FORMAT 1

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).

See http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/ for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	Fisheries	**College/School**	SFOS
Prepared by	Anne Beaudreau	**Phone**	(907) 796-5454
Email Contact	abeaudreau@alaska.edu	**Faculty Contact**	Anne Beaudreau

1. ACTION DESIRED (CHECK ONE): Trial Course [ ] New Course [X]

2. COURSE IDENTIFICATION: Dept: FISH | Course #: 676 | No. of Credits: 3

Justify upper/lower division status & number of credits: This is a graduate-level course that covers advanced material and is aimed at students with a basic foundation in ecology and proficiency with Excel and basic statistics. The course is comprised of 2 hours of lecture and 3 hours of lab per week.

3. PROPOSED COURSE TITLE: Aquatic Food Web Ecology

4. To be CROSS LISTED? *YES/NO*: Yes | If yes, Dept: MSL | Course #: 676

NOTE: Cross-listing requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.

5. To be STACKED? *YES/NO*: No | If yes, Dept. | Course #

How will the two course levels differ from each other? How will each be taught at the appropriate level?:

Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi—undergraduate and graduate versions—will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online – see URL at top of this page.

6. FREQUENCY OF OFFERING: Fall Even-numbered Years

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (AY2013-14 if approved by 3/1/2013; otherwise AY2014-15): AY2014-15

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, **any core course compressed to less than six weeks must be approved by the Core Review Committee**.

COURSE FORMAT: (check all that apply)		*1*		*2*		*3*		*4*		*5*	X	*6 weeks to full semester*
OTHER FORMAT (specify)												
Mode of delivery (specify lecture, field trips, labs, etc)	Lecture, discussion, computer lab											

9. CONTACT HOURS PER WEEK:	2	LECTURE hours/weeks	3	LAB hours /week		PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-computing-/ for more information on number of credits.

OTHER HOURS (specify type)	

10. COMPLETE CATALOG DESCRIPTION including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

Example of a complete description:

FISH F487 W, O Fisheries Management

3 Credits Offered Spring

Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. *Prerequisites: COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X; ENGL F414; FISH F425; or permission of instructor.* Cross-listed with NRM F487. (3+0)

FISH 676 Aquatic Food Web Ecology
3 Credits Offered Fall Even-numbered Years
This course will examine theoretical and applied aspects of aquatic food web ecology, from the ecological processes that give rise to patterns in aquatic communities to the incorporation of trophic interactions into ecosystem-based management. Lectures and discussion will focus on ecological theory and case studies. Lab exercises will introduce empirical and modeling approaches for studying food web interactions. Proficiency with Excel and basic statistics is preferred. ***Prerequisites: FISH 425 or permission of instructor.*** Cross-listed with MSL 676. (2+3)

11. COURSE CLASSIFICATIONS: Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities		S = Social Sciences	

Will this course be used to fulfill a requirement for the baccalaureate core? **If YES, attach form.**	**YES:**		**NO:**	

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, **Format 6**		W = Writing Intensive, **Format 7**		X = Baccalaureate Core	

11.A Is course content related to northern, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES		NO	X

12. COURSE REPEATABILITY:

Is this course repeatable for credit?	YES		NO	X

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).	

How many times may the course be repeated for credit?		TIMES
If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?		CREDITS
If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?		CREDITS

13. GRADING SYSTEM: Specify only one. Note: Changing the grading system for a course later on constitutes a Major Course Change – Format 2 form.

LETTER:	X	PASS/FAIL:	

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES FISH 425 or permission of instructor

These will be *required* before the student is allowed to enroll in the course.

15. SPECIAL RESTRICTIONS, CONDITIONS None

16. PROPOSED COURSE FEES None

Has a memo been submitted through your dean to the Provost for fee approval? **Yes/No**

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously? **Yes/No** Yes

If yes, give semester, year, course #, etc.: Fall 2012; FISH/MSL 693 Aquatic Food Web Ecology

18. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

This course requires a classroom with VCON capability five hours per week. Computers will be needed to complete in-class exercises during some lab sessions. Students will need to provide their own laptops, unless they are available for checkout from their home department.

Anne Beaudreau is teaching this course as a part of her faculty workload; it will serve as one of the 2-3 courses she is required to teach each academic year.

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No		Yes	X

During my initial development of this course, I consulted with Anne Christie, the former UAF BioSciences Librarian and Library Liaison for SFOS, about library services to support the proposed course. She reviewed the course reading list and confirmed that the library has all necessary electronic and print resources in its collection and is capable of acquiring additional books or media to support the course, as needed (see attached *Library Resources Memo* from Ms. Christie dated 1/22/12).

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

The proposed course will most directly impact two departments: Fisheries and Marine Science & Limnology, both within the School of Fisheries and Ocean Sciences. To assess impacts of the proposed course on other programs/departments, I discussed the proposed course with faculty in Fisheries and Marine Science & Limnology to ensure that it does not duplicate or conflict with other courses currently offered in those departments. The faculty I spoke with were very supportive of the proposed course and offered several helpful suggestions that I incorporated into the course design and syllabus. My conversations and correspondence with these faculty members are detailed in the attached *Course Contacts Memo*.

A number of courses with ecological themes are taught in Fisheries and Marine Science & Limnology, including graduate Fish Ecology (FISH 650), Behavioral Ecology of Fishes (FISH 426/626), Physiological Ecology of Fishes (FISH 428/628), Data Analysis in Community Ecology (FISH 631), Marine Biology (MSL 610), Marine Ecosystems (MSL 652), and Coastal Ecosystem Science (FISH 693). I reviewed the syllabus and spoke to the professors of each course and worked to ensure that there is minimal redundancy in course material.

21. POSITIVE AND NEGATIVE IMPACTS

*Please specify **positive and negative** impacts on other courses, programs and departments resulting from the proposed action.*

I expect this course to appeal to a variety of graduate students from Fisheries, Biology & Wildlife, Natural Resource Management, and Marine Sciences (GPMSL). The course will not be a requirement, but will give students another option to fulfill graduate level elective coursework. The course will be distance-delivered if requested. There should be no negative impacts, as this course will not be a requirement and should not reduce enrollment in other courses. Based on feedback I received from students who took the course in Fall 2012, this course will also help prepare students for more advanced modeling courses, such as Quantitative Fish Population Dynamics (FISH 622), by introducing them to population and systems ecology and improving proficiency in advanced analytical tools in Excel.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

The goals of this course are to introduce students to theoretical and applied perspectives in aquatic food web ecology and a range of approaches to studying food webs. We examine empirical and modeling techniques that both advance ecological understanding of predator-prey interactions and address resource management needs. Food web considerations are central to ecosystem-based management (EBM) of aquatic systems. As EBM takes hold in national and regional policy, training students in the science underpinning ecosystem-based management is important to their professional development and will contribute to the next generation of experts.

