

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

NAME: Sadie Ryan

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>
SUMMER:					
FALL:	EFB 496*	Emerging Infectious Diseases	3	8	0
	EFB 797	Adaptive Peaks (co-I with Fierke)	1	20	0
	EFB 796	Conservation Conversation (co-I with Frair, Gibbs)	1	4	0
SPRING:					
	EFB 360	Introduction to Epidemiology	3	33	0
	EFB 497/797	Emerging Infectious Diseases of Wildlife and Humans	1	5	0
	EFB 797	Adaptive Peaks (co-I with Cohen)	1	7	0
	EFB 796*	Parameter Estimation and Modeling in Population Biology Studies (co-I with Cohen) (computer lab graduate course)	3	9	1

*Listed as provisional offerings, but are planned as regular, when COI approval happens

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>
*See above for exception			

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>
EST 696:	Environmental Health Policy	1

II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor 15 and unofficial advisor

Five additional undergraduates on research credits.

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

James MacCarthy, PhD, August 2011

CO-MAJOR PROFESSOR

MEMBER, STEERING COMMITTEE (other than those listed above)

Anna Stewart, PhD
Will Helenbrook, PhD
Wilkinson, Sarah, MS
Fitzsimmons, Kelly, MS

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Emily Byrne, MS, FNRM, Defense Chair, April 4th, 2012.

Byrne, E. 2012. "The Role of Politics in the Allocation of Funds from the American Recovery and Reinvestment Act for Renewable Energy." *MS Thesis*, Department of Forest and Natural Resource Management (FNRM), SUNY College of Environmental Science and Forestry, Syracuse, NY.

Scott Warsen, MS, EFB, Defense Exam Committee – anticipated Summer, 2012.

III. RESEARCH COMPLETED OR UNDERWAY

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

- **Using land cover maps to inform management models for farm outbreaks** – collaboration with M. Tildesley, University of Warwick, UK. 5% research time
- **Primate social systems, ecology, phylogeny, community structure, and disease ecology**, ongoing projects, including undergraduate and graduate research credit – 10% research time
- **Amphibian Ranavirus Project**, lab work to identify ranavirus in vernal pools at Heiberg forest, and model metapopulation disease processes, undergraduate-led project, collaborative in EFB – 5% research time, supported with start-up funds and good will from others.

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)

Co-PI: NSF CNH-ex: **"Hotter Hotspots: Land-Use Intensification and Protected-Area Vulnerability in Africa's Albertine Rift"** - \$249,995, 2011-2013 (*\$23, 718 AY*)

Co-PI: National Geographic: **"Parks, People, and Climate Change: Assessing Household Vulnerability in Equatorial Africa"** - \$20,000 (project costs only), 2012-2014. (*\$0 AY – project costs only*)

Co-PI, INECOL/SUNY-ESF Seed Grant, **"Emerging diseases and health status of black howler monkeys in degraded habitat in Balancan, Tabasco, Mexico"** - \$5,000, 2012 (*\$0 AY – project costs only*)

Short-term visit to NIMBioS **"Can we build Foot-and-Mouth disease (FMD) management models for the US, and would they be used?"** (*\$0 AY – travel and project costs only*)

(No graduate student support written explicitly into these grants at this institution – incoming students will start to benefit from conservative grant use in the upcoming years)

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

PI, Department of Homeland Security, International Research in Homeland Security Science & Technology Mission Areas DHS-11-ST-108-002: **"The use of satellite and land use data to model epidemic threat and determine optimal intervention policies for livestock, wildlife and zoonotic disease outbreaks in the USA"**, \$750,000

(Funding for a postdoc at ESF)

Co-PI, National Institutes of Health, Program Announcement: Climate Change and Health: Assessing and Modeling Population Vulnerability to Climate Change (R21) PAR-10-235: **"Climate-ocean and socio-ecological dynamics predict local dengue vulnerability in Ecuador"**, \$275,000

(Funding for technicians)

Supporting Faculty, NIH-NIAID, joint program SUNY-ESF Outreach & New York Academy of Sciences: **"Community Health through Science Education: Afterschool Science as a Vehicle for Community Wellness Education."** \$n/a.

