

**Preliminary Syllabus 8/22/2016**  
**FAS 6355c / FAS 4932 Fisheries Management**

Course Syllabus, Fall 2016, 4/3 Credits

Lectures: Monday and Wednesday 09:00– 10:25 AM, 222 Newins-Ziegler Hall  
Lab (graduate only): Monday 1:00 - 3:30 PM, 3096 McCarthy B (on-campus);  
Tuesday 8:00-10:00 PM, Canvas Meeting (distance students)  
Tutorial (undergraduate only): Wednesday 08:30– 09:00 AM, 222 Newins-Ziegler Hall

### **Course Description**

Integrating scientific, social, political and legal factors in fisheries management.

### **Overview**

Fisheries are an important source of food and recreational opportunities, yet many are in poor shape due to overfishing and/or habitat degradation. Managing fisheries sustainably and restoring fisheries that have been degraded is a complex task that requires a broad set of competencies from fisheries professionals. The course aims to help students develop key competencies including knowledge of essential ecological, social, institutional, and economic dimensions of fisheries management; skills in fisheries systems analysis, interview and social survey techniques, resource assessment and modeling, institutional analysis, participatory planning and reflection-in-action; and a repertoire of case studies. The course also aims to foster motivation for problem solving in an interdisciplinary and participatory manner, critical thinking and innovation. Lectures will be used to outline key concepts and approaches, and laboratories and homework assignments will provide experience in applying key methods. Throughout the course, all students will develop a case study on a fishery of their choice, applying what they have learned, providing concrete examples for class discussions, and eventually providing an independent review and recommendations for the further management of the fishery. Graduate students will also conduct a project design practicum: a service-oriented project aimed at addressing a current fisheries management issue through innovative science and/or professional practice. This interdisciplinary course is intended for graduate or undergraduate students majoring in any subject relevant to fisheries management including fisheries/aquatic science, wildlife, resource economics, geography, and political science.

### **Course Objectives**

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- 1) Appreciate the complex, multi-dimensional nature of fisheries management problems and the benefits of integrative-interdisciplinary approaches to addressing them
- 2) Understand key relevant concepts in the areas of fisheries ecology, stakeholder

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characteristics and behavior, governance systems, fisheries economics, and management and planning processes

- 3) Gain practical skills in fisheries assessment, interview techniques, institutional analysis, economic analysis, and participatory planning.
- 4) Gain practical experience in analyzing fisheries management issues in a problem- and outcome-oriented, interdisciplinary manner.
- 5) Strengthen group work, communication, facilitation and reporting skills.

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- 6) Gain practical experience in designing a project aimed at addressing a current fisheries management issue through scientifically informed professional practice.

#### **Teaching and learning approach**

The starts off with structured lectures and labs/homework assignments, but progresses towards more open-ended, student-driven and often group-based learning. From you as a student, the course requires enthusiasm for grappling with complex and poorly defined real-world fisheries management issues (“messes”). Many students enjoy these challenges but some don’t. If you want to be told what to do at all times, are uncomfortable engaging with problems that don’t have a right or wrong answer, or dislike peer review and group work then this course may not be for you.

The course is taught in mixed mode for both on-campus and distance students. On-campus and distance students will interact directly through a variety of electronic means and may work collaboratively on certain activities. All undergraduate and on-campus graduate students are expected to attend lectures and tutorials or labs regularly and in person.

#### **Instructor**

Dr. Kai Lorenzen (Professor), Fisheries and Aquatic Sciences, SFRC, 7922 71<sup>st</sup> Street, Gainesville, FL 32653. Phone 352-273 3646, Email: [klorenzen@ufl.edu](mailto:klorenzen@ufl.edu), Skype: kailorenzenuf  
Web Page: <http://fisheriessolutions.org>.  
Office hours: Mondays 10:30-11:30 AM at the NOAA-RTR, McCarthy B (or by arrangement)

#### **Teaching assistant**

Claudia Friess, Fisheries and Aquatic Sciences, SFRC, McCarty C, FL 32611. Email: [elasmophile@ufl.edu](mailto:elasmophile@ufl.edu). Office hours: by arrangement.