Based on my discussions with faculty and students and my own examination of the course catalog, I believe that

the proposed course would be of general interest and provide a unique and meaningful contribution to the curriculum for the following reasons:

- There is no other course that focuses exclusively on food webs and feeding ecology of aquatic organisms.
- The proposed course should be of broad interest to graduate students in Fisheries, Marine Science & Limnology, and Biology because 1) it examines theoretical and applied aspects of food web ecology in freshwater, estuarine, *and* marine ecosystems, and 2) most of the course topics address broad concepts in ecology that are applicable to other ecosystems (e.g., terrestrial) and are not exclusive to fish and fisheries.
- The course will help to prepare students for participation in research and natural resource management in their graduate and professional careers by developing their knowledge of the science underpinning ecosystem-based management.
- This course fills a gap in the curriculum by covering some of the material formerly taught in Fish Bioenergetics (FISH 615), which was recently expunged from the catalog.
- Most FISH and MSL ecology courses are offered in the spring (e.g., FISH 426/626, FISH 428/628, FISH 631, FISH 650, FISH 693, MSL 610, MSL 652). The proposed course will be offered in the fall and provides an additional opportunity for students to take an ecology course if they were unable to do so during spring semester.

This course was offered as a special topics course during Fall 2012 and the initial offering drew broad interest from multiple departments, schools, and universities. Eleven students enrolled, including 6 in Juneau, 3 in Fairbanks, 1 in Kodiak, and 1 in Anchorage. The students were MS and PhD students in Fisheries, Marine Science & Limnology, and Biology & Wildlife; one individual was a Biology MS student at the University of Alaska Anchorage. She took *Aquatic Food Web Ecology* because there were no equivalent courses in ecology at UAA. The students' reception to the course was positive (Table 1). Students provided feedback anonymously though written responses to the UAF course evaluation (100% response rate) and an optional supplemental evaluation that I administered after the completion of the course (73% response rate). Students described the course as intellectually stimulating; they appreciated the depth and breadth of topics, discussions of theoretical and applied perspectives on food web ecology, and the opportunities to practice quantitative skills. In summary, this course fills a gap in UA graduate science courses in the area of quantitative ecology, has demonstrated broad applicability within and beyond SFOS, is successful as a distance-delivered course, and has the potential to increase our connections with other campuses. Based on these merits, I believe that it will make a strong contribution to the permanent course offerings at UAF.

Table 1. Interpolated median scores calculated from IAS course evaluations for four metrics. N = 11 respondents (100% response rate)

Metric	Interpolated median score
1. The course as a whole was:	4.4
2. The course content was:	4.3
3. The instructor's contribution to the course was:	4.9
4. The instructor's effectiveness in teaching the subject matter was:	4.4

5=excellent, 4=very good, 3=good, 2=fair, 1=poor, 0=very poor

APPROVALS: Add additional signature lines as needed.

See attached		Date	
Signature, Chair, Program/Department of:	Fisheries / SROC		
		Date	9/9/2013
Signature, Chair, College/School Curriculum Council for	School of Fisheries and Ocean Sciences		
		Date	9/26/13
Signature, Dean, College/School of:	School of Fisheries and Ocean Sciences		

Offerings above the level of approved programs must be approved in advance by the Provost.

	Date		

Signature of Provost (if above level of approved programs)

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date		

Signature, Chair

Faculty Senate Review Committee: ___Curriculum Review ___GAAC

___Core Review ___SADAC

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

Brenda Konar see attached	Date		
Signature, Chair, Program/Department of:	Marine Science and Limnology		
	Date		
Signature, Chair, College/School Curriculum Council for	School of Fisheries and Ocean Sciences		
	Date		
Signature, Dean, College/School of:	School of Fisheries and Ocean Sciences		

UNIVERSITY of ALASKA

Mercedes Anderson <mlanderson11@alaska.edu>

Questel - Adv to Cand

Brenda Konar <bhkonar@alaska.edu> Sat, Sep 21, 2013 at 5:19 AM
To: Mercedes Anderson <mlanderson11@alaska.edu>

Mercedes
I approve the stacking of the Food Web Ecology course. Sounds great!
Thanks
Brenda

[Quoted text hidden]

the proposed course would be of general interest and provide a unique and meaningful contribution to the curriculum for the following reasons:

- There is no other course that focuses exclusively on food webs and feeding ecology of aquatic organisms.
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4. The instructor's effectiveness in teaching the subject matter was:	4.4

5=excellent, 4=very good, 3=good, 2=fair, 1=poor, 0=very poor

APPROVALS: Add additional signature lines as needed.

[signature]	Date	9/3/12	
Signature, Chair, Program/Department of:	Fisheries / SFOS		
	Date		
Signature, Chair, College/School Curriculum Council for	School of Fisheries and Ocean Sciences		
	Date		
Signature, Dean, College/School of:	School of Fisheries and Ocean Sciences		

Offerings above the level of approved programs must be approved in advance by the Provost.

ATTACH COMPLETE SYLLABUS (as part of this application). This list is online at:
http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/uaf-syllabus-requirements/
The Faculty Senate curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course (or changes to it) may be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:

❑Title, ❑ number, ❑credits, ❑prerequisites, ❑ location, ❑ meeting time
(make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:

❑ Name, ❑ office location, ❑ office hours, ❑ telephone, ❑ email address.

3. Course readings/materials:

❑ Course textbook title, ❑ author, ❑ edition/publisher.
❑ Supplementary readings (indicate whether ❑ required or ❑ recommended) and
❑ any supplies required.

4. Course description:

❑ Content of the course and how it fits into the broader curriculum;
❑ Expected proficiencies required to undertake the course, if applicable.
❑ Inclusion of catalog description is *strongly* recommended, and
❑ Description in syllabus must be consistent with catalog course description.

