

ANNUAL REPORT: June 1, 2011 – May 31, 2012
(i.e., Summer 2011, AY 2011-2012)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: Karin Limburg

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>	<u>No. of Lab. Sections</u>
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SUMMER:

FALL:

<u>Course ID</u>	<u>Section</u>	<u>Course Title</u>	<u>Credit Hrs</u>	<u>NumStudents</u>	<u>Total credit hours</u>
EFB487	1	Fisheries Science & Mgt	3	32	96
EFB488	1	Fisheries Science Practicum			
EFB687	1	Fisheries Science & Mgt	3	3	9

SPRING:

NOTE: PLEASE INDICATE WHICH COURSE(S) HAD A SERVICE-LEARNING COMPONENT AND BRIEFLY EXPLAIN THE NATURE OF THIS COMPONENT. For examples of service-learning in courses, see: <http://www.esf.edu/students/service/courses.htm>. Service-learning is a form of structured experiential education in which students engage with the community to be active learners, to enrich their sense of civic responsibility, and to explore practical application for course content. Faculty oversight, reflective thinking, and reciprocity are key components of service-learning. EFB courses currently listed with service-learning components include: 416/6/1, 486, 518, 521, 532, 446/646.

2. Non-Scheduled Course Offerings (e.g., 496, 899, 999)

<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>	<u>Total credit hours</u>
Course ID	Section	Course Title	Credit Hrs	NumStudents
EFB498	39	Resrch Prob/Env&For Bio	1	2
EFB798	39	Resrch Prob/Env&For Bio	1	5
EFB899	39	Masters Thesis Research	4	3
EFB999	39	Doctoral Thesis Research	1.5	2

3. Continuing Education and Extension (short courses, workshops, etc.)

4. Guest Lecture Activities

<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
EFB797	Hydrology & Biogeochemistry	1

II. STUDENT ADVISING

- A. Number of undergraduates for whom you are the student's official advisor 19 and unofficial advisor 0
- B. Graduate Students: (Name, degree sought, starting date, month & year; if a degree was completed, please give date and full citation for the thesis or dissertation).

MAJOR PROFESSOR

Monteiro, Rita; PhD, began 9-2004, **defended and completed dissertation December 2011.**
Dissertation title: *Land Use and Its Influence on Coastal Fisheries. Doctoral dissertation, State University of New York, College of Environmental Science and Forestry, Syracuse, New York.*

Nack, Christopher; MSc, began 9-2009

Ogburn, Emily, MSc, began 9-2011; became co-advised with Chris Whipps spring 2012.

Turner, Sara; PhD, began 9-2009. Passed qualifier exam, November 2011.

CO-MAJOR PROFESSOR

Boslett, Andrew; MSc, began 9-2009 (with Colin Beier); **defended and completed thesis December 2011. Thesis title:** *A Hedonic Analysis of Urban Environmental Amenities in the City of Syracuse, New York. Master's thesis, State University of New York, College of Environmental Science and Forestry, Syracuse, New York.*

Jackman, George; PhD, began 9-2008 (CUNY Queens College, with John Waldman); passed qualifier exams, June 2010.

Mandel, Jill; MSc, began 9-2010 (with Bill Shields)

Smith, Alexander J.; PhD, began 9-2010 (with Neil Ringler)

MEMBER, STEERING COMMITTEE (other than those listed above)

Chen, Xiaoxia; PhD (Syr. U.)

Gurdak, Daniel, PhD (passed qualifier exams October 2011)

Hazell, C.J.; PhD (passed qualifier exams 2006?)

Hermann, Ted, PhD

Ingel, Claire S., MSc (Cornell U.)

