits Offered Fall Odd-numbered Years

Comparative examination of issues affecting northern indigenous people from Alaska, Canada, Greenland and Russia. Issues include the impact of the alienation of land on which these people depend; the relationships between their small, rural microeconomies and the larger agroindustrial market economies of which they are a part; education, language loss and cultural transmission; alternative governmental policies toward indigenous peoples and contrasting world views. Prerequisites: Graduate standing or upper-division standing with permission of instructor. Cross-listed with ANTH F610. (3+0)

NORS 611 Environmental History

3 credits Offered Spring Even-numbered Years

Discussion of significant works of environmental history. Cultural history of the landscape in world civilization with emphasis on Western Europe and North America. Discussion of interdisciplinary approaches to the history of environment and cooperative work across disciplines. Prerequisites: Graduate standing or permission of instructor. Stacked with HIST F411. (3+0)

NORS 627 Polar Geography (a)

3 Credits Offered Spring Odd-numbered Years

Comparative physical, cultural, political and economic geography of the Circumpolar North and Antarctic regions. Special attention given to Arctic natural resource and climate change in both polar regions, and polar geopolitics. Prerequisites: Graduate standing or permission of instructor. Cross-listed with GEOG F627. (3+0)

NORS 647 US Environmental Politics

3 Credits Offered Spring

U.S. political institutions as they relate to making policies for protecting the quality of the natural environment. The politics of nuclear waste, endangered species, air and water pollution, and wilderness preservation. Analysis of the National Environmental Policy Act, sustainable development, limits to growth and other topics. Course is also available online. Prerequisites: Graduate Standing or permission of instructor. Cross-listed with PS F647. (3+0)

NORS 648 Environmental Politics and the Circumpolar North

3 Credits

Overview of how environmental politics and policy as a field of study relates to the Arctic region. Analysis of various threats to the northern environment, focusing on the policy making institutions at selected Arctic Rim nations, as well as strategies to deal with environmental problems in an international context. Course is also available online. Prerequisites: Graduate standing or permission of instructor. Cross-listed with PS F648. (3+0)

NORS 652 International Relations of the North (a)

3 Credits

Examination of the international strategies of circumpolar states. Consideration of theoretical and practical elements of strategy formation in major issue areas such as national security, the political economy, human rights and scientific exchange. Prerequisites: Graduate standing or permission of instructor. Cross-listed with PS F652. (3+0)

NORS 654 International Law and the Environment (a)

3 Credits

International environmental law. Includes international case law regulating the sea, airspace, outer space and the polar regions; comprehensive international regulatory and legal instruments to protect the environment (e.g. the U.N. Framework Convention on Climate Change); and the doctrines, principles, and rules of international law that are basic to an understanding of international legal regimes and the environment. Course is also available online. Prerequisites: Graduate standing; permission of instructor. Recommended: Undergraduate course in international law, organization or politics. Cross-listed with PS F654. (3+0)

**NORS 655 Political Econ Global Environment Political Economy of the
Global Environment (a)**

3 Credits

Interactions between basic aspects of the global economy (international trade, investment and development) and the natural environment. Topics include the economic impact of global environmental agreements and the environmental impact of global markets, transnational corporations and development assistance by organizations such as the World Bank. Prerequisites: Graduate standing and permission of instructor. Cross-listed with PS F655. (3+0)

NORS 656 Science, Technology, and Politics

3 Credits

Relationship of science, technology and politics. Connections among scientific knowledge, technology, technological innovations, politics and power. Gender roles and the influence of western science. Both historical and comparative aspects are included. Course is also available online. Prerequisites: Graduate standing or permission of instructor. Recommended: PS F101. Cross-listed with PS F656. (3+0)

NORS 658 Comparative Environmental Politics 3 Credits

Offered Fall Odd-numbered Years

Enduring issues of the field of comparative politics and their relation to global environmental problems. Biodiversity, transboundary pollution capacity, political processes and organizations, and international commitments all potentially shape the nature and dynamics of global environmental politics and vice versa. Course is also available online. Prerequisites: Graduate standing or permission of instructor. Recommended: PS F201 or equivalent comparative politics course. Cross-listed with PS F658. (3+0)

NORS 670 Oral Sources; Issues in Documentation (a)

3 Credits Offered Alternate Fall

Preparation for recording and use of oral resources. Examines how meaning is conveyed through oral traditions and personal narratives and the issues involved with recording and reproducing narratives. Includes management of oral recordings, ethical and legal considerations, issues of interpretation and censorship, and the use of new technologies to access and deliver recordings. Prerequisites: At least one undergraduate ANTH course and one undergraduate HIST course, or permission of instructor. Cross-listed with ANTH F670. (3+0)

NORS 683 20th Century Circumpolar History (a)

3 Credits Offered Spring Even-numbered Years

A comparative history of the circumpolar North, including Alaska, Siberia, Scandinavia, Greenland and Canada. Focus on social, economic, political and environmental issues of the 20th century, such as exploration, aboriginal land claims, subsistence, military strategy, transportation, oil development, Arctic

haze and scientific research in the Arctic. Prerequisites: Graduate standing or permission of instructor. Cross-listed with HIST F683. (3+0)

NRM 370 Introduction to Watershed Management

3 Credits Offered Fall

The hydrologic cycle and the influence of land management techniques on water quantity, quality and timing. Water yield, soil erosion and non-point pollution, snowpack management, and land use alternatives. Prerequisites: NRM F101 and GEOS F101X or permission of instructor. (2+3)