5. ❑ Course Goals (general), and (see #6)

6. ❑ Student Learning Outcomes (more specific)

7. Instructional methods:

❑ Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

❑ A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

❑ Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

❑ Specify how students will be evaluated, ❑ what factors will be included, ❑ their relative value, and ❑ how they will be tabulated into grades (on a curve, absolute scores, etc.) ❑ Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (Not required in the syllabus, but is a convenient way to

publicize this.) Link to PDF summary of grading policy for "C":
http://www.uaf.edu/files/uafgov/Info-to-Publicize-C_Grading-Policy-UPDATED-May-2013.pdf

11. Support Services:

❑ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services: Note that the phone# and location have been **updated.** http://www.uaf.edu/disability/ The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials.

❑ State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655)to provide reasonable accommodation to students with disabilities.

5/21/2013

Aquatic Food Web Ecology

FISH 676/MSL 676

Fall Even-numbered Years

Course information

3 credits (2+3)

Prerequisites: FISH 425 or permission of instructor

Recommended: proficiency with Excel and basic statistics

Tentative schedule: Lectures MW 10:30-11:30 am; Labs W 1-4 pm

Location: Juneau, Distance sites via VCON

Instructor

Dr. Anne Beaudreau

321 Lena Point Building

(907) 796-5454

E-mail: abeaudreau@alaska.edu

Skype: anne.beaudreau

Office hours: Thurs 3-5 pm or by appointment

Course readings/materials (see attached reading list)

There is no textbook for this course. Required and recommended supplementary readings will be made available on Blackboard. Computer labs will require the use of Microsoft Excel, R (free from http://www.r-project.org/), and Ecopath with Ecosim (free from http://www.ecopath.org/). Students will need to provide their own laptops, unless they are available for checkout from their home department.

Course description

FISH 676 **Aquatic Food Web Ecology**

3 Credits Offered Fall Even-numbered Years

This course will examine theoretical and applied aspects of aquatic food web ecology, from the ecological processes that give rise to patterns in aquatic communities to the incorporation of trophic interactions into ecosystem-based management. Lectures and discussion will focus on ecological theory and case studies. Lab exercises will introduce empirical and modeling approaches for studying food web interactions. Proficiency with Excel and basic statistics is preferred. ***Prerequisites: FISH 425 or permission of instructor.*** Cross-listed with MSL 676. (2+3)

Course goals

Predation plays a fundamental role in the dynamics of marine and freshwater ecosystems. Furthermore, quantifying predator-prey relationships in aquatic food webs is an important component of the science supporting ecosystem-based management. The goals of this course are to introduce students to theoretical and applied perspectives in aquatic food web ecology and a range of approaches to studying food webs. We will examine empirical and modeling techniques that both advance ecological understanding and address resource management needs.

Upon completion of the course, students should be familiar with major theoretical concepts in food web ecology and prepared to develop a conceptual framework for original research on food web interactions in aquatic ecosystems.

Student learning outcomes

In this course students will:

1) Gain knowledge of fundamental theory in aquatic food web ecology

2) Develop an understanding of important primary literature through synthesis and critical analysis of classic and contemporary literature in food web ecology
3) Achieve familiarity and practice with analytical tools and approaches for quantifying trophic interactions in aquatic systems
4) Understand approaches to developing food web studies for management applications
5) Develop a conceptual framework for original research on food webs in aquatic ecosystems

Instructional methods

The course will be taught using a combination of lectures, discussion, and weekly computer labs. Lectures (2 hr/wk) are designed to introduce students to ecological theory, classical and current literature, empirical and modeling approaches in food web ecology, and applications of food web studies to management and conservation. Computer lab sessions (3 hr/wk) will consist of brief presentations by the instructor, group discussion of assigned readings as related to lab exercises, and hands-on practice designed to introduce students to quantitative methods in aquatic food web ecology.

Lecture slides, handouts, readings, and assignments will be provided to students through Blackboard. If requested, the course will be distance delivered from the Juneau campus.

Course policies

My approach to teaching is to promote active learning in the classroom. My role in this course is to largely serve as a facilitator in your exploration of aquatic food web ecology. This includes providing the necessary background on each week's topics, facilitating labs and in-class exercises, and moderating classroom discussions. Your role is to be an active, contributing member of the class.

Attendance and in-class participation are very important in learning the course material. If you cannot turn in an assignment or attend class for a legitimate reason, it is your responsibility to contact me in advance in order to avoid a penalty. With the exception of emergencies, late assignment requests will only be honored if a legitimate reason is provided to me in writing at least one week prior to the due date. Unexcused absences will result in deductions from your participation grade. **Lab exercises, writing assignments, and the final paper will be docked 10% of their total point value for each day late (including weekends).**

Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated in this class. Cheating is when a student gives or receives any form of assistance during an examination or quiz; duplicated or paraphrased answers on assignments are also considered cheating. Plagiarism is defined as the submission or presentation of work that is not a student's own without acknowledgment of the source. Submission of the same work in more than one course without prior approval of all professors responsible for the courses is also considered academic dishonesty. Any suspected cases of academic misconduct will be handled according to University regulations and violations will result in automatic failure of the course.

You are responsible for understanding and following the UAF Student Code of Conduct (http://www.uaf.edu/catalog/current/academics/regs3.html).

Evaluation

Students will be evaluated on their participation, weekly lab exercises and writing assignments, and final paper, each comprising the following percentage of the final grade:

Assignment (N/semester)	**Percent of grade**
Final paper (1)	35
Paper analysis (9)	25
Lab exercise (13)	30
Participation (14)	10
TOTAL	**100**

Each paper analysis is worth 10 points, each lab exercise is worth 10 points, and participation is 5 points per week. The final paper is worth 100 points. To calculate your final grade, use the following formula:

Final grade = (35*final paper points)/100 + (25*paper analysis points)/90 + (30*lab exercise points)/130 + (10*participation points)/70

Letter grades are determined according to the following scale:

Points	**Grade**
90-100	A (≤ 92.9: A-, ≥ 97: A+)
80-89.9	B (≤ 82.9: B-, ≥ 87: B+)
70-79.9	C (≤ 72.9: C-, ≥ 77: C+)
60-69.9	D (≤ 62.9: D-, ≥ 67: D+)
< 60	F

Participation: Participation counts as 10% of your grade. In this class, participation is defined as attendance *and* contribution to the class during lectures, labs, and discussion by asking questions and providing comments and input.