Karbowski, Curt, MSc

Kirby, Lucas (passed qualifier exams, spring 2011)

Kroll, Stefanie; PhD **defended PhD April 2012**

Legard, Chris, MSc

Mohan, John, PhD (U. Texas at Austin)

Payne, Molly, MSc (U. Southern Maine)

Watson, Cynthia; PhD **defended PhD December 2011**

Whritenour, Cheryl; PhD

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Zhao, Xingfei (Chair)

III. RESEARCH COMPLETED OR UNDERWAY

A. Departmental Research (unsupported, boot-legged; title - % time spent)

I continue to have a non-funded collaboration with Swedes, studying Baltic Sea cod, flounder, and eels. To date this has resulted in 4 publications, a dissertation (in Sweden), and several presentations. We continue to put in grant applications; two went in to the two largest research agencies in Sweden this April (see below). These will fund R&D work at Lund University, and if funded, I can then leverage a grant proposal to support an American doctoral student.

B. 1. Grant-supported Research (source, subject, amount - total award and current year, award period starting and ending dates; list graduate research assistants supported by each grant)

- In-kind grant awards, Cornell High Energy Synchrotron Source (CHESS): Beam time at the synchrotron for X-ray fluorescence analyses: October 2011, March 2012. Note that these are NSF sponsored awards. During these runs, 2 EFB grad students and 1 EFB post-doc conducted research.
- Grant award, NOAA: "Habitat Use by American Shad Larvae in the Hudson River Estuary, New York," \$40,000, 5/01/10 – 5/31/12. Supports one grad student (C. Nack, who co-wrote the grant).
- Grant award, Hudson River Foundation: "Geochemical Markers in Otoliths to Aid in Stock Identification and Conservation of River Herring," \$184,660, 6/1/09 – 5/31/11. Supports 2 grad students (S. Turner and R. Monteiro) and one summer intern (M. Payne)
- Grant award, National Science Foundation: "Positioning Rust Belt Cities for a Sustainable Future: A Systems Approach to Enhancing Urban Quality of Life," (D. Nowak and M. Hall, PIs), \$300,000, 1/1/10 – 12/31/11. Supported one of my students (A. Boslett).
- Grant award, USGS (via U. Florida): "Near Shore Fish Ecology in the Grand Canyon," 4 years, \$1,178,711 total, \$272,976 to ESF. Role: co-PI, but PI at ESF. Supports one post-doc (T. Hayden). I was able to send two students out to raft the Grand Canyon and collect fish data during summer 2010. It will support one incoming PhD student in 2012.
- Grant award, USGS Grand Canyon Monitoring and Research Center: "Validating of $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ otolith chemistry signatures of resident Little Colorado River fish using secondary ion mass spectrometry." 1.25 years, \$64,000. Supported post-doc and student technician.
- Grant award, National Fish and Wildlife Foundation (via Duke University), "Determining Origins of River Herring Bycatch," total \$428,401 to a group, of which ESF receives \$187,137. Supports a doctoral student and summer student field assistants. 3 years.
- Grant award (combined), NYS DEC and New England Interstate Water Pollution Control Commission: "Analysis of samples collected in the Hudson River Estuary for various *Alosa* projects." \$40,000, 2 years, supports 1 grad student and 1 undergrad summer assistant.
- Grant award, Riverkeeper Inc.: "Filling in the gaps: building the knowledge base on ecosystem function, utilizing partnerships to move forward." \$115,000, 3 years, supports 1 grad student and 1 summer assistant.

- Fellowship award to Master's student Emily Ogburn: "Fish Parasites in the Hudson River Estuary's Littoral Habitats: A Prelude to Restoration." T.T. Polgar Fellowship, \$4,000, summer 2012. (KL is co-advisor with Chris Whipps)
- Grant award, Diadromous Species Restoration Research Network: "Paradox of the Dammed - An American shad Workshop" – June 8 & 9, 2012. Funding: \$7,000.
- Grant award, New York State Water Resources Institute: Relative Abundance of Blueback Herring (*Alosa aestivalis*) in Relation to Permanent and Removable Dams on the Mohawk River. 5/1/2012 – 2/28/2013, \$20,000. Supports one grad student and one summer undergraduate intern.
- Grant award, NSRC: "Impacts of Forest Management on Regulating Services in Northern Forest Watersheds: Development of the Forest Ecosystem Services Toolkit." C. Beier, PI. 9/01/2011 – 8/31/2013. \$115,117. Supports one of Colin's doctoral students.

