

**ANNUAL REPORT**  
**DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY**  
**SUNY College of Environmental Science and Forestry**  
**(June 1, 20010 - May 31, 2011; i.e., Summer 20011, AY 2010-20011)**

NAME:

**I. INSTRUCTIONAL ACTIVITIES**

1. Regular Course Offerings

	<u>Course No.</u>	<u>Title</u>	<u>Credit</u>	<u>No.</u>	<u>No. of Lab.</u>
<u>Students</u>	<u>Sections</u>				<u>Hrs.</u>
FALL:	ESC 325/525	Energy (with T. Volk)	3	28	
	EFB 518	Systems Ecology	4	20	1
	EFB 498	Research	2+-	6	
SPRING	Sabbatical				
	EFB 498	Research	2+-	3	

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

<u>Course No.</u>	<u>Title</u>	<u>Credit</u>	<u>No.</u>
		<u>Hrs.</u>	<u>Students</u>
EFB 495	Undergraduate TAs		2
EFB /EST	Masters Research		4
EFB/EST 999	Doctoral Research		5

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

Special conference on developing an approach for teaching Biophysical Economics in High Schools and Community Colleges. June 11, SUNY ESF. Syracuse NY

4. Guest Lecture Activities

Course No.	Title	No. of Lectures
EFB 220 Urban Ecology	Energetics of Cities	1
EFB 516 Ecosystems	Estuaries, Energy	2
FOR xxxx	Urban Forestry	1
EST 296 Introduction to Environmental Studies	Overview of biology concentration	1
EST 426/626 Concepts of Sustainable Development	Oil: Nature's premium fuel	2

## II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor about 20 and unofficial advisor: countless

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

1. Aileen Guzman	PhD	8/03	PhD 12/2010
2. David Murphy	PhD	8/07	PhD 12/2010
3. Anna Stewart	PhD	8/07	
4. Lindsay Cray	MS	8/07	MPS 5/2010 (check)
5. Ajay Gupta	MS	8/07	
6. Jill McMichael	MS	8/07	MS 12/2010
7. Carlos P. Ramirez	PhD	8/09	
8. Steve Balogh	MS	8/08	
9. Rhidima Nayyar	MS	8/09	MS 5/2011

### CO-MAJOR PROFESSOR

1. Suzanna DelGranado	PhD (with Jack Manno)	8/07
2. Karla Hyde	MS (with Myrna Hall)	8/05
3. Seth Myers	PhD (with Myrna Hall)	8/05 (Myrna does most advising etc)
4. Whitney Lash	PhD (with Valerie Luzadis)	8/06
5. Braulio Quintero	PhD (with Ruth Yanai)	8/09

### MEMBER, STEERING COMMITTEE (other than those listed above)

Adam Willis PhD Syracuse University  
a few more? I cannot remember

### CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Two

### **III. RESEARCH COMPLETED OR UNDERWAY**

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

Lots

#### 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)

National Science Foundation \$ 5,000,000 (my share \$152,000) (\$25,000 per year) Long Term Ecosystem Research in the Luquillo Forest Grant period 2006-2012  
Supported: Lindsay Cray Whitney Lash and David Murphy

Positioning Rust-Belt Cities for a Sustainable Future: A Systems Approach to Enhancing Urban Quality of Life.”  
National Science Foundation Urban Long-Term Research Area Exploratory Award (ULTRA-EX), (\$300,000, my research \$37,596), David Nowak (PI), Myrna Hall, Charlie Hall, Rick Smardon, and E. Carter (co-PIs). September 2009 – December 2011.  
Supports Steve Balogh

Social-Ecological System Change, Vulnerability, and the Future of a Tropical City” National Science Foundation Urban Long-Term Research Area Exploratory Award (ULTRA-EX), (\$300,000, my research \$30,000), Ariel Lugo (PI), Tischa Munoz (co-PI), March 2010 to March 2012. Supports David Murphy [Administered in Puerto Rico]

An Environmental Basis for Rural Planning in the Province of Cordoba, Argentina.” Argentine National Government Award, (\$1,000,000, my research portion (about \$10,000) is for travel, per diem, and potentially tuition for an Argentine student to study some semesters at ESF), Oscar Giayetto and Juan-Jose Cantero (PIs). May 2010 to May 2013.