#### **Guest lecturers**

Dr. Edward Camp, SFRC, UF (fisheries economics)  
Chelsey Crandall, SFRC/SNRE, UF (stakeholder engagement and conflict management)  
Shepherd Grimes, NOAA (fisheries law)  
Dr. Martha Monroe, SFRC, UF (communication and education)

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Dr. Taylor Stein, SFRC, UF (quantitative social surveys)

Dr. Juliane Struve, SFRC, UF (habitat issues)

### **Mixed mode (on-campus and distance) delivery**

The class will be offered in mixed on-campus/distance mode. Distance delivery is mostly asynchronous except for a lab session that will be arranged for mutual convenience (usually on Tuesday night).

All lectures and discussions will be automatically recorded by the UF Mediasite system.

Recordings normally become available within 1-2 hours of each session and can be accessed on: <https://mediasite.video.ufl.edu/Mediasite/Catalog/Full/1f364064d8ed4e17817fca2030b2ee5b21>

All students must upload a personal introduction clip and an introduction clip about their case study fishery via the VoiceThread system. Distance students will also use voice thread to upload brief reflections on their case studies, presentations etc. throughout the course.

Arrangements for distance students for lab and discussion sessions will be discussed and agreed at the beginning of the course. All participants are encouraged to maintain contact and discuss questions throughout the course using a suitable means agreed upon at the start of class (e.g. Canvas chat room, facebook, etc.).

### **E-learning and distance learning support**

A Canvas site is available. Course material and interactive elements are organized as follows:

#### Announcements

- All important announcements are posted on the Canvas site and copied to your email.

#### Resources

- Access to resources such as lecture slides and key readings is via a Canvas web interface, organized by week. Lecture slides uploaded for sessions that have not yet been held are preliminary and are normally updated around the time a lecture is given (the course evolves constantly and so do the lectures!).
- Lecture recordings are automatically uploaded to the Mediasite catalog. We also make screen recordings as a backup and these will be made available via Canvas in cases where Mediasite recordings are unavailable.
- Coursework assignments are posted under *Assignments*. Please turn in your coursework through the *Assignments* functionality. (I will accept assignments submitted by email, but only under exceptional circumstances).
- You will receive feedback and grades through the same channel.

#### VoiceThread

- Use VoiceThread to upload and view clips, presentations etc.

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### Chatroom

- Please use Canvas chat room to post questions and thoughts of general interest to the class.
- Post your questions for the discussion sessions here – by the previous day at the latest!

### **Assessment & Grading**

#### Graduate

A variety of different assessment approaches will be used, with emphasis on evaluating understanding of key concepts, development of core skills, critical thinking, and creative problem solving. The different assessments and their weighting are:

Lab reports (5)	25%
Case study presentation	25%
Fisheries project design practicum	25%
Interim exam	<u>25%</u>
Total	100%

#### Undergraduate

A variety of different assessment approaches will be used, with emphasis on evaluating understanding of key concepts, development of core skills, critical thinking, and creative problem solving. The different assessments and their weighting are:

Homework exercises (5)	30%
Case study presentation	30%
Quizzes	15%
Interim exam	<u>25%</u>
Total	100%

#### Grading information

Grades will be allocated as: A (93 - 100 %), A- (90 - 92 %), B+ (86 - 89 %), B (82 - 85 %), B- (78 - 81 %), C+ (74 - 77 %), C (67 - 73 %), C- (63 - 66 %), D+ (59 - 62 %), D (55 - 58 %), D- (51 - 54 %), E (< 50 %).

Click here for UF grading information for students: <http://www.registrar.ufl.edu/hubstudents.html>

### **Coursework requirements**

#### Introductory clips

All students are required to upload introductory clips about themselves and their case study to Voice Thread.

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### Lab reports (graduate) /homework assignments (undergraduate)

Lab sessions (graduate) and homework assignments (undergraduate) are designed to help students exercise key skills in fisheries assessment, interviewing, and bio-economic analysis. The graduate labs and undergraduate assignments will cover similar ground and are due within 2 weeks of the assignment being given.