2. Research Proposals pending (include information as in B.1., above).

- Proposal, The Swedish Research Council Formas: "Understanding Fish Migration, Habitat Use and Population Connectivity to Restore Resilience in Swedish Fisheries-Ecological Systems." 2013-2015. Approx. \$425,000. (Through Lund University, not ESF)
- Proposal, Vetenskapsrådet (The Swedish Research Council, equivalent to NSF): "Studying biomineralisation processes in fish otoliths by using photon-tagged Nuclear Reaction Analysis (PNRA) for isotope ratio measurements." 2013-2016. Approx. \$580,000. (Through Lund Univ.)
- Proposal, New York State Oceans and Great Lakes Conservation Council: "Blueback Herring Conservation in the Mohawk and Hudson Rivers." Through NYSDEC. Approx. \$50,000/year for three years.

3. Research Proposals submitted, but rejected (include information as in B.1., above)

- Proposal, National Science Foundation: "IGERT – Helping Forests Walk: Engaging Scientific and Traditional Ecological Knowledge in Service to Sustainability." 3/01/12, 60 months, \$3,500,000.
- Proposal, National Science Foundation: "Collaborative research: Bioenergy and resilience in the northern hardwood forest," (Peter Groffman, Cary Inst of Ecosystem Studies, PI), \$450K to ESF (of a total \$1.5M), 5 years.

IV. PUBLICATIONS (Full bibliographic citation, i.e., do not use "with Jones," or "Jones, et al."; please list only publications published, in press, or actually submitted during this reporting period --- **do not list manuscripts in preparation**).

A. Refereed Publications

- Daniels, R.A., R.E. Schmidt, and K.E. **Limburg**. 2011. Hudson River fisheries: Once robust, now reduced. Chapter 4 In R.E. Henshaw, editor. Environmental History: Human Uses that Changed Ecology; Ecology that Changed Human Uses. SUNY Press.
- Hasselmann, D.J., and K.E. **Limburg**. 2012. Alosine management in the 21st century: challenging the status quo. Marine and Coastal Fisheries (in press).

- Hayden, T.A., K.E. **Limburg**, and W.E. Pine, III. 2012. Using otolith chemistry tags and growth patterns to distinguish movements and provenance of native fish in Grand Canyon. *River Research and Applications* (in review).
- Hong, B., K.E. **Limburg**, M.H.Hall, G. Mountrakis, P.M. Groffman, K. Hyde, L. Luo, V.R. Kelly, and S.J. Myers. 2011. An integrated monitoring/modeling framework for assessing human-nature interactions in urbanizing watersheds: Wappinger and Onondaga Creek watersheds, New York, USA. *Environmental Modelling and Software* 32: 1-15.
- Limburg**, K.E., D.P. Swaney, and M.H. Hall. 2012. Temporal and spatial dynamics of a “Rust-Belt” urban stream: metabolic and water quality responses to hardened land. *Urban Ecosystems* (in review).
- Turner, S.M., and K.E. **Limburg**. 2012. Comparison of juvenile alewife growth and movement in a large and small watershed. *Marine and Coastal Fisheries* (in press).
- Walther, B.D., and K.E. **Limburg**. 2012. The use of otolith chemistry to characterize diadromous migrations. *Journal of Fish Biology* (in press).

B. Non-refereed Publications

- Limburg**, K.E., D.P. Swaney, and D.L. Strayer. 2012 (in press). River Ecosystems. In *Encyclopedia of Biodiversity* (S.A. Levin, editor). Elsevier.
- Gren, I.-M., and K.E. **Limburg**. 2012. Nutrient recycling and waste treatment from estuarine and coastal systems. *Treatise on Estuarine and Coastal Science, Volume 12. Ecological Economics of Estuaries and Coasts* (M. van den Belt and R. Costanza, editors).