Co-PI (with M. Fierke), NSF Preliminary Proposal: **"Modeling the Mother Trees: the super spreader phenomenon in an emerging emerald ash borer (*Agilus planipennis*) infestation"** \$n/a

(Includes funding for PhD and MS student)

Co-PI (with J. Cohen and C. Whipps), MOU with NYDEC: **"Factors Limiting New England Cottontail (*Sylvilagus transitionalis*) Populations in New York: Implications for Habitat Restoration"** \$880,000

(Includes partial funding for one PhD student (Cohen) and one MS student (Ryan))

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

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

In press/published

Ryan, S.J., Cross, P.C., Winnie, J, Jr, Hay, C., Bowers, J., Getz, W.M. *in press*. The utility of NDVI for predicting African buffalo forage quality. *Journal of Wildlife Management*.

Ryan, S.J., Brashares, J. S, Walsh, C., Milbers, K., Kilroy, C., Chapman, C.A. *in press*. A survey of gastrointestinal parasites of olive baboons (*Papio anubis*) in human settlement areas of Mole National Park, Ghana. *J. Parasitology*.

Hartter, J., Stampone, M.D., **Ryan, S.J.**, Kirner, K., Chapman, C.A., Goldman, A. 2012. Patterns and perceptions of climate change around a biodiversity hotspot. *PLoS ONE* 7(2) e32408

Ryan, S.J. and Walsh, P.D. 2011. Consequences of non-intervention for infectious disease in African great apes. *PLoS ONE* 6(12): e29030

Wolf, A., Anderegg, W., **Ryan, S.J.**, Christensen, J. 2011. Robust detection of plant species range shifts under biased sampling regimes. *Ecosphere* 2(10):115

Hartter, J.*, **Ryan, S.J.***, Southworth, J., and Chapman, C.A. 2011. Landscapes as continuous entities: forest disturbance and recovery in the Albertine Rift Landscape. *Landscape Ecology* 26(6):877-890

In review

Ryan, S.J. and Hartter, J. *in review*. (Invited). Beyond ecological success of corridors: integrating land use history and demographic change to provide a whole landscape perspective.

M.J. Tildesley and **Ryan, S. J.** *in review*. Disease prevention versus data privacy: using landcover maps to inform spatial epidemic models.

Rudnick, D., **Ryan, S.J.**, Preziosi, D., Epps, C., Deiffenbach, F., Kintsch, J., Beier, P., Jenness, J., Perkl., R., Trombulak, S., Hartter, J., Gerber, L., Merenlender, A., Austen, D., Cushman, S. *in review*. Emerging principles in understanding landscape connectivity: practical tools for conservation decision-making. *Issues in Ecology*.

Mordecai, E.A., Paaijmans, K.P., Johnson, L.R., Balzer, C.H., Ben-Horin, T., deMoor, E., McNally, A., Pawar, S., **Ryan, S.J.**, Smith, T.C., Lafferty, K.D., *in review*. Physiological constraints dramatically lower the expected temperature for peak malaria transmission

B. Non-refereed Publications

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

Organized Symposium lead talk:

Ryan, S.J. and Gaff, H.C., 2011 "Looking to the future: how to progress to success from the US-Africa Biomathematics Initiative" *MiniSymposium (Gaff and Ryan): Reports from US - African BioMathematics Initiative: Conservation Biology*, 8th European Conference on Mathematical and Theoretical Biology, and Annual Meeting of The Society for Mathematical Biology, Krakow, Poland, June 28 - July 2, 2011.

Invited:

Ryan, S.J. and Hartter, J. 2012. "Living locally in the larger landscape: People, Environment and Climate in the Albertine Rift", Wildlife Conservation Society (WCS), Bronx Zoo, NY, February 24th, 2012

Ryan, S.J. and Hartter, J. 2011. "The value of fragments: extending park boundaries, dwindling resources, or sourcing crop raiders?", Symposium: Healthy Ecosystems, Healthy Communities?: Links between Conservation and Food Security, International Congress on Conservation Biology (ICCB), Auckland, New Zealand, December 8th, 2012.

Ryan, S.J. 2011. "From satellites to parasites: measuring health in African parks landscapes", Department of Biology Seminar, Syracuse University, October 28th, 2011.

