Course Syllabus
Spring Semester 2009
University of Alaska Fairbanks

Course Title: Integrated Assessment & Adaptive Management
(a.k.a. Adaptive Management)
Semester and year: Spring 2009
Course Number: NRM 694/BIOL 694/ECON 694/ANTH 694
Class time: Tu. & Th. 9:45 – 11:15
Room: 201 Irving Building #1
Web page: See Blackboard site

Course Instructors:

<table>
<thead>
<tr>
<th>Name</th>
<th>Department affiliation</th>
<th>Phone numbers</th>
<th>Office</th>
<th>e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gary Kofinas</td>
<td>Department of Resources Management, SNRAS and Institute of Arctic Biology</td>
<td>O: 474-7078, H: 457-5725</td>
<td>128 Arctic Health Research Building</td>
<td><a href="mailto:gary.kofinas@uaf.edu">gary.kofinas@uaf.edu</a></td>
</tr>
<tr>
<td>Branka Valcic</td>
<td>Department of Economics, School of Management</td>
<td>O: 474-2754</td>
<td>Bunnell Building 213e</td>
<td><a href="mailto:branka.valcic@uaf.edu">branka.valcic@uaf.edu</a></td>
</tr>
</tbody>
</table>

Prerequisites: Participation in the Resilience and Adaptation Program (RAP) in good standing; having previously taken “Global-Local Sustainability” or received approval of instructional team based on background in resilience theory and potential to function effectively in a graduate-level interdisciplinary environment.

Course Description: This course is an interdisciplinary examination of the practice of adaptive co-management and integrated assessment. Students survey concepts important in understanding societal and professional-level decision-making on sustainability and learn about tools and approaches for interdisciplinary and transdisciplinary analysis that build resilience. Students work as individuals and in small teams to undertake assignments and the completion of an integrated assessment.

Learning Goals of the Course:
- Develop an understanding in theory of adaptive co-management and integrated assessment.
- Become familiar with case studies that illustrate the potential contributions and limitations of adaptive co-management and integrated assessment in practice.
- Gain experience making operational the ideas of resilience thinking in research.
- Receive hands-on training through completion of a student-led integrated assessment.
- Develop the skills of working in a transdisciplinary research team.

Background: Today’s conditions of rapid change challenge policy makers at all levels to think beyond issues of sustainability and actively consider how society can build its adaptive capacity, facilitate social learning and innovation, and where needed, achieve social transformation. Meeting these challenges is far from simple. Today the outcomes of contemporary issues related to sustainability are determined by the complex political maneuvering of actors with differing societal goals and values. These interactions occur in an environment of contested legal mandates, changing resource production capabilities, uncertain social-ecological conditions, and
differing perspectives on risk. To support decision making in these difficult conditions, approaches are needed that build collaboration and integrate cultural, economic, and ecological perspectives using a diversity of knowledge. This course examines approaches of sustainability science for achieving these goals.

**Definitions:** *Adaptive management* (AM) is an iterative process of decision making that includes experimentation, implementation, and reflection for dealing with uncertainty and complexity in social-ecological systems. It has been called management based on the science of learning by doing. *Co-management* (CM) is the sharing of power and responsibility between resource users and management agencies in resource management. *Adaptive co-management* (ACM), a relatively new concept, and integrates these ideas in order to achieve multi-scale processes of social learning, problem solving, and adaptation. *Integrated assessment* (IA) is the process of drawing on interdisciplinary perspectives to inform the policy process. IA typically uses computer simulation models as decision support tools.

How then do we realize the goals of ACM? In an ideal system ACM is implemented through resource governance that works across scales to coordinate management goals and objectives. ACM employs participatory scenario analyses, constructs and uses integrated decision-support systems in planning such as simulation models, and compares the outcomes of past decisions to previously predicted conditions. IA is an integral part of the ACM process.

While the ideal notions of ACM and IA are commonly discussed in the literature, there is often a significant shortfall in their implementation. This situation gives our class a unique opportunity to be creative and critical, to make new discoveries, and to push the current thinking in this field forward.

