

ANNUAL REPORT: June 1, 2014 – May 31, 2015
(i.e., Summer 2014, AY 2014-2015)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: Gordon Paterson

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:	EFB202	Ecol. Monitoring & Assess.	3	36	4
FALL:	EFB298	Research internship	3	2	
	EFB400	Toxic health hazards	3	31	
	EFB498	Independent research	1	2	
	EFB600	Toxic health hazards	3	3	
	EFB797	Adaptive peaks	1	11	
SPRING:	EFB298	Research internship	1	1	
	EFB498	Independent research	6	1	
	EFB523	Tropical ecology	3	11	

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.

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>
EFB496	Special topics in environmental toxicology	3	5
EFB611	Special topics in environmental toxicology	3	5

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>
EFB496	Senior Synthesis AFS (mock-employment interviews)	1

II. STUDENT ADVISING

- A. Number of undergraduates for whom you are the student's official advisor 18 and unofficial advisor _____
- B. Graduate Students: (list 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

CO-MAJOR PROFESSOR

MEMBER, STEERING COMMITTEE (other than those listed above)

Kelly Huffman, MS, Fish & Wildlife Biology & Management (J. Farrell MP)
Jessica Saville, PhD, Ecology (D. Leopold MP).

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Andrew Miano, MS, Fish & Wildlife Biology & Management (J. Farrell MP)
Matthew Gunderson, MS, Fish & Wildlife Biology & Management (K. Kapuscinski MP)
Funmi Afelumo, MS, Plant Science & Biotechnology (L. Newman MP)
Andrew Brainard, PhD, Fish & Wildlife Biology & Management (K. Schulz MP)
Jesse Crandall, PhD, Chemistry, Examiner (M. Teece MP)
Erin Swallow, PhD, Environmental & Natural Resources Policy, Chair (P. Hirsch MP)

III. RESEARCH COMPLETED OR UNDERWAY

- A. Departmental Research (unsupported, boot-legged; title - % time spent)
- i) Estimating individual efficiencies for Great Lakes lake trout, unsupported 5 %.
 - ii) Contrasting PCB bioaccumulation patterns in Lake Huron lake trout, unsupported 5 %
 - iii) Seasonal trends in Oneida Lake yellow perch PCB and lipid content, unsupported 5%.
 - iv) Relationships between life history strategy and persistent organic pollutant bioaccumulation in freshwater mysid shrimp, unsupported 5%.
- 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)
2. Research Proposals pending (include information as in B.1., above).
 3. Research Proposals submitted, but rejected (include information as in B.1., above)

Fate and effects of neonicotinoid pesticides in Lake Ontario and St. Lawrence River wetlands (\$218,580, New York Sea Grant; PIs G. Paterson, JM Farrell and KL Schulz)

Quantifying contaminant bioavailability in the Hudson River following large scale sediment remediation. (\$161,732, Hudson River Foundation; PI G. Paterson)

Great Lakes lake trout lipids & energy densities during dreissenid invasion (\$19,725 Great Lakes Fishery Commission; PI G. Paterson)

Quantifying relative potencies of perfluoroalkyl compounds to amphibian and reptile species. (\$866,893 Strategic Environmental Research and Development Program; PIs G. Paterson and S. A. Rush).

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

Paterson G., Ryder M., Drouillard KG., and Haffner GD. Contrasting PCB bioaccumulation patterns among Lake Huron lake trout reflect basin specific ecology. *Environ. Toxicol. Chem.* In press.

McLeod AM., Arnot JA., Borgå K., Selck H., Kashian D., **Paterson G.**, Drouillard KG. and Haffner GD. 2015. Quantifying uncertainty in the trophic magnification factor related to spatial movements of organisms in a food web. *Int. Environ. Assess. Man.* 11: 306-318.

Abma RA., **Paterson G.**, McLeod A., and Haffner GD. 2015. Cross-basin comparison of mercury bioaccumulation in Lake Huron lake trout emphasizes ecological characteristics. *Environ. Toxicol. Chem.* 34: 355-359.

McLeod AM., **Paterson G.**, Drouillard KG. And Haffner GD. PCB food web dynamics quantify nutrient and energy flow in aquatic ecosystems. Submitted to *Environmental Science & Technology*.