Regular Conference Talk:

Hartter, J. and **Ryan, S.J.** 2012. "The island fortress: people, wildlife and parks landscapes in the Albertine Rift" American Association of Geography (AAG) Annual Meeting, New York, NY, February 25th, 2012

Poster:

Ryan, S.J. and Tildesley, M. 2011 "Utility of landcover maps for spatial epidemic models of disease transmission in UK livestock". *Epidemics*3, November, 2011. **Poster Pitch:** <http://www.youtube.com/watch?v=yAlwChrlvfw>

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

Ryan, S.J. "Human-Animal Interactions in Africa", Museum of Cultural Zoology, hosted by: Multicultural Affairs & the Roosevelt Wildlife Collection, Nifkin Lounge, SUNY ESF, April 11th, 2012

V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

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

Research and Policy for Infectious Disease Dynamics (RAPIDD) "Foot and Mouth Disease", 2011-
Supported by Fogarty Institute, NIH and the Department of Homeland Security (DHS) RAPIDD program

Steering Committee Member, NSF iRCN-URE (Incubator Resource Coordination Network for Undergraduate Biology Education). "Research Coordination Network: Interdisciplinary Communication Laboratory for Undergraduate Biology (iCLUB)"

2. Industrial and Commercial Groups, etc.

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

VI. PROFESSIONAL DEVELOPMENT

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

NSF ECTMB travel grant - \$1,000, 2011

SMB (Society for Mathematical Biology) Landahl Award - \$500, 2011

NIMBioS short-term visitor award: “Can we build Foot-and-Mouth disease (FMD) management models for the US, and would they be used?”, 2011

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

Society for Conservation Biology (SCB) –
Chapters committee, Member
Student affairs committee, Chair
2012 conference committee, Member

2. Professional Society Membership

Society for Conservation Biology (SCB), The Wildlife Society (TWS), American Association of Geographers (AAG), Ecological Society of America (ESA), Society for Mathematical Biology (SMB)

3. Other Professional Activities

a. Editorial activity

Journal (s)

Animal Conservation

Responsibility

Associate Editor

Other (books, symposia, etc.)

b. Reviewer

Journal(s)

African Journal of Ecology
PLoS ONE
Journal of Applied Geography
Primates
Ecography

No. of manuscripts

3 (+2 re-reviews)
5 (+1 re-review)
1
1
1

Agency

No. of proposals

Other

Reviewer for SCB Student Awards for talks at:
ICCB in NZ (December, 2011)
ECCB in Edinburgh (April 2012)
NACCB in Oakland, CA (July 2012)

Reviewer for SCB’s Student Spotlight for
North American Section (January, 2012)
European Section (March, 2012)

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
Research and Policy for Infectious Disease Dynamics (RAPIDD) "Foot and Mouth Disease", 2011- <i>Supported by Fogarty Institute, NIH and the Department of Homeland Security (DHS) RAPIDD program</i>		
"Building better models for malaria under climate change" 2011, 2012 <i>Supported by Luce Foundation and the National Center for Ecological Analysis and Synthesis (NCEAS)</i>		

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

D. Foreign Travel (Where, When, Purpose)

Krakow, Poland, July 2011, European Congress for Theoretical and Mathematical Biology
Auckland, New Zealand, December 2011, International Congress for Conservation Biology

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

Burgess Awards Committee
Phyllis Roskins Award Committee
Wildlife Faculty Committee

B. College-level

CGMA – Committee on Geospatial Modeling and Analysis, member
IACUC – Institutional Animal Care and Use Committee, member
Program Coordinator, Health and Environment focus, Division of Environmental Science
Faculty member, Graduate Program in Environmental Science (GPES), CNH group
Lead coordinator, establishing Environmental Health (EH) major proposal materials.

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.

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.

Students

In this past year, I have introduced 2.5 new 3-credit classes in EFB, 2 of which are in the new track of Environmental Health: Emerging Infectious Diseases (Fall), and Epidemiology (Spring). Both of these classes enabled upper level undergraduate students to explore a new realm of biology, and see a different perspective on their broader training in ecology. I used innovative classroom techniques, such as a daily short presentation by each student, including Powerpoint™ slides and point-by-point handouts, which will prepare them for the real world, in terms of synthesizing often complex information in a publicly accessible way. I placed strong emphasis on written assignments, creative projects and participation, in addition to quizzes and tests, in order to appeal to a range of learning styles. This was particularly useful in Epidemiology, which can be dry and

technical without a larger context, and I was eager to make it accessible and applicable. The written evaluations suggest that this worked, and is a good grounding for the future of this class, and the Environmental Health program.