Five lab/assignment reports are required:

- 1) Qualitative interviews (Individual reports)
- 2) Quantitative social surveys (Group reports by section: on-campus graduate, distance graduate, on-campus undergraduate).
- 3) Fisheries assessment I: biomass dynamics modeling (Individual reports).
- 4) Fisheries assessment II: dynamic pool models (Individual reports).
- 5) Bio-economic modeling (Group reports, two students per group).

Depending on the lab/assignment, students will work and submit reports either individually or in groups. Reports should concisely address the questions posed in the assignments in writing, supported by pertinent figures and/or tables. It is not necessary to provide introductory material or describe methods, though knowledge and understanding of both should be evident in the presentation and interpretation of results. Individual lab reports will normally be around 3-5 pages in length, group reports may be longer.

Grading criteria: The report answers all questions posed in the assignment in a clear and concise manner. Text is supported by key figures and/or tables, all of which are appropriately labeled, described in a legend and referenced in the text. Interpretation of results shows good understanding of the underlying concepts and methods.

### Integrative fisheries case study

All students will develop an integrative case study on a fishery or a fisheries-related natural resource of their choice. The aim of the case study is to conduct and present an integrative-interdisciplinary analysis of the outcomes of a fishery, the factors that led to these outcomes, options for improving management (or sustaining positive outcomes), and generic lessons that can be learned from the case study. Taken together, the case studies will become part of the student's 'repertoire'.

In the spirit of reflective practice, students will develop the case study in multiple steps interspersed with feedback and reflection.

- 1) Identification of case study topic
- 2) Completion of an information checklist summarizing key information on all attributes of

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the case study and information sources

- 3) Peer and instructor feedback
- 4) Initial case study presentation (in class for on-campus, VoiceThread for distance students)
- 5) Peer and instructor feedback
- 6) Final case study presentation (VoiceThread)

Grading criteria: The presentations provide a clear, integrative and concise assessment of the fishery, possible management responses, and any generic lessons that can be learned from this specific case. Statements are appropriately supported by reference to publications, information from stakeholders, or personal observations. The presentation shows ability to synthesize and critically evaluate information.

### Problem-based project design practicum

In the practicum, students design a project aimed at addressing a real, current fisheries management problem through innovative professional practice. Where appropriate, students are encouraged to select problems related to their research or professional practice and to design projects they may subsequently implement as part of these activities. Students also have the option of obtaining credit for implementing their projects as part of a special study following the class.

Project design involves:

- a clear analysis of the management problem
- a realistic appreciation of what the proposed project will contribute to addressing the problem and over what time scale
- a set of well-designed, scientifically and professionally sound, and fully developed and pre-tested project activities
- an assessment of resources required to implement the project (budget, personnel, etc.)

Project design will normally require students to interact with stakeholders in order to aid problem analysis, design of activities, and pre-testing of specific tools such as survey instruments. Proposed project activities may include e.g. interview studies or social surveys, modeling studies involving interaction with stakeholders, conducting stakeholder workshops, or development of educational materials. All proposed activities must be grounded in sound science and professional practice and defined and pre-tested to the extent that they are ready to be implemented.

The project design practicum is conducted in five steps:

- (1) Drafting of a pre-proposal
- (2) Peer and instructor review of pre-proposals
- (3) Development of the main proposal including consultation with stakeholders, pre-testing of

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activities etc.

(4) Peer and instructor review of pre-proposals

(5) Submission of final proposal.

The pre-proposal should be about 3 pages in length and include: (a) background; (b) problem definition; (c) aims and objectives; (d) project activities; (e) timeline; (f) outputs (g) intended contributions of the project to addressing the problem identified. The full proposal should follow the same format and be about 10 pages in length, plus appendices.

Grading criteria: the management problem is clearly identified; the project activity is clearly described, of appropriate scope, and designed to a high standard.

### Interim exam

A take-home interim exam will be held in week 12. The exam will consist of a mix of short-answer and essay questions.

### **Deadlines**

All deadlines are on Mondays at 23:59 unless otherwise noted.