McPhedran, K., Grgicak-Mannion A., **Paterson G.**, Briggs T., Ciborowski J., Haffner G.D., and Drouillard, K.G. Field validation of multi-chemical hazard metrics for predicting benthic invertebrate toxicity in the Detroit River, Ontario, Canada. Submitted to *Integrated Environmental Assessment and Monitoring*.

B. Non-refereed Publications

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

Paterson G., Rush SA., Johnson TB., Drouillard KG., Haffner GD., Hebert CE., Arts MT., McGoldrick DJ., Backus SM., Lantry BF., Lantry JR., Schaner T., Fisk AT. Surviving the meltdown? Ecological tracer and biomonitoring data for Lake Ontario lake trout during the Ponto-Caspian invasion. 58th Annual Conference of the International Association for Great Lakes Research, University of Vermont, Burlington, Vermont, USA. May 25-29 2015.

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):

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.)

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

2. Professional Society Membership

International Association for Great Lakes Research
American Society of Limnology and Oceanography
Society of Environmental Toxicology and Chemistry

3. Other Professional Activities

a. Editorial activity

Journal (s)

Bulletin of Environmental
Contamination & Toxicology.

Responsibility

Senior Editor: Editorial review, processing,
and final decision for 36 manuscripts.

Other (books, symposia, etc.)

b. Reviewer

Journal(s)

Science of the Total Environment

Journal of Great Lakes Research

Canadian Journal of Fisheries & Aquatic Sciences

No. of manuscripts

2

2

1

Agency

No. of proposals

Other

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.

Date

Place

Session Chair: Fishing Down the Food Web. 58th Annual Conference of the International Association for Great Lakes Research, University of Vermont, Burlington, Vermont, USA. May 25-29 2015.

Great Lakes Research Consortium, Mentoring Workshop, Onondaga Lake Visitor's Center, March 28, 2015.

Host: Editorial Board Meeting, Bulletin of Environmental Toxicology and Contamination. October 5-7th, 2015. Gateway Center, SUNY-ESF.

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

National Science Foundation Career Grant Workshop, Syracuse University, Office of Research, April 17, 2015.

D. Foreign Travel (Where, When, Purpose)

Commonwealth of Dominica, May 13 – 24th, 2015, co-teach Tropical Ecology (EFB523) field course with Dr. Donald Stewart.

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

Cranberry Lake Biological Station Advisory Committee
Grober Graduate Research Fellowship (Candidate review and selection)
Robert Burgess Graduate Scholarship in Ecology (Candidate review and selection)

B. College-level

Ad-hoc Library Council (Committee).
Faculty position search, EFB representative, Environmental Health, Division of Environmental Science (Committee).
Spotlight on Student Research Conference April 15-16th (Judge).

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 (i.e., three paragraphs total) 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 (when available), which I'll continue to award based on your contributions to the department and college this reporting period.

During the fall of 2014 I taught Toxic Health Hazards and received strong positive feedback from multiple students regarding the course content. This included a recent ESF graduate student whom indicated that much of the course syllabus was responsible for their receipt of an offer of employment with an environmental consulting firm. I also offered the Environmental Risk Assessment course requirement for the Environmental Health program, however, this course was closed due to low enrollment. This course will again be offered as a mandatory requirement during the fall 2015 semester. I again co-taught the Adaptive Peaks graduate seminar course with Dr. Shannon Farrell during the fall 2014 and spring 2015 semesters. The highlight of the course this year was visiting speaker and ESF alumnus Dr. Russ Lea, director of the NSF's National Ecological Observatory Network, who was very well received by both student and faculty members in EFB and across campus. I again taught a special topics course in environmental toxicology during the spring semester which expanded on specific concepts introduced in Toxic Health Hazards. This course also challenged students to learn some of the thermodynamic and mathematical concepts associated with understanding pollutant bioaccumulation in terrestrial and aquatic food webs. I co-taught Tropical Ecology with Dr. Donald Stewart in the spring 2015 semester. The cancellation of the field trip to Dominica during Spring Break due to weather related concerns highly disappointed approximately 50% of the students registered in the course. However, an additional effort was made to complete the field component of this course from May 13 – 24th, 2015 and was very well received by the students that were able to participate. I was also able to supervise a range of students (6) through research internships, independent research projects and also the honors thesis program. These projects were very enjoyable and valuable for helping teach students the lab and data analysis skills associated with pollutant extraction and analysis in biological samples and also for evaluating the status of laboratory facilities for this research. Despite my enjoyment in

contributing to the multitude of undergraduate courses previously listed above, I feel I need to reduce the number of such commitments in order to focus on my research program and graduate student training.