NRM 403W,O Environmental Decision Making

3 Credits Offered Fall

Analysis of philosophical/ethical, economic, scientific and political foundations of diverse natural resource management perspectives. Prerequisites: COMM F131X or COMM F141X; NRM F101; junior standing; or permission of instructor. (3+0)

NRM F483 W Research Design, Writing, and Presentation Methods

3 Credits Offered Fall

Capstone research practicum for Geography and Natural Resources Management majors. Focuses on designing an individual research project or thesis in coordination with a faculty mentor. Designed to integrate the knowledge and skills students have gained through undergraduate course work, and to prepare them for graduate research or professional level projects. Emphasizes scientific method, research design, proposal writing, development of field and analytical methods, scientific writing, and the oral, written, and graphical presentation of data and research results. Prerequisites: ENGL F211X or ENGL F213X; at least one writing intensive course designated (W); junior standing in Geography or Natural Resources Management. Cross-listed with GEOG F483. (3+0)

NRM F601 Research Methods in Natural Resources Management

2 Credits Offered Fall

Introduction for graduate students to the research methods employed in the various fields of resource management, including agriculture, forestry, ecology and social sciences. Designed to acquaint students with the relationship between theory and research, the nature of scientific inquiry, approaches to research, the sequence of steps involved in scientific investigation and the presentation of research results. Prerequisites: Graduate standing or permission of instructor. (2+0)

NRM 637 Evolution of Conservation Concepts and Policy

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3 Credits Offered Fall Even-numbered Years

Resource policy issues development and implementation including forestry, mining, fisheries, oil, wildlife and other topics as demand warrants. Focus on policy issues involved in management of Alaska's resources. Prerequisites: Graduate standing or permission of instructor. Cross-listed with ECON F637. (3+0)

NRM 647 Global to Local Sustainability

3 credits Offered Fall

Explores the basic principles that govern resilience and change of ecological and social systems. Principles are applied across a range of scales from local communities to the globe. Working within and across each of these scales, students address the processes that influence ecological, cultural and economic sustainability, with an emphasis on northern examples. Prerequisites: Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF; and permission of instructor. Cross listed with ANTH F647, BIOL 647, ECON 647. (3+0)

NRM 430/630 Resource Management Planning

3 Credits Offered Spring

Application of planning and conflict resolution principles to natural resources management. Examines plans prepared in response to current Alaska resource disputes, including wolf, brown bear, boreal forest and recreation river plans. Includes public involvement, consensus building, the basic steps in the planning process, and resource dispute simulations. Prerequisites: Graduate standing or permission of instructor. Stacked with NRM F430. (3+0)

NRM F613 Resilience Internship

2 credits Offered Fall

Students of the Resilience and Adaptation Program may participate in internships to broaden their interdisciplinary training, develop new research tools and build expertise outside their home disciplines. Internships are a full time commitment of four to 10 weeks. Students typically meet fall semester to discuss their internship experiences and make public presentations.

NRM 637 Evolution of Conservation Concepts and Policy

3 Credits Offered Fall Even-numbered Years

Resource policy issues development and implementation including forestry, mining, fisheries, oil, wildlife and other topics as demand warrants. Focus on policy issues involved in management of Alaska's resources. Prerequisites: Graduate standing or permission of instructor. Cross-listed with ECON F637. (3+0)

NRM 638 GIS Programming

3 Credits Offered Spring Odd-numbered Years

GIS programming for ArcView, Arc/Info and ArcGIS. Programming techniques for customizing GIS, efficient batch processing, and development of custom tools for GIS display and analysis. Prerequisites: NRM F338 or equivalent. (3+0)

NRM 649 Integrated Assessment and Adaptive Management

3 Credits Offered Spring

Interdisciplinary exploration of theoretical and practical considerations of integrated assessment and adaptive management. Concepts important in understanding societal and professional-level decision-making. Students work as individuals and as a team to undertake case studies with relevance to integrated assessment and adaptive management. Collectively, the class builds a portfolio of cases and conducts an integrated assessment. Prerequisites: Graduate student standing in a natural science, social science, humanities or interdisciplinary program at UAF or another university or permission of instructor. The course is designed to fit into the sequence of the Resilience and Adaptation program's core courses. It is open to other graduate students interested in and prepared to conduct interdisciplinary studies relating to sustainability. Recommended: ANTH/BIOL/ECON/NRM F647 and ANTH/BIOL/ECON/NRM F667 (previously or concurrently). In case of enrollment limits, priority will be given to graduate students in the Resilience and Adaptation program in order for them to be able to meet their core requirements. Cross-listed with ANTH F649; BIOL F649; ECON F649. (3+0)

BIOL 649 Integrated Assessment and Adaptive Management

3 Credits Offered Spring

Interdisciplinary exploration of theoretical and practical considerations of integrated assessment and adaptive management. Concepts important in understanding societal and professional-level decision-making. Students work as individuals and as a team to undertake case studies with relevance to integrated assessment and adaptive management. Collectively, the class builds a portfolio of cases and conducts an integrated assessment. Prerequisites: Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF; and permission of instructor. The course is designed to fit into the sequence of the Resilience and Adaptation program's core courses. It is open to other graduate students interested in and prepared to conduct interdisciplinary studies relating to sustainability. Recommended: ANTH/BIOL/ECON/NRM F647 and ANTH/BIOL/ECON/NRM F667 (previously or concurrently). In case of enrollment limits, priority will be given to graduate students in the Resilience and Adaptation program in order for them to be able

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to meet their core requirements. Cross listed with ANTH F649, BIOL 649, ECON 649. (3+0).