**Course as part of RAP Curriculum.** This course is the second of two core courses that are part of the Resilience and Adaptation Program curriculum, with the first being the Global-Local Sustainability course offered each fall. Whereas the Sustainability course explores the fundamental concepts of resilience, vulnerability, adaptation, and transformation in social-ecological systems, this course provides training in skills and techniques associated with putting those ideas into practice. Students who are approved to take the IA&AM course must have a background in the concepts central to resilience theory. Ask the instructors for readings if you have not taking the previous course.

**Note on demands of the course and its experiential approach:** Anticipate that the course will demand a tremendous amount of work, including reading, in-class activities, as well as non-class time for research. Being attentive to the process of research planning will be critical to the success of your project. We expect students to delve deeply into the literatures of ACM and IA, while also working as members of an interdisciplinary research team in and outside of class.

**Organization of the course:** The course is organized around two complementary and concurrent activities.

1) Key aspects of IA and ACM are examined through readings, lectures, discussions, and class assignments and activities.
2) Students work in interdisciplinary teams to develop and complete an integrated assessment that is intended to inform a policy and planning process.

In many cases, classes will alternate between presentation of material by instructors followed by student led sessions or sessions built around hands-on activities.
**The Use of Blackboard:** Class syllabus, assignments, readings, and other class relevant information are posted on Blackboard (Bb). Please check it regularly for updated information. Students should use View/Complete Assignment or Digital Dropbox interfaces on Bb to submit finished assignments.

**Grading:**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>Readings assignments and reflection papers based on readings</td>
</tr>
<tr>
<td>15%</td>
<td>Hands-on assignments</td>
</tr>
<tr>
<td>20%</td>
<td>Exam</td>
</tr>
<tr>
<td>35%</td>
<td>IA team project deliverables (see “percentages for project grading” below)</td>
</tr>
<tr>
<td>15%</td>
<td>Class participation and attendance</td>
</tr>
</tbody>
</table>

**Reading assignments.** Students are expected to complete all reading assignments before each class, and come to class with an understanding of the material and or questions about the readings. Be prepared to describe the material presented in readings and present your own critique. In some cases students may be asked to lead class discussions about readings. Students are also expected to delve into recommended readings that are of interest to them. All readings are posted on Bb. Study questions for each assignment are posted on Bb at least two weeks prior to the day they are covered in class. Study questions are provided for your benefit. Students are expected to answer study questions before class. Written answers to questions are not turned in for grades but may be the subject of class discussions. In some cases, readings not included in this syllabus will be added as assignments to take advantage of new opportunities. Students receive a grade in this category at the end of the semester based on their comprehension and evaluation of reading assignments, as demonstrated through class discussions.

**Hands-on assignments** include group or individual hands-on exercises to be completed during class and may require preparation prior to class. In most cases assignments will be posted and submitted through the View/Complete Assignment Bb interface. In the case of group assignments, only one copy may be submitted to the Digital Dropbox.

See course outline below for a list of reading-related and hands-on assignments. We anticipate that reading assignments and hands-on assignments will build our repertoire of skills, which will be helpful in the completion of the group project.

**The Exam** will test on any material covered in class completed by the date the test is given, including readings, lectures, and discussions. Students are expected to work individually and not discuss any aspects of the test with others during the exam period. The exam will be a take-home / open book test, and will be posted on Bb on Tuesday, March 4th. Completed exams are due Thursday, March 6th and should be submitted through View/Complete Assignment interface in Bb.