In the graduate level class (EFB 796) that Dr Cohen and I put together on parameter estimation and population modeling, I conducted the population modeling component. This class represents ESF's offering for population modeling at the graduate level; before I came to ESF, it was stressed to me that this was a gap that many of the faculty wanted to see filled, so it was a pleasure to do so. As this class was conducted in a computer lab, it was a great way to introduce both concepts and coding examples in R (which is open-source and therefore available to students after graduation, in the real world). In the first week, I demonstrated a classic example of using long-term census data, and how one might present this in a report to wildlife managers; as I looked at the class, I realized that there were at least 3 state employees looking back, and that I probably had directly influenced applied management outside the classroom. I cannot express how rewarding that was, given my desire to be an academician with applied impact.

In addition to brand-new courses, I also interacted with both undergraduates and graduate students in a research mentoring role. I had five undergraduates working on research projects during the year; each with different backgrounds and different objectives. They worked on

1. Data collection and analysis for primate ecology and evolutionary questions – including reading classic articles in phylogenetic methods, and discussing how this fit into their data research.
2. Collecting and collating mosquito identification information for the greater Washington D.C. area, as preparation for an internship in a vector ID lab. We discussed how this would be best derived from literature and internet resources, and then put together for a practical field and lab identification tool. Ultimately, this exists as a poster, and as a Prezi presentation (Prezi is a web hosted application that allows nonlinear presentation of information, which is a truly innovative means to think about field/lab identification guides).
3. Research and preparation of introductory materials for the Environmental Health program, including logo generation, poster and flyer graphics and text, and general brainstorming about community outreach and involvement, and how ESF and EH will operate.
4. Investigation of a metapopulation disease in a wetland restoration site, and using social media to fund raise for summer field equipment and lab supplies.

Having undergraduates as part of the lab group has been fantastic; they challenge me to think in their modern, highly connected and technology-driven world, and I gain additional opportunities to explore research ideas, teach concepts on the fly, and learn about undergraduate life at ESF. An additional benefit that this provides is to let my graduate student gain some mentoring experience. While my graduate student earned research credits with me on his own project this spring (*manuscript in prep*), he also oversaw and discussed progress on data collection and research questions for one of the group's returning undergrads. Three of the five undergraduates will be returning to continue their research with the lab group, and with the addition of 3 incoming graduate students (1 PhD, 1 MS, 1 MPS), this will be a solid group.

Department/College

In terms of the larger picture (department/college), this summer marks the first placement of an ESF graduate student at the NYC Urban Field Station (UFS), a joint US Forest Service and NY City Parks and Recreation operation, to work on a project to answer questions relating to policy needs at the station. The student will also be helping to write protocols for use of the station and lab, to help establish a framework for future researchers. I hope that the bond I am forging will increase the use of the UFS by ESF students, and open up future internship opportunities for applied research and analyses.

This year, I have also been putting together the materials for proposing the new Environmental Health major. In November, 2011, the letter of intent was approved and well-received by SUNY. In May, 2012, after external review, the full proposal was completed to be sent out for review. As a preamble to the establishment of the new major, I took on two positions in the Division of Environmental Science (where the EH major will be established): curriculum coordinator, Health and Environment focus, and faculty member of GPES. I have revised the curriculum for the Health and Environment focus area, in coordination with Tim Knight and Dr

Briggs, to ensure that it remains a pre-health track option, and that the classes are available at ESF. I have also been working with Dr Colin Beier to revise the presentation of our program area in GPES, and understand how to best serve students working in coupled human-natural systems (CHNS) at ESF.

In related endeavors, I have joined the Center for Global Health and Translational Science (CGHATS) at Upstate Medical University, as voluntary faculty in Microbiology and Immunology. This will open up countless opportunities to pursue research in the human health side of environmental health, engage with practicing medical professionals, and connect into SUNY joint research initiatives.