Paper analysis: **Paper analyses are due at the beginning of lab section on Wednesday.** An important element of this course is gaining practice in reading, synthesizing, and critically evaluating scientific literature. For given topics in the syllabus, students will select one paper from the supplementary reading list and write a 1 page summary that includes the following elements:

(1) A brief description of the study, including what was done, why, and what was discovered
(2) A summary of how the work contributed to the body of research and/or theory on the subject
(3) A critical assessment of the strengths and weaknesses of the work and additional questions that you have about the study

Weekly exercises and lab session: **Weekly lab exercises are due Friday by 11:59 pm and should be submitted by e-mail.** Lab sessions are intended to get you started on these exercises with the help of the instructor. It should be possible to complete the majority of the exercises

during the lab period but any unfinished work must be completed outside of class. You are encouraged to discuss your answers with each other, but the answers that you turn in must be your own. You will need access to a computer with Microsoft Excel, R, and Ecopath with Ecosim installed to complete the exercises (see course materials above).

Final paper: Research prospectus: A research prospectus is a formal description of a proposed research project. In your final paper, you will describe an original research project that addresses a theoretical or applied question in aquatic food web ecology. The required and supplementary readings are a good starting point for thinking about potential research topics/questions. While you will not be required to complete the research that you propose, this is a good opportunity to prepare a description of a project that you might want to undertake as part of your M.S. thesis, Ph.D. dissertation, or additional paper outside of your core graduate research.

The prospectus should be 10-15 double-spaced pages (not including references and tables/figures) and include the following components: 1) Title, 2) Abstract, 3) Introduction (literature review, context for the study), 4) Identified project need (statement of problem, broader impacts), 5) Specific objectives and Hypotheses, 6) Study plan (methods, timeline), 7) Deliverables and expected research products, 8) Conceptual model/Tables/Figures, and 9) Literature cited.

To ensure that students are making progress on the research prospectus throughout the semester, there will be interim deadlines for submitting a draft outline and components of the final paper. The final paper is worth 35% of your total grade and points are allocated as follows:

Section	Points
Proposed research topic (Title, Abstract, Objectives, Hypotheses)	5
Annotated outline (Introduction, Project need)	10
Annotated outline (Study plan)	10
Final paper (all sections)	75
Total	**100**

Support services

This is an upper-level course which requires intensive learning, both in and out of the classroom. I encourage you to take advantage of my scheduled office hours or, if necessary, make an appointment to meet with me. If you are struggling with any aspects of the course material or learning environment, please talk with me before you get discouraged—I am happy to provide the support you need to be successful in the course.

Disabilities services

The UAF 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. I will work with the Office of Disability Services (208 Whitaker, Fairbanks campus; http://www.uaf.edu/disability/) to provide reasonable accommodation to students with disabilities. You can also contact Disability Services by phone (907-474-5655) or e-mail (fydso@uaf.edu). If you need course adaptations or accommodations because of a disability, *please contact me as soon as possible* in order to make the necessary arrangements.

Course schedule: M 1030-1130, W 1030-1130 & 1300-1600 (subject to revision)

Week	Topic	Assigned reading *
1	**Introduction and overview** *Structure of freshwater and marine food webs; Primary producers through apex predators; Top down vs. bottom up control; Approaches for depicting trophic relationships (topological, energetic, interaction); Management applications of food web studies* No paper analysis due this week Lab: Theoretical properties and conceptual models of food webs (Due Fri)	Required: Paine 1980, Martinez 1992
2	**Identifying and quantifying food web linkages** *Field approaches to food habits studies and sample size considerations; Diet composition metrics; Spatial and temporal variation in diets; Bioenergetics and field-based consumption models* Paper analysis due Wed Lab: Introduction to bioenergetics models (Due Fri)	Required: Chipps & Wahl 2008 Supplementary: Madenjian et al. 2004, Stewart et al. 1981
3	**Size-dependent predator-prey interactions** *Predator gape limitations; Prey size refuges; Size-based predator-prey relationships; Body size and trophic position* Paper analysis due Wed Lab: Ontogenetic diet shifts and prey size spectra (Due Fri)	Required: Scharf et al. 2000, Juanes 1994 Supplementary: Brose et al. 2006, Jennings et al. 2002
4	**Feeding and foraging** *Optimal foraging theory; Foraging strategies; Trade-offs and predation risk; Patch dynamics; Habitat-mediated interactions* Paper analysis due Wed Lab: Optimal foraging models (Due Fri)	Required: Abrahams & Healey 1993, Mittlebach & Osenberg 1994 Supplementary: Savino & Stein 1982, Heithaus et al. 2007
5	**Predator-prey dynamics: Predator responses to prey supply** *Functional and numerical responses; Prey-switching and handling; Prey supply and availability; Foraging arenas* Proposed research topic due Wed Lab: Functional response models (Due Fri)	Required: Abrams & Ginzburg 2000, Hunsicker et al. 2011
6	**Predator-prey dynamics: Linking predation to prey population dynamics**	Required: Bax 1998

	Integrating population dynamics and predation models; Lotka-Volterra dynamics, isoclines; Top-down control; Quantifying predation mortality Paper analysis due Wed Lab: Lotka-Volterra two-species models (Due Fri)	Supplementary: Roby et al. 2003, Tsou & Collie 2001
7	**Competition and resource partitioning** *Trophic niche breadth; Functional groups and guild structure; Apparent competition, exploitation competition; Indirect effects* Paper analysis due Wed Lab: Niche breadth, competition, and coexistence (Due Fri)	Required: Wootton 1994 Supplementary: Garrison & Link 2000, Schmitt 1987
8	**Discussion: Stability and resilience in ecological systems** No paper analysis due this week Background & Project need due Wed Lab: Research practicum peer-review workshop	Required: Grimm & Wissel 1997, Holling 1973, Holling Discussion Guide
9	**Energy pathways and material flow through food webs** *Benthic and pelagic pathways; Stable isotopes; Fatty acid analysis; Nutrients and contaminants; Trophic efficiency; Allochthonous/autochthonous inputs; Spatial and temporal energy and nutrient subsidies* Paper analysis due Wed Lab: System responses to spatial subsidies (Due Fri)	Required: Polis et al. 1997, Schindler and Scheuerell 2002 Supplementary: Nakano and Murakami 2001, Polis and Hurd 1995
10	**Food web dynamics: Interaction strengths** *Theoretical and empirical approaches to measuring interaction strength; Weak and strong interactions; Trophic cascades* Paper analysis due Wed Lab: Quantifying species interactions strengths (Due Fri)	Required: Berlow et al. 2004, de Ruiter et al. 1995, Paine 1992 Supplementary: Frank et al. 2005, Myers et al. 2007
11	**Multispecies and ecosystem models** *Qualitative models (e.g., loop analysis); Mass balance models; Multispecies and ecosystem modeling approaches and applications* Paper analysis due Wed Lab: Ecosystem modeling using Ecopath (Due Fri)	Required: Hollowed et al. 2000 Supplementary: Kitchell et al. 2000, Kitchell et al. 2002
12	**Fishing effects on food webs**	Required: Pauly et al. 1998, Essington et al. 2006,