**The Group Project: Integrated Assessment of Community Resilience**

**Focus:** The goal of the group project is to learn the skills of doing a team-based integrated assessment that is designed to inform decision making and or planning. Students of the class work as a team to complete the integrated assessment. Groups projects are selected by the team and subject to the approval of the instructors. One of several problem areas can serve as the focus of the integrated assessment. For example:

- *Assessing Community Resilience with rapid change on the Alaska North Slope.*
- Assessing issues of sustainability as related to infrastructure and energy
- Exploring possible futures for the Tanana River area of the North Star Borough
- Pathways to Sustainable Development in a village of interior Alaska
- Anticipating Rural-Urban interactions of Alaska with climate change

Other project topics will be considered if a strong argument is made regarding the relevance of the study to the course, the availability of data, and the potential for good analysis.

The IA should include an assessment and integration of cultural, economic, and ecological dimensions relevant to the issue. To achieve this, the group project must develop a conceptual model of the studied system, identify and analyze pertinent sustainability and resilience indicators, and build and evaluate scenarios of change. The IA must include quantitative and qualitative data analysis. Students must draw from the skills developed in the course. We encourage students to be creative in their application of the IA to a real-world problem. The project research plan is reviewed and approved by the instructors. Upon submission of the research plan, students are informed of the approval within three days. Failure to meet the approval may result in a serious delay to the project schedule as the research plan is revised and resubmitted for approval.

Project Organization: Students undertake a group project as an interdisciplinary team (or teams) including people with disciplinary homes in social or natural sciences. One student (in each team) is to be selected as the group leader/coordinator. Students choose a project topic from the options given above. Students are expected to do work that is new to them and not rely solely on previous experiences. To the extent that it is possible, team(s) should conduct their work in partnership with a community. Many of the in-class activities will be applicable to developing and completing the IA, which should help to build the project through the course of the semester. See project schedule and deadlines listed below. The final weeks of the semester will be devoted mostly to finalizing the project. The final classes are an integration and synthesis exercise to formulate overarching findings. Team project culminates with final paper and a public presentation.

Project deliverables will include:

- Project proposal: A five page (single spaced plus bibliography) project proposal. The proposal should lay out the problem and study questions; the conceptual ideas to be explored, tested, or used; the general methods to be employed; information on the data to be used, product or products to be generated, organization of the study team (roles and responsibilities), the project schedule, and organization or organizations to be engaged in the project.
- Project proposal presentation: A 15 minute class presentation of the project proposal, allowing time for feedback and discussion.
- Progress report presentation: A class presentation of the project progress achieved to date. It should include the aspects of the problem of interest, and refined study questions, methods being used to address the study questions. The team is expected to have some preliminary findings at the time the progress report is presented.
- Final public presentation: This event is held each year by the class and attended by many members of the UAF and broader community. The public presentation will include a presentation on team projects and the results of the synthesis exercise. All students will be involved.
- Final paper: The final paper should be no more than 35 single spaced pages in length, including bibliography and footnotes, and suitable for publication in the
journal *Ecology and Society*. See paper guidelines for details on length and formatting (http://www.ecologyandsociety.org/submissions.php#guidelines). In addition to the paper, each student must evaluate the performance of other members of their research team and assign them a grade (10 to 1 with, 10 the highest) on the quality of their contribution to the group project.

- **Peer-evaluations:** At the end of the project, the group meets to complete a performance appraisal of each individual's contribution. The group is given 20 points per person to award towards students’ final grades. Based on that appraisal, the group collectively decides the total number of points to be awarded to each student member. The amount awarded to each student must have a spread of at least one point.

All project deliverables are to be submitted through Digital Dropbox in Bb.

**Percentages for grading and schedule deadlines:** The table below shows the percentages attributed to each project item and their due dates. All together, project deliverables are worth 35% of your grade.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
<th>Date Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project proposal</td>
<td>20%</td>
<td>Feb 12</td>
</tr>
<tr>
<td>Proposal presentation</td>
<td>5%</td>
<td>Feb 12</td>
</tr>
<tr>
<td>Progress presentation</td>
<td>15%</td>
<td>April 7</td>
</tr>
<tr>
<td>Final public presentation</td>
<td>15%</td>
<td>April 30</td>
</tr>
<tr>
<td>Final paper and peer evaluations</td>
<td>45%</td>
<td>May 9</td>
</tr>
</tbody>
</table>

**Criteria for evaluating the group project:**
- Quality of overall work and professionalism,
- Depth of analysis,
- Overall organization,
- Resourcefulness,
- Meeting deadlines,
- Level of cooperation and teamwork.