C. Papers Presented at Science Meetings (give title, date, occasion, and location)

- Limburg**, KE, Jackman, G, Hayden, T, Oliveira Monteiro, R, Turner, S, Nack, C, Walther, Y. A Plausible Mechanism for Uptake of Manganese in Fish Otoliths – Evidence and a Model. 11/09/2011, 21st Biennial Conference of the Coastal and Estuarine Research Federation, Daytona Beach, FL.
- Limburg**, KE. What Can Otolith Chemistry Tell Us About Fish Habitat in the Northeast? 4/17/2012, Northeast Natural History Conference, Syracuse, NY.
- Limburg**, KE, Swaney, DP, Hall, MH. “Dr. Jekyll and Mr. Hyde” – The Two Divergent States of an Urban Stream. Poster, Hudson River Environmental Society conference “Clean Water Act at 40: Facing the Future,” 5/07/2012, Poughkeepsie, NY.
- Nack, CC, **Limburg**, KE. Diet of larval American Shad in the Hudson River Estuary. 4/16/2012, Northeast Natural History Conference, Syracuse, NY.
- Turner, SM, **Limburg**, KE. Understanding Juvenile River Herring Movements with Otolith Microchemistry. 9/07/2011, American Fisheries Society Annual Meeting, Seattle, WA.
- Turner, SM, **Limburg**, KE. Natal Origin and In-river Movements of River Herring in New York Waters. 4/16/2012, Northeast Natural History Conference, Syracuse, NY.

D. Public Service Presentations (lectures, seminars, etc. to and for the public; give group or occasion, date(s), and attendance)

- Invited seminar, Stockholm Resilience Center (Stockholm, Sweden): “Can fish otolith chemistry pick up signals of hypoxia? Baltic cod and other species.” June 22, 2011. Attendance: 40.
- Invited participant, Hudson River National Estuarine Research Reserve: “Fish Otoliths: Natural Data-loggers.” Part of “Science on the River 2011,” Norrie Point, Staatsburg, NY, September 17, 2011. Attendance: approx. 100.

Invited seminar, Hudson River Foundation: "River Herring: Past, Present, Future (?)" May 8, 2012.
Attendance: 25 in room, 30 on webinar.

V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

1. Government Agencies (Federal, State, Local):

- Atlantic States Marine Fisheries Commission: Chair, peer review, American Eel Stock Assessment
- Atlantic States Marine Fisheries Commission: Chair, peer review, River Herring Stock Assessment
- External reader of doctoral dissertation, University of New South Wales, Australia

2. Industrial and Commercial Groups, etc.

Marine Stewardship Council: evaluated the State of Maryland commercial fisheries for striped bass for potential certification as a sustainable fishery (<http://www.msc.org/track-a-fishery/in-assessment/north-west-atlantic/maryland-striped-bass>). My role: evaluate ecosystem impacts.

B. Unfunded Service to Governmental Agencies, Public Interest Groups, etc.

- Provided advice to various groups, e.g., Sustainable Hudson Valley
- Ad-hoc reviewer for National Science Foundation
- External reviewer for P & T decision, Drexel University
- IMBER-LOICZ Continental Task Team (IMBER = Integrated Marine Biogeochemistry and Ecosystem Research; LOICZ = Land-Ocean Interactions in the Coastal Zone) – member, 2011-2014
- Committee to advise NYSDEC/NYSDOS initiative on Ocean Ecosystem-Based Management Action Plan

VI. PROFESSIONAL DEVELOPMENT

A. Professional Honors and Awards (for teaching, research, outreach, etc.)

B. 1. Activities in Professional Organizations (offices held, service as chairman, member, participant or consultant)

- Awards Committee, Kenneth Boulding Award for Ecological Economics, International Society for Ecological Economics
- Convener, Fish Ecology sessions, Northeast Natural History Conference, April 16-18, 2012
- Co-convener, Theme Session J, International Council for the Exploration of the Seas (ICES) Annual Science Conference (September 2012)
- Ran for (and lost), President of Bioengineering Section, American Fisheries Society

2. Professional Society Membership

- American Fisheries Society
- American Institute of Biological Sciences
- American Society of Limnology and Oceanography
- Coastal and Estuarine Research Federation
- Ecological Economics (both the International and U.S. chapters)
- Ecological Society of America
- Hudson River Environmental Society