	Serial depletion of upper trophic levels; Trophic effects of age- and size-selectivity; Fishing mediated distributional shifts of predators and prey Paper analysis due Wed Lab: Effects of marine reserves on food web structure (Due Fri)	Branch et al. 2010 Supplementary: Pauly et al. 1998, Essington et al. 2006, Branch et al. 2010
13	**Climate and physical forcing effects on food webs** *Environmental mediation of trophic interactions; Spatial and temporal scales of change; Climate regime shifts, changes in system productivity* Study plan due Wed Lab: Bottom-up control of aquatic food webs (Due Fri)	Required: Woodward et al. 2010, Doney et al. 2012
14	**Food webs and natural resource management** *Ecosystem-based management; Spatial management of predators and prey; Invasive species impacts; Wild/hatchery fish interactions* No paper analysis; Prepare 10-min presentations for Wed Lab: Research prospectus presentations (Short write-up due Fri)	Required: Link 2002, Mangel & Levin 2005, Levin et al. 2009
15	**Summary and wrap-up** *Discussion of assigned reading*	Required: Holling & Meffe 1996

Final paper due Fri (finals week)

* See attached reading list for detailed citations

Aquatic Food Web Ecology

FISH 676/MSL 676

Fall Even-numbered Years

Course reading list – *subject to revision*

* = required reading; s = supplementary reading for paper analysis (choose one)

Week 1—Introduction and overview

*Martinez ND (1992) Constant connectance in community food webs. The American Naturalist 139(6):1208-1218

*Paine RT (1980) Food webs: Linkage, interaction strength, and community infrastructure. Journal of Animal Ecology 49:667-685

Week 2—Identifying and quantifying food web linkages

*Chipps SR, Wahl DH (2008) Bioenergetics modeling in the 21st century: reviewing new insights and revising old constraints. Transactions of the American Fisheries Society 137:298-313

[s]Madenjian CP, O'Connor DV, Chernyak SM, Rediske RR, O'Keefe JP (2004) Evaluation of a chinook salmon (*Oncorhynchus tshawytscha*) bioenergetics model. Can. 687 J. Fish. Aquat. Sci. 61:627-635

[s]Stewart DJ, Kitchell JF, Crowder LB (1981) Forage fishes and their salmonid predators in Lake Michigan. Trans. Am. Fish. Soc. 110:751-763

Week 3—Size-dependent predator-prey interactions

[s]Brose U, Jonsson T, Berlow EL, et al. (2006) Consumer-resource body-size relationships in natural food webs. Ecology 87:2411-2417

[s]Jennings S, Pinnegar JK, Polunin NVC, Warr KJ (2002) Linking size-based and trophic analyses of benthic community structure. Marine Ecology Progress Series 226:77-85

*Juanes F (1994) What determines prey size selectivity in piscivorous fishes? *In* Stouder DJ, Fresh KL, Feller RJ (eds) Theory and Application in Studies of Fish Feeding Ecology. University of South Carolina Press, Columbia, SC, pp 79-100

*Scharf FS, Juanes F, Rountree RA (2000) Predator size - prey size relationships of marine fish predators: interspecific variation and effects of ontogeny and body size on trophic-niche breadth. Marine Ecology Progress Series 208:229-248

Week 4—Feeding and foraging

*Abrahams MV, Healey MC (1993) Comparison of the willingness of four species of Pacific salmon to risk exposure to a predator. Oikos 66(3):439-446

[s]Heithaus MR, Frid A, Wirsing AJ, Dill LM, et al. (2007) State-dependent risk-taking by green sea turtles mediates top-down effects of tiger shark intimidation in a marine ecosystem. Journal of Animal Ecology 76:837-844

*Mittlebach GG, Osenberg CW (1994) Using foraging theory to study trophic interactions. *In* Stouder DJ, Fresh KL, Feller RJ (eds) Theory and Application in Fish Feeding Ecology. University of South Carolina Press, Columbia, SC, pp 45-60

[s]Savino JF, Stein RA (1982) Predator-prey interactions between largemouth bass and bluegills as influenced by simulated, submersed, vegetation. Transactions of the

American Fisheries Society 111:255-266

Week 5—Predator-prey dynamics: Predator responses to prey supply

*Abrams PA, Ginzburg LR (2000) The nature of predation: prey dependent, ratio dependent, or neither? Trends in Ecology and Evolution 15:337-341

*Hunsicker ME, Ciannelli L, Bailey K, et al. (2011) Functional responses and scaling in predator-prey interactions of marine fishes: contemporary issues and emerging concepts. Ecology Letters 14(12):1288-1299

Week 6— Predator-prey dynamics: Linking predation to prey population dynamics

*Bax NJ (1998) The significance and prediction of predation in marine fisheries. ICES J. Mar. Sci. 55:997-1030

[s]Roby DD, Lyons DE, Craig DP, Collis K, Visser GH (2003) Quantifying the effect of predators on endangered species using a bioenergetics approach: caspian terns and juvenile salmonids in the Columbia River estuary. Can. J. Zool. 81:250-265

[s]Tsou TS, Collie JS (2001) Predation-mediated recruitment in the Georges Bank fish community. ICES Journal of Marine Science 58:994-1001

Week 7—Competition and resource partitioning

[s]Garrison LP, Link JS (2000) Dietary guild structure of the fish community in the northeast United States continental shelf ecosystem. Mar. Ecol. Prog. Ser. 202:231-240

[s]Schmitt RJ (1987) Indirect interactions between prey: apparent competition, predator aggregation, and habitat segregation. Ecology 68(6):1887-1897

*Wootton JT (1994) The nature and consequences of indirect effects in ecological communities. Annual Review of Ecology and Systematics 25:443-466

Week 8— Stability and resilience in ecological systems

*Grimm V, Wissel C (1997) Babel, or the ecological stability discussions: An inventory and analysis of terminology and a guide for avoiding confusion. Oecologia 109:323-334

*Holling CS (1973) Resilience and stability of ecological systems. Annual Review of Ecology and Systematics 4:1-23