US Forest Service Energy and economic analysis for the Caribbean . \$20,000 Supports David Murphy

Institute for Integrated Economic Research \$10,000 Supports Steve Balogh and two undergraduates for summer)

Various private sources: Multiple Sponsors \$1000

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

Consolidating and promulgating EROI Research. UK Government \$160,000  
I have been promised this money verbally and by email but have not seen it]

**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

**Published**

Harris, Nancy, Hall, C.A.S. and Ariel Lugo. 2008. Empirical estimates of species-and ecosystem- level respiration of woody stems along an elevational gradient in the Luquillo Mountains, Puerto Rico. *Ecological Modeling*. 216:253-254

Gowdy, J., Hall, C.A.S., Klitgaard, K., Krall, Lisi. 2010. What Every Conservation Biologist Should Know about Economic Theory. *Conservation Biology*. 24: 1440–1447, December 2010

Murphy, David J. and Charles A. S. Hall. 2011. Energy return on investment, peak oil, and the end of economic growth. in "Ecological Economics Reviews." Robert Costanza, Karin Limburg & Ida Kubiszewski, Eds. *Ann. N.Y. Acad. Sci.* 1219: 52–72.

**Accepted and In Press** (New)

Murphy, D.J., Hall, C.A.S. EROI, Insidious Feedbacks, and the End of Economic Growth. *Ecological Modeling* . (In Press)

Marshall, Whitney, C. A. S. Hall and Wei Wu. (in press) From four forest types to gradients: the evolution of how we think about the structure and function of Luquillo experimental forest. Chapter 1 *in* González, Grizelle, Robert Waide, and Michael Willig Editors: *Ecological Gradient Analyses in a Tropical Ecosystem*. *Ecological Bulletins*.

Gupta, A. J. and C. A. S. Hall. Energy Costs of Materials Associated with the Exponential Growth of Thin-Film Photovoltaic Systems, in *Fundamentals of Materials for Energy and Environmental Sustainability*, edited by D.S. Ginley and D. Cahen (Materials Research Society, Warrendale, PA, and Cambridge Univ. Press, Cambridge, England). (In press 2011)

Charles Hall Issue Editor Special issue on EROI Sustainability Journal

Hall, Charles. Introduction to special issue Chapter 1 *in* Charles Hall. Issue Editor. Sustainability Journal **Special issue on EROI**

Murphy, David, Charles Hall and Cutler Cleveland: Order from Chaos: A Preliminary Protocol for Determining EROI for Fuels. Chapter 2 *in* Charles Hall. Editor. Sustainability Special Issue on EROI

- Gupta, Ajay and Charles Hall: A brief review of previous studies of EROI. Chapter 3 *in* Charles Hall. Issue Editor. Sustainability. Special issue on EROI
- King, Carey and Charles Hall: Relating financial and energy return on investment. Chapter 6 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI
- Guilford, Megan, Peter O'Conner, Charles A. S. Hall and Cutler J. Cleveland: A new long term assessment of EROI for U.S. oil and gas. Chapter 8 *in* Charles Hall. Issue Editor. Sustainability. Special issue on EROI
- Grandell, Leena. Charles A.S. Hall and Mikael Höök. Energy return on investment for Norwegian oil and gas in 1991-2008. Chapter 9 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI
- Yan, Hu, Feng, Lianyong, Charles Hall and Tian Dong: Empirical Analysis of production and EROI from China's largest oil field –the Daqing Oil Field. Chapter 11 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI
- Sell, Bryan, Charles Hall and David Murphy: EROI for traditional natural gas in Western Pennsylvania. Chapter 13 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI
- Hall, Charles, Bruce Dale and David Pimentel: Seeking to understand the reasons for different EROI assessments of biofuels. Chapter 15 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI
- Charles Hall: Synthesis. Chapter 23 *in* Charles Hall. Issue Editor. Sustainability Special issue on EROI

**(IN PRESS \_ STILL** (i.e. were in press in last year's annual report)

- Balogh, S.B, Hall, C.A.S., Guzman, A.M., Balcarce, D.E., and Hamilton, A. (In Press 2010). The Potential of Onondaga County to Feed Its Own Population and that of Syracuse New York: Past, Present and Future *in* D. Pimentel (ed) Global Economic and Environmental Aspects of Biofuels. Springer N.Y Sustainability
- Willig, M.R. Christopher P. Bloch, Alan P. Covich, Charles A. S. Hall, D. Jean Lodge, Ariel Lugo, Whendee L. Silver, Robert B. Waide, Lawrence R. Walker, and Jess K. Zimmerman. (In press) Long-term Research in the Luquillo Mountains: Synthesis and Foundations for the Future. *Chapter 8 in* LTER Research in the Luquillo Mountains. Cambridge University Press.
- Mead, J.V., M. Connerton, C.A.S.Hall and N. Ringler. (in press) . Area compensation of primary production along a gradient of riparian forest cover for a small temperate stream. *Journal of the North American Benthic Society.*
- Townsend, J., Hall, C.A.S., T. A. Volk, M. Serapiglia, D. Murphy, G. Ofezu, B. Powers and A. Quaye. Energy return on investment (EROI) of current and alternative liquid fuel sources and their

implications for wildlife science. *Journal of Wildlife Science*. (In Press).