<b>Week</b>	<b>Lab/homework</b>	<b>Integrative case study</b>	<b>Design practicum</b>
<b>1 (8/22)</b>			
<b>2 (8/29)</b>	Introductory clip	Topic	
<b>3 (9/05)</b>			Topic
<b>4 (9/12)</b>	Assignment 1		
<b>5 (9/19)</b>		Information checklist	
<b>6 (9/26)</b>	Assignment 2	<i>Peer feedback on checklist</i>	
<b>7 (10/03)</b>			Pre-proposal
<b>8 (10/10)</b>	Assignment 3		<i>Peer feedback on pre-prop.</i>
<b>9 (10/17)</b>		Presentation	
<b>10 (10/24)</b>	Assignment 4	<i>Peer feedback on pres.</i>	
<b>11 (10/31)</b>			
<b>12 (11/07)</b>	Assignment 5		
<b>13 (11/14)</b>	Interim exam		
<b>14 (11/28)</b>			
<b>15 (11/21)</b>			Draft full proposal
<b>16 (12/05)</b>		Final presentation	<i>Peer feedback on prop.</i>
<b>17 (12/12)</b>			Final proposal

### **Academic honesty**

All students are required to abide by the Academic Honesty Guidelines which have been accepted by the University of Florida:

(<http://www.dso.ufl.edu/judicial/procedures/honestybrochure.html>).

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Failure to comply strictly to these guidelines can result in failure of the course.

### **UF Counseling Services**

Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

### **Accommodations for Students with Disabilities**

Students requesting classroom or laboratory accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

### **Lecture and lab schedule**

*Note: details of the schedule may change in response to external circumstances or pedagogical needs of the course.*

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Recommended reading</b>
1	8/22 Lecture	Introduction to the course: Course overview, student introductions.	
	8/22 Lab	Project design practicum: Initial discussion on possible topics, interests, tasks, timeline	
	8/24 Lecture	Discussion I: Importance of fisheries, what do we expect from a 'good' fishery, how do fisheries measure up, what is the role of professionals in achieving good fisheries?	Gutierrez et al. 2011; Hilborn 2007b; Post et al. 2002; Welcomme et al 2010; Worm et al. 2009; Anderson et al. 2015.
2	8/29 Lecture	Learning from strangers: Qualitative interview studies	Acheson 1982; Weiss 1994; Kuehn et al. 2006; Adkins 2010; Turner 2010; Guion et al. 2011
	8/29 Lab	Qualitative interviewing	
	8/31	Understanding fisheries systems	Degnbol & McCay 2006;



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	Lecture	and identifying options for improving outcomes	Garcia & Charles 2007; Lorenzen 2008
3	9/05 Lecture	Labor Day – no lecture	
	9/05 Lab	Labor Day – no lab	
	9/07 Lecture	Quantitative social surveys (Taylor Stein)	Dillman et al. 2009
4	9/12 Lecture	Stakeholders as individuals: values, attitudes, assets and drivers of behavior	Salas & Gaertner 2004; Smith et al. 2005; Arlinghaus & Mehner 2006; Hutt & Bettoli 2007
	9/12 Lab	Quantitative surveys	
	9/14 Lecture	Fisheries assessment I Biomass dynamics models	Hilborn & Walters 1992 (Ch. 8); Haddon 2001 (Ch. 10); Cooper 2006; Edwards et al. 2012
5	9/19 Lecture	Fisheries assessment II Dynamic pool models (Claudia Friess)	Charles 2001 (Ch. 11), Walters 2007; Hilborn 2007(a); Prager & Shertzer 2010; Edwards et al. 2012
	9/19 Lab	Fisheries assessment	
	9/21 Lecture	Fisheries governance	Sutinen 1999; Hilborn et al. 2005; Ostrom 2007; Branch 2009; Fujita et al. 2010; Gutierrez et al. 2011, NOAA 2007
6	09/26 Lecture	Discussion II: Fisheries management in theory	
	09/26 Lab	Fisheries assessment	
	09/28 Lecture	Gulf Council SSC Meeting (class will attend in person or via video link)	Documents will be on the FTP server at <a href="http://www.gulfcouncil.org">www.gulfcouncil.org</a>
7	10/03 Lecture	Fisheries assessment III Reference points and management procedures (Claudia Friess)	