*Holling Discussion Guide

Week 9—Energy pathways and material flow through food webs

[s]Nakano S, Murikami M (2001) Reciprocal subsidies: dynamic interdependence between terrestrial and aquatic food webs. Proceedings of the National Academy of Sciences 98:166-170

*Polis GA, Anderson WB, Holt RD (1997) Toward and integration of landscape and food web ecology: the dynamics of spatially-subsidized food webs. Annual Reviews in Ecology and Systematics 28:289-316

[s]Polis GA, Hurd SD (1995) Extraordinarily high spider densities on islands: flow of energy from the marine to terrestrial food webs and the absence of predation. Proc Natl Acad Sci USA 92:4382-4386

*Schindler DE, Scheuerell MD (2002) Habitat coupling in lake ecosystems. Oikos 98:177-189

Week 10—Food web dynamics: Interaction strengths

*Berlow EL, Neutel AM, Cohen JE, et al. (2004) Interaction strengths in food webs: issues and opportunities. Journal of Animal Ecology 73:585-598

*de Ruiter PC, Neutel AM, Moore JC (1995) Energetics, patterns of interaction strengths, and stability in real ecosystems. Science 269:1257-1260

[s]Frank KT, Petrie B, Choi JS, Leggett WC (2005) Trophic cascades in a formerly cod-dominated ecosystem. Science 308:1621-1623

[s]Myers RM, Baum JK, Shephard TD, Powers SP, Peterson CH (2007) Cascading effects of the loss of apex predatory sharks from a coastal ocean. Science 315: 1846-1849

*Paine RT (1992) Food-web analysis through field measurement of per capita interaction strength. Nature 355:73-75

Week 11—Multispecies and ecosystem models

*Hollowed AB, Ianelli, JN, Livingston PA (2000) Including predation mortality in stock assessments: a case study for Gulf of Alaska walleye pollock. ICES J. Mar. Sci. 57:279-293

[s]Kitchell JF, Cox SP, Harvey CJ, Johnson TB, Mason DM, Schoen KK, Aydin K, Bronte C, Ebener M, Hansen M, Hoff M, Schram S, Schreiner D, Walters CJ (2000) Sustainability of the Lake Superior fish community: Interactions in a food web context. Ecosystems 3(6):545-560

[s]Kitchell JF, Essington TE, Boggs CH, Schindler DE, Walters CJ (2002) The role of sharks and longline fisheries in a pelagic ecosystem of the Central Pacific. Ecosystems 5(2):202-216

Week 12—Fishing effects on food webs

*Branch TA, Watson R, Fulton EA, Jennings S, et al. (2010) The trophic fingerprint of marine fisheries. Nature 468:431-435

*Essington TE, Beaudreau AH, Wiedenmann J (2006) Fishing through marine food webs. PNAS 103(9): 3171-3175

*Pauly D, Christensen V, Dalsgaard J, Froese R, Torres F, Jr. (1998) Fishing down marine food webs. Science 279:860-863

Week 13—Climate and physical forcing effects on food webs

*Doney SC, Ruckelshaus M, Duffy JE, Barry JP, Chan F, English CA, Galindo HM, Grebmeier JM, Hollowed AB, Knowlton N, Polovina J, Rabalais NN, Sydeman WJ, Talley LD (2012) Climate change impacts on marine ecosystems. Annu. Rev. Marine. Sci. 4:11-37

*Woodward G, Perkins DM, Brown LE (2010) Climate change and freshwater ecosystems: Impacts across multiple levels of organization. Phil. Trans. R. Soc. B 365:2093-2106

Week 14—Food webs and natural resource management

*Levin PS, Fogarty MJ, Murawski SA, Fluharty D (2009) Integrated ecosystem assessments: Developing the scientific basis for ecosystem-based management of the ocean. PLoS Biology 7(1):e1000014

*Link J (2002) Ecological considerations in fisheries management: When does it matter? Fisheries 27(4):10-17

*Mangel M, Levin PS (2005) Regime, phase and paradigm shifts: making community ecology the basic science for fisheries. Philosophical Transactions of the Royal Society of London B 360:95-105

Week 15—Summary and wrap-up

*Holling CS, Meffe GK (1996) Command and control and the pathology of natural resource management. Conservation Biology 10(2):328-337

Optional Readings

These references are not required but may be helpful to you as you develop your research prospectus. They are available on Blackboard.

Anderson PJ, Piatt JF (1999) Community reorganization in the Gulf of Alaska following ocean climate regime shift. Mar. Ecol. Prog. Ser. 189:117-123

Beauchamp DA, Wahl DH, Johnson BM (2007) Predator and prey interactions. *In* Guy CS, Brown ML (eds) Analysis and Interpretation of Freshwater Fisheries Data. American Fisheries Society, Bethesda, Maryland. 502-F.

Beaudreau AH, Essington TE (2009) Development of a new field-based approach for estimating consumption rates of fishes and comparison with a bioenergetics model for lingcod (*Ophiodon elongatus*). Canadian Journal of Fisheries and Aquatic Sciences 66:565-578

Berlow EL (1999) Strong effects of weak interactions in ecological communities. Nature 398: 330-334

Carpenter SR, Fisher SG, Grimm NB, Kitchell JF (1992) Global change and freshwater ecosystems. Annual Review of Ecology and Systematics 23:119-139

Carpenter SR, Kitchell JF, Hodgson JR (1985) Cascading trophic interactions and lake productivity. Bioscience 35:634-639

Chipps SR, Garvey JE (2007) Assessment of diets and feeding patterns. *In* Guy CS, Brown ML (eds) Analysis and Interpretation of Freshwater Fisheries Data. American Fisheries Society, Bethesda, Maryland. 502-F. pp. 473-514

Crowder LB, Hazen EL, Avissar N, Bjorkland R, Latanich C, Ogburn MB (2008) The impacts of fisheries on marine ecosystems and the transition to ecosystem-based management. Annu. Rev. Ecol. Evol. Syst. 39:259-278

de Ruiter PC, Wolters V, Moore JC, Winemiller KO (2005) Food web ecology: Playing Jenga and beyond. Science 309:68-71

Emmerson MC, Raffaelli D (2004) Predator–prey body size, interaction strength and the stability of a real food web. Journal of Animal Ecology 73:399-409

Essington TE, Hansson S (2004) Predator-dependent functional responses and interaction strengths in a natural food web. Canadian Journal of Fisheries and Aquatic Sciences 61: 2215-2226