NRM 668 Resilience Seminar II

1 credit Offered Spring

Provides a forum for students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research that are relevant to sustainability. The seminar provides support to each student planning his/her summer internship and preparing and presenting a thesis research prospectus. Graded Pass/Fail. Prerequisites: ANTH/BIOL/ECON/NRM F647; ANTH/BIO/ECON/NRM F667; or permission of the instructor. Cross listed with ANTH F668, BIOL 668, ECON 668. (2+0)

6. Requirements for the certificate

Complete 12 credits from core courses and approved electives

a. Sample course of study *

Courses (Credits)	Fall Y1	Spring Y1	Fall Y 2	Spring Y2
Biol F616 (1)	X		X	
Anth F616 (1)	X		X	
Econ F616 (1)	X		X	
NRM/BIO/ECON/ ANTH 667 (1)	X		X	
LAS 601 (2)	X	X	X	X
Electives (6)	X	X	X	X

*This schedule will be repeated annually, since a new cohort is admitted each year. Biol, Anth and Econ 616 and NRM/BIO/ECON/ANTH 667, are the foundation courses for the certificate. These courses are offered in Fall semester only and should be completed in the same semester. LAS 601 is offered both Fall and Spring semesters.

**See approved elective courses. The cycle of elective courses is listed in the UAF catalog.

b. Catalog description and layout

Resilience and Adaptation Studies
Graduate School
907-474-7029
www.uaf.edu/RAP
Graduate Certificate

Minimum requirements for certificate: 12 credits

As a post-baccalaureate program, the certificate in resilience and adaptation studies is ideal for current graduate students in many disciplines. The graduate certificate encourages a more in-depth study of resilience, adaptation and

FORMAT 3: Resilience and Adaptation Program Graduate Certificate Application

sustainability and provides students a credential recognizing their expertise in this field of sustainability science. The certificate in Resilience and Adaptation prepares interdisciplinary students for careers in academia, industry, government and non-governmental organizations where sustainability is addressed in an integrated fashion. The certificate is expected to increase competitive ability in the job market.

BIOL 616	Biology Background – Resilience & Adaptation.	1
ANTH 616	Anthropology Background – Resilience & Adaptation	1
ECON 616	Economics Background – Resilience & Adaptation	1
NRM 667	Resilience Seminar I	1
LAS 601	Liberal Arts & Science	2
Approved electives		6
		12 credits

Graduate Certificate

Graduate Certificate Requirements

Complete the following admission requirements:

1. Hold a baccalaureate degree from an accredited institution
2. Gain acceptance from a departmental or interdisciplinary admission committee in an established Masters or Doctoral program
3. Complete the General University requirements for a graduate certificate
4. Complete the listed 6 credits from core RAP certificate courses
5. Complete 6 or more credits of the listed RAP certificate electives
6. Minimum credits required: 12
7. Students must earn a B or Pass grade (or better) in each course.

B. Program Goals

1. *Goals, objectives and means for their evaluation*
 - a. RAP brings together students and faculty from many different departments, institutes and programs. Many RAP participants have acknowledged the value of constant dialogue among RAP students with diverse academic and cultural backgrounds which contributes to their graduate education experience.
 - b. RAP encourages and fosters students to take a “systems” approach to research that explores the interactions of social, economic and ecological components through a holistic lens. Hence, RAP students are given the academic freedom to solve complex real world problems, such as resource management, using the best tools available and without the limitations of commonly accepted tools within single disciplines.
 - c. Students conduct an interdisciplinary inquiry process to address issues of resilience and adaptation.
 - d. Evaluation is based on student performance as judged by successful completion of their courses with a 3.0 or better GPA.
 - e. Specific learning outcomes are described in course syllabi

2. *Relationship of certificate program to purposes of the University of Alaska Fairbanks*
 - a. RAP complements and contributes to all other departments, institutes and programs across the UA system.
 - b. A RAP certificate provides an academic credential that extends well beyond the RAP program's limited resources. The certificate is expected to generate considerable revenue as students apply creative, holistic problem solving to complex questions.
 - c. RAP facilitates communication and collaboration across disciplines.
 - d. RAP students excel at interacting with and expanding communications across disciplines and bringing faculty out of their disciplinary silos and comfort zones.
 - e. RAP students' research is on the cutting edge of resilience and adaptation research—an important part of UAF's strategic plan.
 - f. RAP students and participating faculty bring in financial support from federal, state, and non-profit funding sources.
 - g. A RAP certificate would provide a workforce advantage for both private industry and state agencies.
 - h. RAP certificate can be a model for other interdisciplinary certificates at UAF.
3. Occupational competencies to be achieved: Not applicable
4. Relationship of certificate to program objectives
 - a. Courses give context to complex systems. RAP students are exposed to and challenged with the task of integrating resilience theory into their research.
 - b. Courses introduce interdisciplinary aspects of sustainability science and adaptation. In general, *adaptation* is the process of responding to change. In biological systems, species may adapt to stressors by changing either their biology or behavior. In human social systems, people may adapt by reorganizing institutions and networks.
 - c. The capacity of the community to manage resilience is referred to as adaptability.

Systems with high adaptive capacity reconfigure themselves without losing crucial functions. Systems with low adaptive capacity often sacrifice future options during reconfiguration. RAP students also explore the theory and practice of Adaptive Management, the iterative process of managing systems by using experimentation to learn about system function and reduce uncertainty. Effective adaptive management requires consideration of the social and ecological components of a system.