I remain active in the Hill Collaborations; the ESF/SU/UMU/VA joint initiatives on collaborative research; I am a member of all three groups - Diabetes, Cancer and Neurological Disorders.

Self

In terms of contributing to my own, personal, professional career, this year saw 6 peer reviewed papers into the literature, 3 of which were first-authored. My Google Scholar Citations* reported H-index increased from 8 to 11. Published in December, 2011, "Consequences of non-intervention for infectious disease in African great apes" (PLoS ONE), got a decent amount of press, likely due to a combination of charisma and controversy. The success of three grant applications assures continuation of my collaborative work in Uganda, and a new opportunity in Mexico. With a few more pending grant applications (totaling requests of approximately \$2 million) and four more co-authored manuscripts in review, the challenge of balancing a slightly higher than normal administrative load (Environmental Health) with starting up a lab group and brand new courses, has not disastrously undermined my professional research trajectory.

**I use Google Scholar Citations as a completely open access – thus, no fee - research tool; these numbers may differ from those reported by Web of Science and Scopus*

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 plan to teach my courses again, adding a graduate section to the EID class in the Fall, and improving my understanding and use of the BlackBoard system, particularly for grading. I plan to revise a few aspects of the undergraduate classes, in response to feedback from students – regarding test preparation, lecture delivery (I talk too fast sometimes), and timing of projects in the semester.

I plan to lead my growing lab group in bi-weekly discussions, as a formal means of keeping checks on my mentoring capacity and utility.

This summer, colleagues and I will investigate new field sites in Uganda, expanding our climate data collection network, and capturing more social heterogeneity in our survey data. I will conduct our first coupled remote-sensing and demographic analysis.

In collaboration with the malaria and climate change working group, I will work on 2-3 manuscripts we are preparing, and seek out new funding avenues for further collaborative research meetings.

I will continue my role in establishing an Environmental Health program here at ESF.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2012

a. Course(s) to be offered
n/a

b. Proposed research activity

One month on the ground in the field in Uganda, collecting survey data, establishing new field sites (June)

GIS analyses for several projects; manuscript preparation (May, August)

c. University, professional society, and public service

Review and revision (updates) of course materials and scheduling of assignments.

Present poster at Ecology and Evolution of Infectious Disease (EEID) conference, Michigan, May 22-25

Teach "Quantitative Landscape Ecology and Environmental Sustainability" course at University of KwaZulu Natal in South Africa, July 2-12.

Continue organizing and then run the 2012 North American Congress for Conservation Biology, July 15-18

2. Fall Semester 2012

a. Course(s) to be offered

EFB 496/796*: Emerging Infectious Diseases (3cr)

EFB 797: Adaptive Peaks (co-I with Cohen) (1cr)

b. Proposed research activity

Ongoing GIS analyses for several projects

Pending funding, initiating genetic and parasitological analyses in the lab

Using land cover maps to inform management models for farm outbreaks – collaboration with M. Tildesley, University of Warwick, UK.

Primate social systems, ecology, phylogeny, community structure, and disease ecology, ongoing projects, including undergraduate and graduate research credit

Amphibian Ranavirus Project, lab work to identify ranavirus in vernal pools at Heiberg forest, and model metapopulation disease processes

c. University, Professional society, and public service

3. Spring Semester 2013

a. Course(s) to be offered

EFB 360: Introduction to Epidemiology (3cr)

EFB 797: Adaptive Peaks (co-I with Cohen) (1cr)

EFB 796*: Parameter Estimation and Modeling (3cr)
in Population Biology Studies (co-I with Cohen)
(*computer lab graduate course*)

b. Proposed research activity

Ongoing GIS analyses for several projects

Pending funding, initiating genetic and parasitological analyses in the lab

Using land cover maps to inform management models for farm outbreaks – collaboration with M. Tildesley, University of Warwick, UK.

Primate social systems, ecology, phylogeny, community structure, and disease ecology, ongoing projects, including undergraduate and graduate research credit

Amphibian Ranavirus Project, lab work to identify ranavirus in vernal pools at Heiberg forest, and model metapopulation disease processes

c. University, professional society, and public service