Fauchald P, Erikstad KE (2002) Scale-dependent predator-prey interactions: the aggregative response of seabirds to prey under variable prey abundance and patchiness. Mar. Ecol. Prog. Ser. 231:279-291

Folke C, Carpenter S, Walker B, et al. (2004) Regime shifts, resilience, and biodiversity in ecosystem management. Annu. Rev. Ecol. Evol. Syst. 35:557-81

Francis RC, Hare SR, Hollowed AB, et al. (1998) Effects of interdecadal climate variability on the oceanic ecosystems of the NE Pacific. Fisheries Oceanography 7(1):1-21

Fulton EA, Link JS, Kaplan IC (2011) Lessons in modelling and management of marine

ecosystems: the Atlantis experience. Fish and Fisheries 12:171-188
Gende SM, Edwards RT, Willson MF, Wipfli MS (2002) Pacific salmon in aquatic and terrestrial ecosystems. BioScience 52(10):917-928
Gotelli N (2001) Chapter 6: Predation. *In* A Primer of Ecology. Sinauer Associates, Inc.: Sunderland, MA. pp. 126-153
Hunsicker ME, Essington TE, Watson R, Sumaila UR (2010) The contribution of cephalopods to global marine fisheries: Can we have our squid and eat them too? Fish and Fisheries 11:421-438
MacArthur RH, Pianka ER (1966) On optimal use of a patchy environment. The American Naturalist 100(916):603-609
McIntyre JK, Beauchamp DA (2007) Age and trophic position dominate bioaccumulation of mercury and organo-chlorines in the food web of Lake Washington. Science of the Total Environment 372:571-584
Menge BA (1995) Indirect effects in marine rocky intertidal interaction webs: patterns and importance. Ecological Monographs 65(1):21-74
Mills EL, Casselman JM, Dermott R, et al. (2003) Lake Ontario: food web dynamics in a changing ecosystem (1970–2000). Can. J. Fish. Aquat. Sci. 60:471–490
Ney JJ (1990) Trophic economics in fisheries: assessment of demand-supply relationships between predators and prey. Reviews in Aquatic Sciences 2(1):55-81
Pauly D, Christensen V, Walters CJ (2000) Ecopath, Ecosim and Ecospace as tools for evaluating ecosystem impact of fisheries. ICES J. Mar. Sci. 57:697-706
Post DM (2002) Using stable isotopes to estimate trophic position: models, methods, and assumptions. Ecology 83:703-718
Power ME (1992) Habitat heterogeneity and the functional significance of fish in river food webs. Ecology 73(5):1675-1688
Ross ST (1986) Resource partitioning in fish assemblages: a review of field studies. Copeia (2):352-388
Sih A (1980) Optimal behavior: can foragers balance two conflicting demands? Science 210(4473):1041-1043
Simberloff D, Dayan T (1991) The guild concept and the structure of ecological communities. Annual Review of Ecology and Systematics 22:115-143
Vander Zanden J, et al. (1999) Stable isotope evidence for the food web consequences of species invasions in lakes. Nature 401:464-467
Weber ED, Fausch KD (2003) Interactions between hatchery and wild salmonids in streams: differences in biology and evidence for competition. Can. J. Fish. Aquat. Sci. 60:1018-1036
Werner EE, Gilliam JF (1984) The ontogenetic niche and species interactions in size-structured populations. Ann. Rev. Ecol. Syst. 15: 393-425
Whipple SJ, Link JS, Garrison LP, Fogarty MJ (2000) Models of predation and fishing mortality in aquatic ecosystems. Fish and Fisheries 1:22-40
Winder M, Schindler DE (2004) Climate change uncouples trophic interactions in an aquatic ecosystem. Ecology 85(8):2100-2106

MEMORANDUM

To: Anne Beaudreau (anne.beaudreau@alaska.edu)
From: Anne Christie (anne.christie@alaska.edu)
Date: Sunday, January 22, 2012 1:47 PM (via e-mail)
Subject: Reading list for proposed special topics course

The UAF Libraries are well able to support FISH 693/MSL 693 Aquatic Food Web Ecology. In the past few years, the libraries have greatly expanded online access to library resources.

The present reading list for the class consists of 90 articles from 34 different journals and four sections from two books. Through individual subscriptions, full-text database packages, purchased online backfiles and publisher open access, the library provides online access to 87 of these articles via the UAF Journals List as well as to the complete run of 29 journals on the reading list. The journals for which the library does not have complete online access are *Fish and Fisheries*, *ICES Journal of Marine Science*, *Marine Biology* and *Nature* and as well, no online access to *Reviews in Aquatic Sciences*. The 3 articles on the list which are not available online via the UAF Journals List are in the library collection in paper. Online access can be provided via the Library's passworded Electronic Reserves service http://eres.uaf.edu/eres/. The library owns both of the books on the list and online access to the book sections can also be provided via ERes.

The library subscribes to a number of other journals related to ecology and fish and fisheries which may be relevant for students working on assignments for the class. If students need to identify articles for their work in addition to the articles on the reading list, the library provides several useful databases including *Web of Sciences*, *Biological Abstracts*, *Aquatic Sciences and Fisheries Abstracts (ASFA)*, *Fish, Fisheries and Aquatic Biodiversity Worldwide* and *Zoological Record.* Remote access is available for these databases as well as online journals via the VPN or the library's proxy server which authenticates using the individual's UA GoogleApps user name and password.

Anne Christie
BioSciences Librarian and Library Liaison for the School of Fisheries and Ocean Sciences.

MEMORANDUM

To: UAF Curriculum Council
From: Anne Beaudreau
Date: August 27, 2013
Subject: Contacting UAF faculty to avoid course material redundancy

I discussed the proposed course (FISH 676/MSL 676, Aquatic Food Web Ecology) with faculty in Fisheries and Marine Sciences & Limnology to ensure that it does not duplicate or conflict with other courses currently offered in those departments. The faculty I spoke with were very supportive of the proposed course and offered several helpful suggestions that I incorporated into the course design and syllabus. My conversations and correspondence with these faculty members are summarized below, with the date(s) of contact in parenthesis.

Dr. Trent Sutton (1/9/12) was very supportive of a graduate level course in trophic ecology. Dr. Sutton teaches graduate Fish Ecology (FISH 650), which examines the relationships of fishes to the physical, chemical, and biological features of their environment. The final component of this course deals with biotic interactions, including predation and competition. The proposed course is intended to expand on what students learn in FISH 650 and provide a more in-depth treatment of predation and food web interactions, especially in terms of theoretical foundations, quantitative approaches, and applications to resource management.