How do these concepts fit with sustainability science? Sustainability science addresses actions that promote human well-being while conserving the life-support systems of our region and our planet. Research on sustainability focuses on the dynamic interactions between nature and society. Building a science of sustainability requires a truly interdisciplinary approach that integrates knowledge and practical experience from many different sources. RAP's framework is designed to follow these guidelines.

III. Personnel Directly Involved with Program

- a. Faculty:
 - 1. Lawrence K. Duffy, Program Director
 - 2. Todd J. Brinkman, Associate Program Director
- b. Administrative personnel:
 - 1. Mary van Muelken
- c. Classified: Not applicable

IV. Enrollment Information

- a. Projected enrollment: 30
Current enrollment: Not applicable
- b. Current students: 33
- c. Application process: On line application concurrent with established Master or PhD program application in a discipline, including interdisciplinary.
- d. Minimum enrollment to maintain program for years 1-5.
6 students
- e. Maximum enrollment that program can accommodate: 40 students
- f. Special restrictions on enrollments: registered graduate students

V. Need for the Program

- a. Required for other programs? In what way? How has this requirement been met to date?

The Resilience and Adaptation Program (RAP) is an interdisciplinary graduate program, focusing on the role of social and ecological systems in sustainability. The program began as an NSF funded IGERT grant in 2001. The grant was renewed in 2007 and was then adopted as a state line budget item in 2012. The demand and need for the program has been demonstrated over the last 14 years by stable funding, good enrollment and the production of readily employed MS and PhD graduates in various disciplines (See Appendix A).

RAP offers studies in sustainability science as society faces critical decisions about the future of humans and their relationship to the Earth System. Student research is both "basic" and "applied", transcending disciplinary boundaries by focusing on urgent real-world problems. RAP students are prepared for positions in academia, research institutes, governmental agencies, non-governmental organizations, and indigenous

FORMAT 3: Resilience and Adaptation Program Graduate Certificate Application

organizations. The activities proposed in this certificate application build on the work accomplished by RAP alumnae and faculty members. The RAP certificate supports UAF's strategic plan's goal of serving Alaska's diverse communities by enhancing the strategy of obtaining a Carnegie Community Engaged Institution designation (Goal 3 Strategies, 4th bullet). RAP students will develop expertise in complex system analysis and holistic management.

b. Employment market needs

1. Survey: completed December 2013
2. Respondents reported increasing employment opportunities (100%)
"The RAP allowed me to extend my strong natural science foundation into work as a social scientist with a profound understanding of the cultural and economic issues facing Alaskan individuals and communities."
3. Alumni (n=14) report that 50% are employed in Alaska and 50% are employed out of state (including international).

RAP Alumni are employed in the following areas

Academic setting k-12	7.69 %
College or university setting	53.85 %
State government office	15.38 %
Federal government office	15.38 %
Native corporation/governance office	0 %
Non-governmental organization	7.69%
Private company	0 %

4. 86 % of alumni agreed that participation in RAP improved their ability to secure their current employment.

VI. Additional Information

A \$267,300 continuing allocation was made available by the Alaska state funding in 2015.

VII. Resource Impact

- a. Increased tuition revenue as students take courses to complete the certificate requirements.
- b. Budget: no new funds are requested
- c. Facilities: no facilities are requested
- d. Credit hour production: 360 distributed across disciplines.
- e. Faculty: 6 existing faculty members teach the required or "core" courses.
- f. Library material: The program only requires standard library services.

VIII. Relation of Program to other Programs within the System

- a. Effects on enrollments elsewhere: Enrollment in other programs will be increased due to RAP's complementary nature and the interest it generates among prospective

FORMAT 3: Resilience and Adaptation Program Graduate Certificate Application

students. The tuition generated will be additional income, spread across various departments, since students will be enrolling in 12 additional credits of coursework.

- b. Duplication in the system: none
- c. Relationship to research and service
 - 1. Supports and improves research and service
 - 2. Benefits: increases publications and community partnerships

IX. Implementation/Termination

- a. Date of implementation: Fall 2016
- b. Plans for recruiting students
 - 1. RAP Website <http://www.uaf.edu/rap/>
 - 2. Professional meetings
 - 3. Print publication
 - 4. Graduate school orientation
- c. Termination: FY 2021, if enrollment drops below minimum number of 15 students
- d. Plans for termination: courses will be offered for two years after last cohort is admitted
- e. Assessment of program: standard program review as described on the Provost's website.

X. Regent Guideline Action Request

- 1. Signature Form
- 2. Board of Regents Document

XI. Draft Prospectus: Follows



Board of Regents Program Action Request
University of Alaska
 Proposal to Add, Change, or Delete a Program of Study