**Grading Scheme for Course:**
- Passing grades: 97% (A+), 92% (A), 90% (A-); 87% (B+), 80% (B)
- Non-passing grades: 77% (B-); 65% (C); 50% (D); 0% (F)

Earning an A grade entails excelling in all aspects of the course, and demonstrating a mastery of the material covered, and exceptional depth of analysis, resourcefulness, and quality of work. Earning a B grade entails demonstrating a mastery of the course material and doing well in all aspects of the course. Any performance below this level will result in a B- grade or below.

**Attendance:** Consider this class to be a professional training session where you are expected to attend all classes. Activities related to your thesis, important conferences, and personal emergencies may require that you miss some classes. Missing more than three classes may result in a significant lowering of your course grade. If you know ahead of time that you will not be attending a class, let the instructors and your fellow team members know. It is your responsibility to make up all missed work and or in-class activities. Ask the instructors what is needed to make up a missed class. In some cases writing a reflection paper about the reading will satisfy the requirement of missing a class.
Other Course Policies/Expectations:

- This is a small class that depends on your full participation.
- Good participation means leaving time and space for encouraging ALL students to talk and share ideas.
- We will share many different perspectives. Make your points respectfully, while listening openly to the ideas of others. Seek ways beyond the dialectics of thesis - antithesis.
- You are expected to come to class having read assigned material, answered study questions when relevant, and being prepared to discuss or lead discussion.
- Assignments that are turned in late will be penalized.
- Use of internet and the reading and writing of email messages during class are not permitted.
- The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.
- You are expected to do your own work in accordance with the UAF Student Code of Conduct (http://www.uaf.edu/catalog/current/academics/regs3.html). Cheating and plagiarism are very serious offenses, and will not be tolerated. Any exam or paper that contains plagiarized material will receive a grade of zero. Be sure you understand what constitutes plagiarism and cheating (see below for help on this). Any student who turns in a paper not written by him/herself (such as purchased from a company or downloaded from the Internet) will flunk the entire course. Rasmuson Library has prepared materials to help you understand how to cite sources properly. There are links to these on our Blackboard site.

For an explanation of what constitutes plagiarism see:

http://www.uaf.edu/library/instruction/handouts/Plagiarism.html

For an explanation of how to properly cite sources see:

http://www.uaf.edu/library/instruction/handouts/Citing.html
# Course Outline and Schedule

(Note: The course outline, assignments, and schedule are subject to change at the discretion of the instructors)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics / Reading/ Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thu, Jan 22</td>
<td>Define terms; review syllabus &amp; group project; rationale for a new paradigm</td>
</tr>
<tr>
<td></td>
<td><strong>PART ONE: PARADIGMS OF ECOLOGICAL GOVERNANCE; KNOWLEDGE CO-PRODUCTION, CROSS-SCALE LINKAGES, AND SOCIAL LEARNING</strong></td>
</tr>
<tr>
<td>Tue, Jan 27</td>
<td><strong>Session Topic:</strong> Moving from theory to praxis in resilience-based ecosystem stewardship</td>
</tr>
<tr>
<td></td>
<td><strong>Readings:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Assignment:</strong> Define key concepts (each person gets one)</td>
</tr>
<tr>
<td></td>
<td>- Social learning</td>
</tr>
<tr>
<td></td>
<td>- Experimentation in resource management</td>
</tr>
<tr>
<td></td>
<td>- Power and power sharing</td>
</tr>
<tr>
<td></td>
<td>- Bureaucracy and democracy</td>
</tr>
<tr>
<td></td>
<td>- Management</td>
</tr>
<tr>
<td></td>
<td>- Integration and synthesis</td>
</tr>
<tr>
<td></td>
<td>- Collaboration</td>
</tr>
<tr>
<td></td>
<td>- Innovation</td>
</tr>
<tr>
<td></td>
<td>- Stewardship</td>
</tr>
<tr>
<td></td>
<td>- Governance</td>
</tr>
<tr>
<td></td>
<td><strong>Recommended Readings:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>In-Class Activity</strong> (readings-related assignment): Lecture and discussion to identify salient points of readings and critical issues and questions of moving from theory to praxis in governance of SESs.</td>
</tr>
</tbody>
</table>
### Thu, Jan 29