B. Non-refereed (well they are reviewed but..) Publications

**Books**

Hall Charles and Kent Klitgaard. 2011 (September). *Energy and The Wealth of Nations: Understanding the Biophysical Economy*, Springer, N.Y.

Book Series Editor *Energy and the Economy* Springer

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

“Energy return on investment, peak oil, and the end of economic growth.” Invited Plenary speaker, Seventh International Meeting on Advances in Energy Research. Barcelona, Spain (October 2010)

“Energy return on investment, peak oil, and the end of economic growth.” Special Address, University of Cordoba, Cordoba Argentina.

“Welcome and Introduction”. Third International meeting on Biophysical Economics, Syracuse N.Y. (April 2011)

“New estimates for EROI for US Oil and Gas”. (With Megan Guilford) Third International meeting on Biophysical Economics, Syracuse N.Y. (April 2011)

“Energy and the future cost of food” SUNY conference on food. Onondaga Community College (April 2011)

“Welcome and overview” Special conference on developing an approach for teaching Biophysical Economics in High Schools and Community Colleges. June 11, SUNY ESF. Syracuse NY

**Invited University presentations:**

“Peak oil, EROI and your financial future” Tompkins County Community College, Dryden NY (April 2011)

“Peak oil, EROI and your financial future” Colgate University (April 2011)

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

**V. PUBLIC SERVICE**

A. Funded Service (include consulting activities)

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

none

2. Industrial and Commercial Groups, etc.

none

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

Many small issues

**VI. PROFESSIONAL DEVELOPMENT**

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

None

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

None

2. Professional Society Membership

AAAS (Fellow)

International society of Ecological Economics (Editorial Board)

North American Society of Ecological Economics

Active in ASPO (Association for the study of peak oil)

3. Other Professional Activities

a. Editorial activity

Journal (s)

Responsibility

Editorial Board Ecological Economics Managing editing for specific papers

Special issue of Journal Sustainability on Energy Return on Investment

Other (books, symposia, etc.)

Series chief Editor, Springer Series on Energy

b. Reviewer

Journal(s)

No. of manuscripts

Ecological Economics

2

Energy

1

Energies		2
Others		
Books:	Springer	(Book proposals) 6

<u>Agency</u>	<u>No. of proposals</u>
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Other

Scientific Advisory Board  
 International Institute of Economic Analysis,  
 Zurich, Switzerland

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
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Organizer: Third International meeting on Biophysical Economics, Syracuse N.Y.  
 (April 2011)

Organizer: First meeting on teaching Biophysical Economics in High Schools and  
 Community Colleges SUNY ESF, Syracuse N.Y. (June 11, 2011)

Participant: NSF ULTRA meetings in Syracuse and San Juan

C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.  
 Sabbatical in Argentina and Syracuse

D. Foreign Travel (Where, When, Purpose)

Barcelona Spain Give plenary and attend meeting on Advances in Energy  
 Cordoba, Bariloche and San Martin, Argentina. Sabbatical: meet with colleagues,  
 computer programming and writing.

**VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)**

A. Department-level

B. College-level

President's committee on a carbon-neutral ESF



Informal committee to generate a program in Biophysical and Ecological Economics

C. University-wide, including Research Foundation

**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.**

**DEPARTMENT/COLLEGE**

**STUDENTS:** In the fall I continued with my normal teaching: Systems Ecology and Energy, continuing with demanding, serious, thinking paper. As I think anyone knowledgeable will tell you, there is usually a line of students waiting for personal interaction with me essentially every afternoon.

My graduate students continue to do very well. Anna Stewart continues to receive about every possible prize including a Fulbright for her PhD research. She just received a best poster award for her workshop at Columbia University. Suzanna el Granado received a Fulbright grant for her research in Bolivia. My former graduate students continue to receive what I consider premium job offers. David Murphy accepted a joint faculty/research position between Northern Illinois University and Argonne National Laboratory focusing on energy and its relation to economics. He turned down a position to be a Congressional Fellow in Washington, D.C. Aileen Guzman has a great position with an NGO in New York. Jill MacMichael has an offer (pending funding) for U.S. Department of Energy. Ridhima Nayaar is working for a green building company in New York.

**RESEARCH:** Accomplishments during sabbatical:

I greatly needed some time off from my intense teaching and advising schedule, and a research opportunity in Argentina gave me an excellent opportunity to escape from the daily grind and to miss winter, my least favorite season now that I am too old for ice hockey.