1a. UA University (choose one) UAF	1b. School or College Graduate School	1c. Department or Program Resilience and Adaptation Program																																								
2. Complete Program Title																																										
3. Type of Program <input type="checkbox"/> Undergraduate Certificate <input type="checkbox"/> Associate <input type="checkbox"/> Baccalaureate <input type="checkbox"/> Post-Baccalaureate Certificate <input type="checkbox"/> Master's <input checked="" type="checkbox"/> Graduate Certificate <input type="checkbox"/> Doctorate																																										
4. Type of Action <input checked="" type="checkbox"/> Add <input type="checkbox"/> Change <input type="checkbox"/> Delete		5. Implementation date (semester, year) <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer Year 2016																																								
6. Projected Revenue and Expenditure Summary. Not Required if the requested action is deletion. (Provide information for the 5 th year after program or program change approval if a baccalaureate or doctoral degree program; for the 3 rd year after program approval if a master's or associate degree program; and for the 2 nd year after program approval if a graduate or undergraduate certificate. If information is provided for another year, specify (1st) and explain in the program summary attached). Note that Revenues and Expenditures are not always entirely new; some may be current (see 7d.)																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Projected Annual Revenues to the University in FY 15</th> </tr> <tr> <td>Unrestricted</td> <td></td> </tr> <tr> <td>General Fund</td> <td>\$ 289800</td> </tr> <tr> <td>Student Tuition & Fees</td> <td>\$</td> </tr> <tr> <td>Indirect Cost Recovery</td> <td>\$</td> </tr> <tr> <td>TVEP or Other (specify):</td> <td>\$</td> </tr> <tr> <td>Restricted</td> <td></td> </tr> <tr> <td>Federal Receipts</td> <td>\$</td> </tr> <tr> <td>TVEP or Other (specify):</td> <td>\$</td> </tr> <tr> <td>TOTAL REVENUES</td> <td>\$</td> </tr> </table>		Projected Annual Revenues to the University in FY 15		Unrestricted		General Fund	\$ 289800	Student Tuition & Fees	\$	Indirect Cost Recovery	\$	TVEP or Other (specify):	\$	Restricted		Federal Receipts	\$	TVEP or Other (specify):	\$	TOTAL REVENUES	\$	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Projected Annual Expenditures in FY 15</th> </tr> <tr> <td>Salaries & benefits (faculty and staff)</td> <td>\$119800</td> </tr> <tr> <td>Other (commodities, services, etc.)</td> <td>\$7500</td> </tr> <tr> <td>TOTAL EXPENDITURES</td> <td>\$289800</td> </tr> <tr> <td colspan="2">One-time Expenditures to Initiate Program (if >\$250,000)</td> </tr> <tr> <td colspan="2">(These are costs in addition to the annual costs, above.)</td> </tr> <tr> <td>Year 1</td> <td>\$</td> </tr> <tr> <td>Year 2</td> <td>\$</td> </tr> <tr> <td>Year 3</td> <td>\$</td> </tr> <tr> <td>Year 4</td> <td>\$</td> </tr> </table>	Projected Annual Expenditures in FY 15		Salaries & benefits (faculty and staff)	\$119800	Other (commodities, services, etc.)	\$7500	TOTAL EXPENDITURES	\$289800	One-time Expenditures to Initiate Program (if >\$250,000)		(These are costs in addition to the annual costs, above.)		Year 1	\$	Year 2	\$	Year 3	\$	Year 4	\$
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Page # of attached summary where the budget is discussed, including initial phase-in:																																										
7. Budget Status. Items a., b., and c. indicate the source(s) of the General Fund revenue specified in item 6. If any grants or contracts will supply revenue needed by the program, indicate amount anticipated and expiration date, if applicable.																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Revenue source</th> <th>Continuing</th> <th>One-time</th> </tr> <tr> <td>a. In current legislative budget request</td> <td>\$</td> <td>\$</td> </tr> <tr> <td>b. Additional appropriation required</td> <td>\$</td> <td>\$</td> </tr> <tr> <td>c. Funded through new internal UA university redistribution</td> <td>\$</td> <td>\$</td> </tr> <tr> <td>d. Funds already committed to the program by the UA university¹</td> <td>\$289800</td> <td>\$</td> </tr> <tr> <td>e. Funded all or in part by external funds, expiration date</td> <td>\$</td> <td>\$</td> </tr> <tr> <td>f. Other funding source Specify Type:</td> <td>\$</td> <td>\$</td> </tr> </table>			Revenue source	Continuing	One-time	a. In current legislative budget request	\$	\$	b. Additional appropriation required	\$	\$	c. Funded through new internal UA university redistribution	\$	\$	d. Funds already committed to the program by the UA university ¹	\$289800	\$	e. Funded all or in part by external funds, expiration date	\$	\$	f. Other funding source Specify Type:	\$	\$																			
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8. Facilities: New or substantially (>\$25,000 cost) renovated facilities will be required. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, discuss the extent, probable cost, and anticipated funding source(s), in addition to those listed in sections 6 and 7 above.																																										
9. Projected enrollments (headcount of majors). If this is a program deletion request, project the teach out enrollments.																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Year 1: 33</td> <td style="width: 25%;">Year 2: 30</td> <td style="width: 25%;">Year 3: 30</td> <td style="width: 25%;">Year 4: 30</td> </tr> </table>			Year 1: 33	Year 2: 30	Year 3: 30	Year 4: 30																																				
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Page number of attached summary where demand for this program is discussed:																																										

¹Sometimes the courses required by a new degree or certificate program are already being taught by a UA university, e.g., as a minor requirement. Similarly, other program needs like equipment may already be owned. 100% of the value is indicated even though the course or other resource may be shared.