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	10/03 Lab	Fisheries assessment Practicum – finalizing proposals	
	10/05 Lecture	Economics of fisheries management (Ed Camp)	Milon et al. 1999; Conrad 1999 (Ch. 3); Whitmarsh 2011 (Ch. 2)
8	10/10 Lecture	Discussion III: Reflection on the Gulf Council SSC meeting and fisheries management in practice	
	10/10 Lab	Project design	
	10/12 Lecture	Communication strategies for working with stakeholders (Martha Monroe)	Kaplan & Kaplan 2009, Monroe et al. 2009
9	10/17 Lecture	Case study presentations and discussions (I)	
	10/17 Lab	Project design	
	10/19 Lecture	Case study presentations and discussions (II)	
10	10/24 Lecture	Stakeholder engagement and workshop facilitation (Chelsey Crandall)	Tierny 2011
	10/24 Lab	Project design	
	10/26 Lecture	Managing fisheries conflicts (Chelsey Crandall)	Covey 1990; Fisher & Uri 1991, Pomeroy et al. 2007; Pomeroy & Rivera-Guieb 2006
11	10/31 Lecture	Natural sciences, social sciences, artistry and the practice of fisheries management	Schön 1983; Sarewitz 2004; Jentoft 2006
	10/31 Lab	Project design	
	11/02 Lecture	Reforming fisheries management: change and processes	McCay (1989); Grimes (1996); Harris et al. (2007); Shelley (2012)
12	11/07 Lecture	Spatial fisheries management and marine spatial planning	Fogarty & Botsford 2007; Lorenzen et al. 2010
	11/07 Lab	Project design	
	11/09 Lecture	Ecosystem-based fisheries management	Francis et al. 2006; Hobday et al. 2011; Rice 2011
13	11/14 Lecture	Habitat in fisheries management (Juliane Struve)	Langton et al. 1996; Levin & Stunz 2005
	11/14 Lab	Project design	
	11/16		

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	Lecture		
14	11/21 Lecture	Law in Fisheries Management – Discussion (Shepherd Grimes, NOAA lawyer)	
	11/21 Lab	Project design	
	11/23 Lecture	Day before Thanksgiving – no class	
15	11/28 Lecture	Managing recreational fisheries: do different principles apply?	Radomski 2001; Post et al. 2002; Arlinghaus et al. 2007; Johnston et al. 2014; TRCP 2014
	11/28 Lab	Project design	
	11/30 Lecture	Where there is no data and no government: managing small-scale fisheries in developing countries	Allison & Ellis 2001; Prince 2010; Cochrane et al. 2011.
16	12/05 Lecture	TBD	
	12/05 Lab	Project design	
	12/07	Discussion IV/ Class synthesis	

### Textbooks

There are no required text books, but students may refer to the following for many aspects of the course:

Charles, A.T. 2001. *Sustainable Fishery Systems*. Wiley-Blackwell, London.

Haddon, M. 2011. *Modelling and Quantitative Methods in Fisheries*. Chapman and Hall, London.

### Key readings

Acheson, J.M. (1975) Fisheries management and social context: the case of the Maine lobster fishery. *Transactions of the American Fisheries Society* 104: 653-668.

Adkins, T.J. (2010) Fishing for masculinity: recreational fishermen's performances of gender. M.A. Thesis, Kent State University. 64pp.

Allison, E. H. & Ellis, F. (2001) The livelihoods approach and management of small-scale Fisheries. *Marine Policy* 25: 377-388.

Anderson, J. L., Anderson, C. M., Chu, J., Meredith, J., Asche, F., Sylvia, G. et al. (2015) The Fishery Performance Indicators: a management tool for triple bottom line outcomes.