- 1) We met with our older, long-standing colleagues while helping to train three younger students in a Systems Approach to agriculture in Cordoba. This region, including part of the Pampas, has a long reputation as one of the world's premier agricultural areas. It has traditionally had a system of crop rotation from one or two years of row crops to several of fallow and several of pasturage. Now, under the influences of large global demand for soy in the world and neoclassical (University of Chicago) economists (know by all Argentines, usually disparagingly as "the Chicago Boys") the land has been put into continuous cultivation. One effect has been a great increase in soil erosion, so that in e.g. the undulating Pampas soil losses were as high as 3 cm per year out of a topsoil base of 30 cm. One response of this was to initiate a large program of using glyphosphate (roundup) to reduce the need for soil disturbance through plowing. But glyphosphae is energy-intensive, as are the increasing applications of fertilizers, so that the profitability of farming in Argentina appears increasingly uncertain. Meanwhile farmers have made huge investments in combines etc. and Argentina, a moderate oil producing

countries, has experienced its own peak oil (10 years ago). It is increasingly difficult to understand how the nation's agriculture, its principle economic factor, can continue in this direction. My work was to construct a biophysical economic model of all of these processes to assess quantitatively the major factors and to seek a different, sustainable future for Cordoba Agriculture. Preliminary results indicate that the current approach to agriculture in Cordoba is not sustainable for economic as well as environmental reasons.

- 2) My time in Argentina was much more eaten up by emails etc than I had wished. Retrospectively I can see that this was because I was undertaking three very large projects:
  - 1) Organizing the Third International Conference on Biophysical Economics in Syracuse April
  - 2) Editing a special issue of the Journal Sustainability on Energy Return on Investment, and administering the review process for some 20 papers
  - 3) Polishing our new book "Energy and The wealth of Nations" while beginning the editing of a new Springer series of "100 page" books on energy

**OUTREACH:** I run an energy list serve with about 500 members where I distill and send out at weekly intervals what I believe to be the most important energy and energy/economic information.

I have also been interviewed for local TV number of times was featured on the Discovery Channel and a national NPR program on climate.

My research and teaching in Argentina constitutes international outreach.

### **My assessment of my year:**

**SELF:** I am 68 and am aware every day of the long shadow of aging. I have to think about how long I can or should play this game and at what level. It is very hard for me to contemplate retiring because I do not know who I am if I am not Professor Hall. I fish, read and travel all I wish and have few other things I wish to do. Nevertheless I believe that my abilities and productivity as a teacher and scientist show little if any indication of decline. I continue to publish something like 10-15 peer reviewed papers a year plus a book and other things. My main intellectual activities, EROI and Biophysical Economics, are gaining large momentum in various ways (as I am seeing at this moment at our ULTRA meeting in Puerto Rico). Many, many people who attended our conference on Biophysical Economics said "Best conference I ever attended" and "I have never seen so many very smart people in one room". It is obvious to me that there is increasing awareness of the importance of energy in our economy and of the need for a different basis for economics. Many people, including myself, believe that Ecological Economics has not developed the alternatives we need. Hopefully we will be able to do that with Biophysical economics, which I am pursuing through all the teaching and research contained herein. This focus has many dimensions that influence biology and the natural world, including a better assessment of the pressures on biodiversity, natural areas and resources more generally.

**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 continue to worry about what will remain at ESF after I am gone from here or from the Earth. I take great satisfaction that Systems Ecology and Ecosystems, what I was brought here to develop, are strong and healthy, that we have a functional new energy minor and it will soon be a major and that we have a formal course in Biophysical Economics. Our Environmental Sciences program is more formalized and perhaps strengthened, although with less punch than I envisioned. I have begun working with about 5 other faculty members to create unified undergraduate programs (minor etc) in Biophysical and Ecological Economics (BEE).

**B. PROJECTED ACTIVITIES FOR NEXT YEAR**

1. Summer 2011

a. Course(s) to be offered  
none

b. Proposed research activity

- 1) Continue energy work
- 2) Finish “Energy and the wealth of Nations”
- 3) try to finish up some earlier Estuarine biology papers

c. University, professional society, and public service

I continue to work on Campus energy committee, work on various local and International outreach activities and operate my energy list serve

2. Fall Semester 2011

Course(s) to be offered

:	EST 325/525	Energy (with T. Volk)	3
	EFB 518	Systems Ecology	4

3. Spring semester 2012

EFB/ES 120	The Global Environment	3
EFB 516	Ecosystems	3
EFB 522	BioPhysical Economics	3

b. Proposed research activity

More of the same, mostly on energy and its relation to the economy

c. University, Professional society, and public service

Will teach Systems Ecology (with Myrna Hall) at National Universidad de Rio Cuarto,  
Argentina December 2011

3. Spring Semester 2009