3. Other Professional Activities

a. Editorial activity

<u>Journal (s)</u>	<u>Responsibility</u>
• Ecology and Society	Subject editor
• Reviews in Ecological Economics	Founding editor (w/ R. Costanza & I.Kubieszewski)
• Estuaries and Coasts	Subject Editor
• Frontiers in Ecology & the Environment	Subject Editor
• Marine & Coastal Fisheries	Guest Editor
<u>Other (books, symposia, etc.)</u>	

b. Reviewer

<u>Journal(s)</u>	<u>No. of manuscripts</u>
BioScience	2
Ecological Applications	1
Ecological Economics	1
Estuaries and Coasts	1 + revision
Fisheries Magazine	1 + revision
ICES J. Marine Science	1
Limnology & Oceanography	2
Marine Ecology Progress Series	2
PNAS	1
PRSB	1 + revision
Transactions Amer. Fish. Soc	1

<u>Agency</u>	<u>No. of proposals</u>
National Science Foundation	1

Other

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
Member of organizing committee for 8 th Annual Meeting of the Environmental Consortium of Hudson Valley Colleges and Universities (theme: "Collaboration Throughout the Hudson River Watershed"), November 11-12, 2011		
Participated in Syracuse U. "Showcase for Sustainability" symposium (panel discussion), April 18, 2012		

C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.

D. Foreign Travel (Where, When, Purpose)

Traveled to Sweden (Stockholm and Lund), June 2011, to discuss research collaborations.

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

- Chair, EFB Graduate Program Advisory Committee
- Member, EFB Promotion and Tenure Committee

B. College-level

- Participated in Freshmen Learning Community Retreat, September 10
- Participated in Faculty Mentoring Symposium, January 12

C. University-wide, including Research Foundation

- Judge for Norma Slepecky Prize for Undergraduate Research, Syracuse U., April 2012

VIII. SUMMARY OF SIGNIFICANT ACTIVITIES AND ACCOMPLISHMENTS DURING THIS REPORTING PERIOD, ESPECIALLY THOSE MOST NOTEWORTHY AND RELATIVE TO THE COLLEGE'S AND DEPARTMENT'S MISSION. One paragraph on each of the following would be most helpful: this past year, what have you done for our students, department/college, and self professionally? NOTE: The information in this section (along with the supporting specific information elsewhere in this report) should be your strongest case for being considered for a discretionary raise, which I'll continue to award based on your contributions to the department and college this reporting period.

What I have done in 2011-2012 for...

- **ESF's students:** I taught my fisheries class this past fall. Once again, I broke the enrollment record on this ordinarily small class. There has been a continuing increase in Conservation Biology majors taking the course. Additionally, enrollees came from Environmental Science, Environmental Studies, Wildlife Science, and EFB, in addition to the expected Aquatic and Fisheries Science. I'm

glad that the course has appeal to a broadening audience. This is likely due to the increased press about fisheries.

In the spring, I taught my grant-writing graduate seminar, as well as a new graduate seminar titled “A Self-Help Course in R.” Why “self-help”? Because I was learning R alongside the students. My interest in teaching the course was to see if a very basic, introductory seminar on the subject would get the students over the “learning hump” and comfortable with the language. It certainly seemed to do so. I plan to teach this course again next spring, so that it precedes Jaqui Frair’s advanced modeling class, which requires the use of R. Having sat in that course a few years ago, I found that learning R at the same time as learning complex statistical concepts was challenging, to say the least. Hence, if students can learn R in a separate course, they may be able better to grasp the modeling material in Frair’s class.

Outside the classroom, I had several undergraduates working in my lab with grads and my post-doc. I also participated in the new freshman’s learning retreat in September. I was impressed with their depth of thinking and discussion.

• **The department and the college:** I continued to chair the EFB Graduate Program Advisory Committee. This year we solved an important problem with respect to ranking accepted grad students for possible GA funding. The ranking system as it existed for many years placed emphasis on undergraduate achievements, with little or no recognition for work done at the Master’s level (if entering as a Ph.D. student with Master’s in hand), let alone other achievements. The new scheme, which was debated and modified in a departmental faculty meeting, now includes additional ranking points for a number of scholarly criteria. This system will very likely result in more support for accepted doctoral students. In turn, this should aid the department to increase the fraction of doctoral students vs. MSc and MPS students.