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- PLOS One* (2015): e0122809.
- Arlinghaus, R. & Mehner, T. (2006) Determinants of management preferences of recreational anglers in Germany: Habitat management versus fish stocking. *Limnologica* 35: 2-17.
- Arlinghaus, R., S.J. Cooke, J. Lyman, D. Policansky, A. Schwab, C. Suski, S.G. Sutton, and E.B. Thorstad. (2007) Understanding the complexity of catch-and-release in recreational fishing: an integrative synthesis of global knowledge from historical, ethical, social, and biological perspectives. *Reviews in Fisheries Science* 15: 75-167.
- Branch, T. (2009) How do individual transferable quotas affect marine ecosystems? *Fish and Fisheries* 10: 39-57.
- Charles, A. T. (2001) *Sustainable Fishery Systems*. Oxford: Blackwell Science.
- Cochrane, K.L., Andrew, N.L. & Parma, A.M. (2011) Primary fisheries management: a minimum requirement for provision of sustainable human benefits in small-scale fisheries. *Fish & Fisheries* 12: 275–288.
- Conrad, J.M. (1999) *Resource Economics*. Cambridge University Press.
- Cooper, A. (2006) *Guide to Fisheries Stock Assessment: from Data to Recommendations*. University of New Hampshire/NH Sea Grant.
- Covey, S.R. 1990. Principles of Empathic Communication. In *The seven habits of highly effective people*. New York: Simon and Schuster.
- Dillman, D.A., Smyth, J.D. & Christian, L.M. (2009) *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. Wiley: Hoboken, N.J. 499 pp.
- Degnbol, P., & McCay, B. J. 2006. Unintended and perverse consequences of ignoring linkages in fisheries systems. *ICES Journal of Marine Science*, 64: 793–797.
- Edwards C. T. T., Hillary R. M., Levontin P., Blanchard J. & Lorenzen K. (2012) Fisheries assessment and management: a synthesis of common approaches with special reference to deepwater and data-poor stocks. *Reviews in Fisheries Science* 20: 126-153.
- Essington, T. E., A. H. Beaudreau, & J. Wiedenmann. (2006) Fishing through marine food webs. *Proceedings of the National Academy of Science* 103:3171-3175.
- FAO (2010) *State of World Fisheries and Aquaculture*. Rome, FAO.  
<http://www.fao.org/docrep/013/i1820e/i1820e.pdf>
- Fisher, R. and W. Ury. 1991. *Getting to yes: negotiating agreement without giving in*. Chapters 1 and 3.
- Fogarty, M.J. & Botsford, L.W. (2007) Population connectivity and spatial management of marine fisheries. *Oceanography* 20: 112-123.
- Francis, R.C., Hixon, M.A., Clarke, M.E., Murawski, S.A. & Ralston, S. (2007) Ten commandments for ecosystem-based fisheries Scientists. *Fisheries* 32: 217-233.
- Fujita, R.M., Honey, K.T., Morris, A., Wilson, J.R. & Russell, H. (2010) Cooperative strategies in fisheries management: integration across scales. *Bulletin of Marine Science* 86: 251-271.
- Garcia, S.M. & Charles, A.T. (2008) Fishery systems and linkages: implications for science and governance. *Ocean and Coastal Management* 51: 505-527.
- Garcia, S. & Rosenberg, A. (2010) Food security and marine capture fisheries: characteristics, trends, drivers and future perspectives. *Philosophical Transactions of the Royal Society B* 365: 2881-2896.