<p>10. Number* of new TA or faculty hires anticipated (or number of positions eliminated if a program deletion):</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td style="width: 30%;">Graduate TA</td><td style="width: 70%;">0</td></tr> <tr><td>Adjunct</td><td>0</td></tr> <tr><td>Term</td><td>0</td></tr> <tr><td>Tenure track</td><td>0</td></tr> </table>	Graduate TA	0	Adjunct	0	Term	0	Tenure track	0	<p>11. Number* of TAs or faculty to be reassigned:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td style="width: 30%;">Graduate TA</td><td style="width: 70%;">0</td></tr> <tr><td>Adjunct</td><td>0</td></tr> <tr><td>Term</td><td>0</td></tr> <tr><td>Tenure track</td><td>0</td></tr> </table> <p>Former assignment of any reassigned faculty: For more information see page _____ of the attached summary.</p>	Graduate TA	0	Adjunct	0	Term	0	Tenure track	0
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<p>12. Other programs affected by the proposed action, including those at other MAUs (please list):</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 25%;">Program Affected</th><th style="width: 75%;">Anticipated Effect</th></tr> <tr> <td>None</td><td></td></tr> <tr> <td> </td><td> </td></tr> </table> <p>Page number of attached summary where effects on other programs are discussed: _____</p>		Program Affected	Anticipated Effect	None													
Program Affected	Anticipated Effect																
None																	
<p>13. Specialized accreditation or other external program certification needed or anticipated. List all that apply or 'none': None</p>	<p>14. Aligns with University or campus mission, goals, core themes, and objectives (list): Expand graduate programs in targeted areas of identified need and existing strengths. Develop innovative approaches to resource management that support the University's mission and position UAF to meet the challenges of the future.</p> <p>Page in attached summary where alignment is discussed: 26</p>																
<p>15. Aligns with Shaping Alaska's Future themes:</p> <p>Page in attached summary where alignment is discussed: 27</p>	<p>16. Aligns with Academic Master Plan goals:</p> <p>Page in attached summary where alignment is discussed: 27</p>																
<p>17. State needs met by this program (list): Workforce Development: RAP students have a good employment track record. They learn to conduct multidisciplinary research, acquire technical expertise from GIS – drone surveillance, and are dedicated to uncovering and sharing knowledge. The majority of RAP students have remained in Alaska.</p> <p>Page in the attached summary where the state needs to be met are discussed: 28</p>	<p>18. Program is initially planned to be: (check all that apply)</p> <p><input checked="" type="checkbox"/> Available to students attending classes at UAF campus(es).</p> <p><input type="checkbox"/> Available to students via e-learning.</p> <p><input checked="" type="checkbox"/> Partially available students via e-learning.</p> <p>Page # in attached summary where e-learning is discussed: 1</p>																
<p>Submitted by the University of Alaska Fairbanks. (choose one above)</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%; text-align: center;"> _____/_____ Provost Date </div> <div style="width: 45%; text-align: center;"> _____/_____ Chancellor Date </div> </div>																	
<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> <input type="checkbox"/> Consensus Support of SAC <input type="checkbox"/> Not Supported by SAC </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Recommend Approval by VPAAR _____ / _____ </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Recommend Disapproval by VPAAR UA Vice President for Academic Affairs Date </div>																	

*Net FTE (full-time equivalents). For example, if a faculty member will be reassigned from another program, but his/her original program will hire a replacement, there is one net new faculty member. Use fractions if appropriate. Graduate TAs are normally 0.5 FTE. The numbers should be consistent with the revenue/expenditure information provided.

Attachments: ☐ Summary of Degree or Certificate Program Proposal

☐ Other (optional)

Revised: 04/20/2015

PROGRAM SUMMARY

Introduction

The request for a certification in Resilience and Adaptation Studies grows out of the highly successful Resilience and Adaptation Program or RAP. RAP began as an NSF funded IGERT grant under the direction of Dr. Terry Chapin in 2002 and was designed to promote regional sustainability research via team-taught multidisciplinary courses and internships, and to spawn collaboration in research among departments. In 2012, RAP was institutionalized by the University with support from the State of Alaska. Under Dr. Lawrence Duffy's direction, the program continues to adapt, evolve, and improve to meet new challenges and take advantage of new opportunities. Educating students to meet the state of Alaska's needs is of paramount importance.

Demand for Program

Demand for RAP admission remains extremely competitive. RAP affiliated faculty members select a small cohort each year from UAF graduate student applicants. A student can apply to an academic department and RAP simultaneously or can be admitted to RAP after beginning coursework. Over 100 graduate students have participated in the program, representing every college and school at UAF.

e-learning

Due to its focus on cohort building, incoming RAP students are asked to spend fall semester at the UAF campus. The foundation courses (4 credits) are taught at this time and students share office space in the RAP trailer behind the Reichardt Building. After the initial semester RAP students may move to other locations such as the UAS or UAA campus. The students may then take courses via distance delivery as offered or needed. The monthly All RAP seminar is videoconferenced.

Effects on other programs

RAP complements both the traditional academic departments and interdisciplinary students by providing a forum for cross-disciplinary learning and communication. As a result, departments may draw students from other areas that would not normally enroll in a course or conduct research in a given discipline. For example, recent MFA graduate (CLA) and ceramicist Perrin Teal Sullivan conducted some of her studies with the assistance of the Advanced Instrumentation Laboratory (CNSM).

Alignment with university mission, goals, core themes and objectives

The RAP certificate aligns well with UAF's mission to integrate teaching, research and public service with an emphasis on the circumpolar North and its diverse peoples. RAP appeals to students with an intellectual curiosity that are willing to step outside disciplinary boundaries with their research design. Students are selected based on their desire to approach Northern research questions from a holistic perspective that includes both natural and social science elements. RAP already attracts the best and brightest students; the certificate will be one more means of retaining talented graduate students.