**Session Topic:** Case studies in Adaptive Co-management

**Session Topic:** Evaluating Adaptive Management

**Readings:**

- Was cross-level power sharing achieved? How? Why?
- What type of social learning occurred? How? Why?
- What were the shortfalls in the governance system? Why?
- What conditions facilitated the system’s success?

### Tue, Feb 3

**Session Topic:** Example of an Integrated Assessment: “The Sustainability of Arctic Community Project”

**Readings:**

**Recommended Readings**

**Assignment:** Review material about the Sustainability project at [www.taiga.net/sustain](http://www.taiga.net/sustain)

**In-Class Activity** (readings-related assignment): Discuss challenges and opportunities of the “science” of integrated assessment
### Thu, Feb 5

**Session Topic:** Collaboration in Interdisciplinary Science

**Readings:**

**Recommended Readings:**

**In-Class Activity** (readings-related assignment): Class discussion based on questions posed in Eigenbrode et al.

### Tue, Feb 10

**Session Topic:** Epistemologies, pluralism, and cultural perspectives

**Readings:**

**Recommended Readings:**
<table>
<thead>
<tr>
<th>Date</th>
<th>Session Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thu, Feb 12</td>
<td><strong>In-Class Activity</strong> (readings-related assignment): Discussion of readings about TEK and Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Session Topic: PROJECT: Presentations of project proposals &amp; discussion</strong></td>
<td><strong>In-Class Activity</strong> (group project deliverable): Presentation by each group with Q &amp; A about focus and direction of the project. Be sure to make use of your cohort for input.</td>
</tr>
<tr>
<td></td>
<td><strong>Due:</strong> Project proposal and presentation</td>
<td></td>
</tr>
<tr>
<td>Tue, Feb 17</td>
<td><strong>Session Topic: Case study research as method</strong></td>
<td><strong>Readings:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Recommended Readings:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>In-Class Activity:</strong> Lecture</td>
<td></td>
</tr>
<tr>
<td>Thu, Feb 19</td>
<td><strong>Session Topic: Comparative Case Studies of Integrative Assessments</strong></td>
<td><strong>Assignment:</strong> Work in groups of three. Identify one integrated assessment. To the extent possible evaluate the success of the assessment considering its interdisciplinary approach, organization of players, generation of helpful information, use of models, and contributions to the policy process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Recommended Reading:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>In-Class Activity</strong> (readings-related assignment): Each group gives a short (7 minute) presentation about its IA and review of its methods. Class will then consider if and how the IA approach may be applicable in the class project. Materials from IAs will be on reserve at the BioScience Library.</td>
<td></td>
</tr>
<tr>
<td>Tue, Feb 24</td>
<td><strong>Session Topic: Systems Thinking</strong></td>
<td><strong>Guest Speaker:</strong> David Newman, Dept. of Physics, UAF (unconfirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Readings:</strong> Meadows, Donella H., (2008), <em>Thinking in Systems: a Primer</em></td>
</tr>
</tbody>
</table>
### Thu, Feb 26

**Session Topic:** **Conceptual Modeling: part 1**

**Readings:** TBA

**Recommended Readings:** TBA

**In-Class Activity:** Lecture

### Tue, Mar 3

**Session Topic:** **Conceptual Modeling: part 2**

**In-Class Activity** (hands-on assignment): Development of a conceptual model for your team project.

**Assigned:** Take home exam given out (posted on Bb)

### Thu, Mar 5

**Session Topic:** **Managing for Ecological Uncertainty in Adaptive Management.**

**Guest Speaker:** Brad Griffith

**Readings:** none

**Recommended Readings:**


**Due:** Take home exam; submit via View/Complete Assignment interface in Blackboard as a MSWORD doc, with your last name in the file name.