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- Grimble, R. & Wellard, K. (1997) Stakeholder methodologies in natural resource management: a review of principles, contexts, experiences and opportunities *Agricultural Systems* 55: 173–193
- Grimes, S.R. (1996) The 1994 net ban constitutional amendment: A case study of fisheries management in Florida. M.S. Thesis, Texas A&M University.
- Gutierrez, N.L., Hilborn, R. & Defeo, O. (2011) Leadership, social capital and incentives promote successful fisheries. *Nature* 470: 386–389.
- Haddon, M. 2001. *Modelling and Quantitative Methods in Fisheries*. Chapman and Hall, London.
- Harris, J.M. et al. (2008) Redressing access inequities and implementing formal management systems for marine and estuarine subsistence fisheries in South Africa. In: *Fisheries Management: Progress Towards Sustainability* (Ed. T.R. McClanahan & J.C. Castilla). Wiley.
- Hilborn, R. (2007a) Defining success in fisheries and conflicts in objectives. *Marine Policy* 31: 153-158.
- Hilborn, R. (2007b) Moving to sustainability by learning from successful fisheries. *Ambio*, 36: 296-303.
- Hilborn, R. & Walters, C. (1992) *Quantitative Fisheries Stock Assessment*. New York: Chapman & Hall.
- Hilborn, R., Orensanz, J. M. & Parma, A. M. (2005) Institutions, incentives and the future of fisheries. *Philosophical Transactions of the Royal Society B*, **360**: 47-57.
- Hobday et al. (2011) Ecological risk assessment for the effects of fishing. *Fisheries Research* 108: 372–384.
- Hutt, C.P. & Bettoli, P.W (2007) Preferences, Specialization, and Management Attitudes of Trout Anglers Fishing in Tennessee Tailwaters. *North American Journal of Fisheries Management* 27: 1257-1267.
- Irwin, E.R., and M.C. Freeman. 2002. Proposal for adaptive management to conserve biotic integrity in a regulated segment of the Tallapoosa River, Alabama, U.S.A. *Conservation Biology* 16:1,212–1,222.
- Irwin, E.R. & Mickett Kennedy, K.D. (2008) Engaging Stakeholders for Adaptive Management Using Structured Decision Analysis. The Third Interagency Conference on Research in the Watersheds, 8-11 September 2008, Estes Park, CO
- Jentoft, S. (2006) Beyond fisheries management: The *Phronetic* dimension. *Marine Policy* 30: 671-680.
- Johnston, F.D., Arlinghaus, R. & Diekmann, U. (in press) Fish life history, angler behaviour and optimal management of recreational fisheries. *Fish and Fisheries*.
- Kaplan, S. & Kaplan, R. (2009) Creating a larger role for environmental psychology: The Reasonable Person Model as an integrative framework. *Journal of Environmental Psychology* 29: 329-339.
- Kuehn, D.M., Dawson, C.P. & Hoffman, R. (2006): Exploring fishing socialization among male and female anglers in New York's Eastern Lake Ontario area. *Human Dimensions of Wildlife: An International Journal* 11: 115-127
- Langton, R.W., Steneck, R.S., Gotceitas, V., Juanes, F. & Lawton, P. (1996) The interface

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- between fisheries research and habitat management. *North American Journal of Fisheries Management* 16: 1-7.
- Levin, P. S. & Stunz, G.W. (2005) Habitat triage for exploited fishes: Can we identify “essential fish habitat?” *Estuarine, Coastal and Shelf Science* 64, 70-84.
- Lorenzen, K. (2008) Understanding and managing enhancement fisheries systems. *Reviews in Fisheries Science* 16:10-23.
- Lorenzen, K., Steneck, R.S., Warner R.R., Parma, A.M., Coleman, F.C. & Leber, K.M. (2010a) The spatial dimensions of fisheries: putting it all in place. *Bulletin of Marine Science* 86: 169-177.
- McCay, B.J. (1989) Co-management of a clam revitalization project: the New Jersey "spawner sanctuary" project. In: *Co-operative Management of Local Fisheries* (Ed. E. Pinkerton). UBC Press.
- Milon, W.J., Larkin, S.L. & Erhardt, N.M. (1999) Bioeconomic models of the Florida commercial spiny lobster fishery. Sea Grant Report Number 117, Florida Sea Grant College Program, Gainesville, Florida.
- Monroe, M.C., Oxarat, A., McDonell, L. & Plate, R. (2009) Using community forums to enhance public engagement in environmental issues. *Journal of Education for Sustainable Development* 3: 171-182.
- NOAA (2007) Magnuson-Stevens Fishery Conservation and Management Act. Public Law 94-265.
- Ostrom, E. (2007) A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Science* 104: 15181-15187.
- Pido, M. D., Pomeroy, R. S. Garces L. R. & Carlos, M. B. (1996) *A Handbook for Rapid Appraisal of Fisheries Management Systems*. Manila, ICLARM.
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