Dr. Andy Seitz (1/11/12) was also enthusiastic about the proposed course and provided helpful feedback on the overall scope of topics covered. Dr. Seitz teaches two courses in fish ecology—Behavioral Ecology of Fishes (FISH 426/626) and Physiological Ecology of Fishes (FISH 428/628). Physiological Ecology covers the physiological responses and adaptations of fishes in both freshwater and marine systems to natural and anthropogenic environmental variables; there are very few similarities to the proposed course. Behavioral Ecology provides students with an advanced understanding of behavioral responses and adaptations of fishes in both freshwater and marine systems to environmental variables; this course includes topics on foraging and predation. The proposed class covers foraging strategies and optimal foraging theory in week 4 but will focus less on the behaviors of individuals and more on how predator and prey foraging strategies translate into population and community-level dynamics. In addition, the proposed class provides broader treatment of aquatic organisms beyond fish.

Dr. Ginny Eckert (1/5/12) was supportive of the proposed course and felt that it addressed some areas of ecology that are not yet covered by existing classes. Dr. Eckert and Dr. Gordon Kruse teach Marine Ecosystems (MSL 652), which is a synthesis of ecological processes that support the structure and functioning of marine ecosystems. Their course focuses on large-scale ecosystem processes in marine systems, while the proposed course is aimed at food web processes across a range of scales, from interactions between individual predator and prey populations to food web dynamics involving multiple species. The proposed course also covers freshwater ecosystems.

Dr. Megan McPhee (1/10/12) was enthusiastic about the course, particularly aspects related to fish bioenergetics and consumption, and knew of several students who would be interested in the

material. Dr. McPhee and Dr. Mark Wipfli taught Coastal Ecosystem Science (FISH 693), a special topics course that focuses on the structure and function of coastal ecosystems. Their course was an in-depth examination of nutrient and energy subsidies in coastal ecosystems with particular emphasis on southeast Alaska. While the proposed course provides a broad overview of energy and nutrient subsidies in week 9, it is focused on general ecological theory related to energy flow in food webs and more broadly discusses the role of spatial subsidies across freshwater and marine habitats.

Dr. Franz Mueter (week of 1/8/12) conveyed enthusiasm for the course and could think of several students who would likely be interested in enrolling. Dr. Mueter teaches Data Analysis in Community Ecology (FISH 631), which is an applied statistics course that introduces methods for examining the structure, abundance, and distribution of species and communities in relation to the environment. This differs from the proposed course, which is focused on ecological theory and applied management questions related to food webs and predator-prey interactions.

Dr. Katrin Iken (1/16/12, 1/28/12) felt that given the broader scope of the course (not exclusive to fish) there would be interest by Marine Science & Limnology graduate students and was supportive of a proposal to cross-list the course with MSL. Dr. Iken teaches Marine Biology (MSL 610), which introduces major marine ecosystems and the specific characteristics, structure, function, and processes shaping these ecosystems. Part of the class covers predation, grazing, and energy flow; however, these components primarily deal with general principals of trophic ecology in specific marine ecosystems and go into little detail on ecological theory and model applications. Dr. Iken thought that students who take MSL 610 will be well prepared for Aquatic Food Web Ecology and that there is not too much overlap between the two classes.

Dr. Keith Criddle (12/19/11, 1/13/12), Dr. Amanda Rosenberger (1/6/12), Dr. Milo Adkison (1/13/12), and Dr. Terry Quinn (1/24/12) were also supportive of the proposed course and felt that it would well-received; Dr. Criddle suggested cross-listing the course with MSL.

Dr. Doug Causey (7/5/12 via e-mail), a Professor of Biological Sciences at University of Alaska Anchorage, expressed interest in building his complex network analysis course on some of the concepts introduced in my course. After reviewing my syllabus, he commented that "you have designed a very comprehensive introduction and review of interaction ecology, the course looks really interesting" and felt that it would help address a gap in quantitative ecology courses within the UA system.

Curriculum Committee SFOS

Members: Trent Sutton (Chair)
Ana Aguilar-Islas
Andres Lopez
Brenda Konar

21 August 2013

Revised Course
Course Number: FISH 676
Course Title: Aquatic Food Web Ecology
Instructor: Beaudreau
First Time of Offering: No

General Recommendations:

As a general comment, the committee recommends that the instructor reduce the length (i.e., summarize) of the Impacts on Programs/Depts and Justification sections of the proposal form. Most justification sections are one to two paragraphs in length.

Response: I reduced the length of both the Impacts and Justification sections. Specific details from conservations with other faculty to ensure that the proposed course does not duplicate existing courses are included in the attached Course Contacts Memo. I am happy to leave this out if you feel it is unwarranted.

Faculty Senate Form:

Clarify and Address the following:

- For the complete catalog description (Section 10) and prerequisites (Section 14), please remove "proficiency with Excel and basic statistics". The university can only enforce prerequisites for actual courses (e.g., FISH 425) and not general statements. If there is a course that requires the use of Excel or basic statistics (e.g., STAT 200, STAT 401) and it is important that students have those skills to take your class, you are encouraged to list those specific courses as prerequisites for your course.

Response: A basic understanding of Excel and statistics is important, but I cannot identify a specific course to develop those skills that is appropriate as a prerequisite. I moved "proficiency with Excel and basic statistics" from the prerequisites to the recommended section. This is consistent with other Fisheries courses currently in the catalog, which list "proficiency in computing with R" (FISH 604—Modern Applied Statistics for Fisheries) and "familiarity with PCs including word processing and spreadsheets" (FISH 621—Estimation of Fish Abundance) as prerequisites.

Syllabus:

- The same concern regarding the prerequisite language as identified on the form ("proficiency with Excel and basic statistics") needs to be addressed on the syllabus as well.

Response: see above

- The Committee was concerned that the amount of weekly reading for students seemed to be rather significant, especially if students read the optional/supplementary readings each week. The recommendation is for the instructor to monitor the reading load given the other responsibilities of course and adjust if necessary.

Response: I have already reduced the reading load since the last time the course was offered. The optional readings are truly optional but are included because they might be helpful for students when they are working on their final papers. To clarify this, I removed the optional readings from the course schedule in the syllabus and simply included them in the reading list as additional references that *may* be used if needed to complete the final paper.