### Mar 9 & 13

**SPRING BREAK**
Tue, Mar 17  | **Session Topic:** Computational and Simulation Modeling: Part 1  
**Readings:**  
**Recommended Readings:**  
**In-Class Activity:** Lecture

Thu, Mar 19  | **Session Topic:** Computational and Simulation Modeling: Part 2  
**In-class Activity** (hands-on assignment): Hands-on intro to computational modeling  
(Location: WWRB Computer Lab)

Tue, Mar 24  | **Session Topic:** Sustainability and resilience indicators: Part 1  
(community sustainability indicator programs; what makes a good indicator; indicators of resilience vs. sustainability)  
**Readings:**  
- Astleithner, Florentina and Alexander Hamedinger, The Analysis of Sustainability Indicators as Socially Constructed Policy Instruments: benefits and challenges of ‘interactive research,’ *Local Environment, Vol. 8, No. 6, 627–640, December 2003*  
**Recommended Readings:**  
- Reed, Mark S.; Andrew J. Dougill, Participatory Selection Process for Indicators of
<table>
<thead>
<tr>
<th>Date</th>
<th>Session Topic</th>
<th>In-Class Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thu, Mar 26</td>
<td><strong>Sustainability and resilience indicators: Part 2</strong></td>
<td>In-Class Activity (hands-on assignment): Develop indicators for team project; evaluate availability and quality of data, and sensitivity of indicator.</td>
</tr>
<tr>
<td>Tue, Mar 31</td>
<td><strong>Scenario Analysis: Part 1</strong></td>
<td>Readings:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recommended Readings:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assignment: Watch streamed lecture by Steve Carpenter on Scenarios</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In-Class Activity: Lecture and discussion</td>
</tr>
<tr>
<td>Thu, Apr 2</td>
<td><strong>Scenario Analysis: Part 2</strong></td>
<td>In-Class Activity (hands-on assignment): Develop scenarios for your team project</td>
</tr>
<tr>
<td>Tue, Apr 7</td>
<td><strong>Project Progress Presentation</strong></td>
<td>In-Class Activity (group project deliverable): Presentation on the progress of your project followed by Q&amp;A and discussion</td>
</tr>
</tbody>
</table>
**Thu, Apr 9**  
*Session Topic: Mapping Local Knowledge*  
*Guest Speaker: Steve Braund, of Stephen Braund and Associates (unconfirmed)*  
*Readings: TBA*

**PART THREE: FROM INTEGRATION TO SYNTHESIS**

**Tue, Apr 14**  
*Session Topic: Decision-Support tools in practice*  
*Reading: Invited Speaker*  
*Readings: TBA*  
*Recommended Readings: TBA*  
*In-Class Activity: Lecture*

**Thu, Apr 16**  
*Session Topic: Cumulative Effects and the Policy Making*

**Tue, Apr 21**  
*Session Topic: Integration vs Synthesis*  
*Readings:*
*In-Class Activity (hands-on assignment):* Develop an integration framework for the class project  
*In-Class Activity (readings-related assignment)*

**Thu, Apr 23**  
*Session Topic: TBA*  
*Readings: TBA*  
*Recommended Readings: TBA*  
*In-Class Activity: TBA*

**Tue, Apr 28**  
Trial run for the public presentation with feedback from instructors

**Thu, Apr 30**  
Class Evaluation

**Week of May 4; Specific date & time TBA**  
Public Presentation of Final Projects

**Sat, May 9 at noon**  
*Group project deliverables Due: Final Paper and Peer Evaluations (no actual class meeting)*

Any part of the syllabus is subject to change at the discretion of the instructors.