RAP prepares students for employment in governmental agencies, non-governmental organizations, academia and private industry. 100 percent of alumni respondents felt that RAP increased employment opportunities. *"The RAP allowed me to extend my strong natural science foundation into work as a social scientist with a profound understanding of the cultural and economic issues facing Alaskan individuals and communities."*

RAP students design projects with community needs in mind. They work with community members to observe, listen, document and develop strategies and/or solutions to identified needs. RAP students generously share their insights and promote knowledge and ways of knowing through scholarly articles, presentations, educational outreach and involvement in community organizations. Students are often the force behind new partnerships and collaborations and serve as the catalyst for change. Students provide the energy to move good ideas and projects forward. RAP students have made significant contributions to the understanding of climate change and Arctic research; their success reflects on the university's reputation.

Alignment with Shaping Alaska's Future themes

The certificate will contribute to state accountability by documenting the successful completion of the program by a student. The number of students in relation to the cost of the program will support the "Shaping Alaska's Future" by improving the efficiency of the program.

- **Student Achievement and Attainment:** The students who apply to RAP are high achievers. They have the initiative to pursue research questions from an interdisciplinary perspective. The awarding of a certificate following 12 credits will acknowledge their progress and provide motivation for completing their Master or PhD degree.
- **Productive Partnerships with Public Entities and Private Industries:** State and federal agencies and non-governmental organizations have hired a significant number of RAP alumni. Both governmental and non-governmental organizations value the students' ability to analyze complex problems and develop effective strategies. Perhaps as a result of the cohort experience, RAP students are excellent communicators. They learn from day 1 how to express their ideas so that others outside their academic discipline can learn and understand.
- **Research and Development and Scholarship to Enhance Alaska's Communities and Economic Growth:** The approach to research using both a physical and social science perspective benefits the individual Alaska communities where the research is conducted and contributes knowledge to Alaska as a whole. RAP students are very cognizant that they must keep their communities informed throughout the entire research process from study design through dissemination of results. For example, Katty Jo Deeter is sharing her knowledge of building a successful tourism business in the Interior with Igiugig's ecotourism development goals.
- **Accountability to the People of Alaska:** The certificate will demonstrate accountability by documenting the students' successful completion of the program. A majority of the students' research addresses impacts of climate change. Whether they are documenting traditional knowledge regarding caribou migration or analyzing cortisol levels in whales to determine stress, the state of Alaska will benefit from the knowledge gained.

Alignment with Academic Master Plan goals

RAP selects students with interests related to the circumpolar North and appeals to students who are informed, responsible citizens. While they often work at the community level, their research often has implications well beyond the state level. Culturally aware, their work extends from Alaska's rural communities to the international stage. RAP alumna Robin Bronen, for example, is considered an international expert on migration as a result of climate change (climigration). Following graduation, students are in demand to fulfill leadership roles in academia as well as state and federal agencies. RAP

students are adept at building partnerships and initiating collaborative work in an effort to build a more sustainable Alaska.

State needs to be met

Workforce Development: RAP students have a good employment track record. They learn to conduct multidisciplinary research, acquire technical expertise from GIS – drone surveillance, and are dedicated to uncovering and sharing knowledge. The majority of RAP students have remained in Alaska.

Budget

By using courses across the university curriculum, the cost of instruction is lowered by increasing the class size of graduate courses. This allows an increased allocation of state funding to student support in the form of fellowships, travel to professional meetings (network formation) and publication costs (Dissemination of research knowledge gains).

Administration: RAP uses the existing administration of UAF's graduate school.

Prospectus for University of Alaska Fairbanks

A. Mission and Goals:

Mission and Vision:

Questions of sustainability for Alaska and the Circumpolar North are the focus of RAP, exploring this topic through an investigation of global-local interactions, up- and down-scale effects, important feedbacks, adaptive capacity, and critical thresholds of social-ecological change.

The Resilience and Adaptation Program is an interdisciplinary training and education program of the University of Alaska Fairbanks, focusing on sustainability in times of rapid change. The Resilience and Adaptation Program prepares scholars, policy-makers, community leaders, and managers to address issues of sustainability in an integrated fashion.

Through coursework, an internship experience, thesis research, and other training, students enrolled in PhD and masters programs address a major challenge facing humanity: Sustaining the desirable features of Earth's social-ecological systems at a time of rapid change.

The concepts of resilience, adaptation, vulnerability, and transformation serve as unifying themes in research examining global-to-local interactions.

The program prepares students for positions of leadership in academia, government, non-government organizations, education, Native organizations and agency management.

Program Goals

1. To provide graduate level students with a formal credential that documents their efforts to understand, communicate and address issues of sustainability in an integrated fashion.
2. To provide students an interdisciplinary academic and research experience that will better prepare them for leadership roles in academia, government, non-government organizations, education, Native organizations and agency management.

B. Authorization:

The University of Alaska Fairbanks (UAF) is one of four individually accredited universities within the University of Alaska system. UAF has been continuously accredited since 1934 by the Northwest Commission on Colleges and Universities.

The Constitution of the State of Alaska establishes the University of Alaska as the state university, governed by a Board of Regents appointed by the governor. Alaska Statutes provide for a board of eleven voting members, including one student, with authority to carry out the mission of the

university system and its constituent units, including the determination and regulation of the university's course of instruction and the conferring of degrees. Members of the board have no contractual, employment, or financial interest in the university. The chair is elected from among the board. The board appoints the president of the university system, who in turn appoints the chancellor of UAF. Both officers are full-time employees whose only responsibility is to the institution

C. Educational Offerings:

1. Descriptive information of the educational offering(s):

Resilience and Adaptation Studies
Graduate School
907-474-7029
www.uaf.edu/RAP
Graduate Certificate

Minimum requirements for certificate: 12 credits

As a post-baccalaureate program, the certificate in resilience and adaptation studies is ideal for current graduate students in many disciplines. The graduate certificate encourages a more in depth study of resilience, adaptation and sustainability and provides students a credential recognizing their expertise in this field of sustainability science. The certificate in Resilience and Adaptation prepares interdisciplinary students for careers in academia, industry, government and non-governmental organizations where sustainability is addressed in an integrated fashion. The certificate is expected to increase competitive ability in the job market.