Additionally, we discussed a grad student/faculty retreat. Time constraints did not permit holding it this academic year, but I would like to try and convene it in the fall.

• **For myself:** I continued to work with my grad students, post-doc, and visiting scientist from China (Professor Jiangyi Liu from the Chinese University of Geosciences in Wuhan). It was a productive year. I was also pleased to have another doctoral student (Rita Monteiro) and master’s student (Andy Boslett) defend their theses. Other students are presenting their research in national and international venues.

I was actively engaged in research alongside my grad students and post-doc. My main foci were on two large projects, one on humpback chub in the Grand Canyon, and the other on river herring (two species of alosine herring) along the East Coast. I note that the former is officially an Endangered Species, and the latter are currently being considered for Endangered listing under the ESA. In addition, I chaired peer reviews of the coastwide stock assessments for river herring as well as American eel (also being considered for ESA listing) for the Atlantic States Marine Fisheries Commission. It’s sobering that species once so common – and not that long ago – are now in such serious decline that their only salvation may come from ESA protection.

I completed my stint as Guest Editor for a special issue of *Marine and Coastal Fisheries*, focused on American shad and river herring biology and restoration. I also continue to collaborate with the Hudson River Fisheries Unit of the NYSDEC in their American shad recovery program.

I also completed my task of conducting an assessment of the State of Maryland’s striped bass fishery for the Marine Stewardship Council, an international certifying body. It is very likely this fishery will be certified as sustainable in the coming months. This “eco-labeling” will have interesting consequences for the coastwide striped bass fishery, both economically and ecologically. It is the first time a government agency (the Maryland Department of Natural Resources) has served as an applicant for sustainable fishery listing by the MSC.

I have also been engaged with the International Council for the Exploration of the Seas (ICES). Despite its name, ICES is really the inter-governmental body for fisheries management in the North Atlantic. I am co-chairing and organizing a major theme session at their Annual Science Conference this fall (Bergen, Norway).

IX. A. FUTURE PLANS, AMBITIONS, AND POTENTIAL CONTRIBUTIONS FOR YOUR OWN PROFESSIONAL DEVELOPMENT AND THE ENHANCEMENT OF THE PROGRAM IN ENVIRONMENTAL AND FOREST BIOLOGY (brief summary)

I will continue to work on the river herring and Grand Canyon projects; the latter will be a major focus this summer and fall. Additionally, I have organized and will in June run a small workshop on American shad that will address the question of why shad stocks are in steep decline in their native range and are very healthy in their introduced range (the west coast of North America). This may result eventually in a CNH proposal to NSF.

Additionally, I will be participating in an international working group under the auspices of the IGBP. This group, called the "Coastal Margins Task Team," is charged with laying out a research agenda that links inland/coastal issues with offshore marine ones.

I will continue in my editorial duties. I will continue to work hard with my grad students. Finally, I will attend several scientific meetings this year, including two abroad.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2012

a. Course(s) to be offered

b. Proposed research activity: Grand Canyon fish; river herring; shad; Baltic Sea cod and flounder; work with grad students.

c. University, professional society, and public service: EFB: P&T committee. Outside ESF: IGBP working group service; ICES conference planning; ESA hearings for river herring

2. Fall Semester 2012

a. Course(s) to be offered: Kevin Kapuscinski will cover my Fisheries courses this fall, and I will help as needed

b. Proposed research activity: as above. Will continue to apply for grants to support my research program, write papers, mentor grad students, etc.

c. University, Professional society, and public service: as above; will serve on new tasks as called upon

3. Spring Semester 2013

a. Course(s) to be offered

- Possibly Hudson River course
- Introduction to R programming (grad students)

b. Proposed research activity: as above. Will continue to apply for grants to support my research program, write papers, mentor grad students, etc.

c. University, professional society, and public service: Will serve as called upon