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ANTH 616	Anthropology Background – Resilience & Adaptation	1
ECON 616	Economics Background – Resilience & Adaptation	1
NRM 667	Resilience Seminar I	1
LAS 601	Liberal Arts & Science	2
Approved electives		6
		12 credits

Graduate Certificate

Graduate Certificate Requirements

Complete the following admission requirements:

1. Hold a baccalaureate degree from an accredited institution
2. Gain acceptance from a departmental or interdisciplinary admission committee in an established Masters or Doctoral program
3. Complete the General University requirements for a graduate certificate
4. Complete the listed 6 credits from core RAP certificate courses
5. Complete 6 or more credits of the listed RAP certificate electives
6. Minimum credits required: 12
7. Students must earn a B or Pass grade (or better) in each course.

2. Evidence of approval by the appropriate academic policy body of the institution:

Senate signature page and BOR approval from the minutes will be provided by the Office of the Provost.

D. Planning:

1. Evidence of need for the change and the students to be served:

The certificate is not required for other programs but allows students to demonstrate a breadth of knowledge outside their discipline and the ability to work in interdisciplinary teams. The anthropocene has created new problems that cannot be addressed with a disciplinary approach.

The demand and need for the program has been demonstrated over the last 10 years by NSF funding, good enrollment and the production of MS and PhD degrees in various disciplines (See Appendix A). The Resilience and Adaptation Program (RAP) is an interdisciplinary graduate program, focusing on the role of social and ecological systems in sustainability. RAP offers studies in sustainability science as society faces critical decisions about the future of humans and their relationship to the Earth System. Resilience and Adaptation serve as central concepts in exploring the challenges of sustainability. Student research is both “basic” and “applied”, transcending disciplinary boundaries by focusing on urgent real-world problems. The RAP graduate program began with an NSF IGERT grant and was recently funded by the University of Alaska Fairbanks beginning FY13. RAP students are prepared for positions in academia, research institutes, governmental agencies, non-governmental organizations, and indigenous organizations. The activities proposed in this certificate application build on the work accomplished by RAP alumnae and faculty members.

Employment market needs

- Survey: completed December 2013
- Respondents reported increasing employment opportunities (100%)

“The RAP allowed me to extend my strong natural science foundation into work as a social scientist with a profound understanding of the cultural and economic issues facing Alaskan individuals and communities.”

- Alumni (n=14) report that 50% are employed in Alaska and 50% are employed out of state (including international).
- 86 % of alumni agreed that participation in RAP improved their ability to secure their current employment.

RAP Alumni are employed in the following areas

Academic setting k-12	7.69 %
College or university setting	53.85 %
State government office	15.38 %
Federal government office	15.38 %
Native corporation/governance office	0 %
Non-governmental organization	7.69%
Private company	0 %

2. The procedures used in arriving at the decision to change¹:

Feedback from students and faculty associated with UAF's Resilience and Adaptation Program indicated a need to document educational achievement with a certificate. The certificate also meets a state condition of documenting effectiveness of the program.

3. The organizational arrangements that must be made within the institution to accommodate the change²:

No new arrangements are necessary. The Resilience and Adaptation Program is housed within the UAF Graduate School.

4. Timetable for implementation³.

The certificate program will be initiated upon BOR and NCCU approval.

E. Budget:

1. The budget projections (revenue and expenditures) for each of the first three years of operation:

2. Revenue and expenditures associated with the change itself:

None. The program currently exists but a certificate is not yet being offered.

3. Institutional financial support to be reallocated to accommodate the change:

None.

4. The budgetary and financial implication of the change for the entire institution:

None.

F. Student Services:

Standard university services are sufficient

G. Physical Facilities:

Program office and student office space currently exists.

H. Library and Information Resources:

Existing library and information services are sufficient.

I. Faculty and Staff:

Lawrence Duffy, Program Director

Todd Brinkman, Associate Program Director

Mary van Muelken, Program Manager

**RESOURCE COMMITMENT TO THE
PROPOSED DEGREE PROGRAM**

Resources	Existing	New		Total
	College/School	College/School	Others (Specify)	
Regular Faculty (FTE's & dollars)	Graduate School 1.5 FTE	0	0	\$24,945
Adjunct Faculty (FTE's & dollars)	Graduate School 2 adjuncts .5FTE			\$6982
Teaching Assistants (Headcount)	.5 FTE			\$7366
Instructional Facilities (in dollars and/or sq. footage)	0	0	0	0
Office Space (Sq. footage)	3 Total 300 SF	n/a	n/a	300 SF
Lab Space (Sq. Footage)	0	0	0	0
Computer & Networking (in dollars)	\$4000	0	0	\$4000
Research/ Instructional/ office Equipment (in dollars)	0	0	0	0
Support Staff (FTE's & dollars)	Graduate School 1 FTE \$89,481			\$89481
Supplies (in dollars)	\$2000			\$2000
Travel (in dollars)	\$15,000			\$15,000

Signature _____
Dean of College/School Proposing New Degree Program

Date