Much of the summer of 2014 was spent trying to resolve contamination issues in the laboratory that continue to be challenging with respect to completing trace chemical analysis in Illick Hall lab space. Ongoing construction issues including the perimeter heating project in Illick Hall resulted in the lab requiring substantial cleaning in addition to a prolonged absence of hot water resulting in substantial challenges for simple pursuits such as glassware cleaning. My laboratory space also requires continued attention with respect to cleaning and regular maintenance in order to maintain a suitable facility for trace chemical research. I was able to submit approximately \$1.3 million in research funding proposals this year unfortunately, none of these proposals were accepted for funding. There remains an outstanding issue of \$10,000 in funding awarded in March 2014 that has yet to materialize despite multiple attempts to establish the fate of this money and the almost \$1000 cost for the associated research publication. I will have a new MS student beginning in the fall 2015 with another beginning in spring 2016. I had tentatively agreed to co-supervise a PhD student with Dr. Donald Stewart, however, issues raised during further discussion with the student's current PhD supervisor indicated that the candidate was unsuitable for the proposed project. One unknown issue associated with graduate student recruitment regarded the absence of my name in the graduate application system in order for students to select myself as their major professor. This issue was only brought to light by a current graduate student applicant who notified me of the situation and initiated the fix for the problem.

I began my first term on the Cranberry Lake Biological Station Advisory Committee. During that time, issues raised and discussed included the capacity for station facilities to continue to support the mandatory requirements of EFB202 and potential solutions for this ongoing issue. Participation on this committee also included application review and candidate selection for the Grober Research Fellowship and the Burgess graduate research award. I also completed another term on the ad-hoc library committee and contributed to the curriculum assessment process for the Aquatics and Fisheries major. I continue to communicate with and mentor young students interested in environmental toxicology and issues related to water contamination and industrial pollutants.

For my own professional development, I participated in an NSF Career grant workshop sponsored by Syracuse University which helped provide valuable information regarding hints and information toward preparing successful proposals for this program and the opportunity to meet and discuss the program with successful program applicants. I also received valuable feedback on Hudson River Foundation and New York Sea Grant proposals which will hopefully help to improve my future success in competitive funding proposals. I continue to work in an associate editor capacity for the Bulletin of Environmental Contamination and Toxicology for which I was responsible for the editorial processing of approximately 35 bulletin publication style manuscripts. For this journal, I also hosted the annual editorial board meeting which also provided an opportunity to showcase the ESF Gateway Center to a range of international faculty, research scientists and Springer administrative staff. I also acted as a professional reference for two post-doctoral fellows, one for a successful faculty position interview and the second who was hired for an environmental consulting firm. In addition to these activities, I also reviewed session abstracts for the 2015 Annual Conference of the International Association for Great Lakes Research.

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 on incorporating feedback from students into the syllabus for the Adaptive Peaks graduate seminar course. This would include having students enrolled in the course develop a proposal based seminar during their semester in the course and have them prepare and deliver this material during an in-class seminar. Consistent feedback from students in this course suggests that such an exercise would benefit them to a greater degree than the current course requirements. For research, I anticipate collaborating with Drs. Charlie Driscoll and Chris Junium at Syracuse University on a project regarding mercury redox cycling and speciation in meromictic and dimictic lakes. I also anticipate developing more research proposals in an effort to investigate research questions surrounding the use of persistent organic pollutants as indicators of species bioenergetics in aquatic ecosystems. I will also have my first MS student begin in the Fall 2015 semester investigating the importance of life history strategy on the bioaccumulation of

pollutants by freshwater mysid shrimp populations. During the summer I will also be travelling to Windsor, Ontario, Canada as an invited speaker at the International Conference on Environmental Indicators.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2015

a. Course(s) to be offered

EFB202 (Ecological Monitoring and Biodiversity Assessment) Contribute to aquatics program teaching.

b. Proposed research activity

Continued lab maintenance for sample processing and pollutant extraction and analyses.

Collection of *Mysis diluviana* from Keuka, Seneca, Cayuga Lakes and Lake Ontario to contrast life history strategies, stable isotope profiles and PCB bioaccumulation patterns.

Begin preparation and composition of NSF CAREER grant application for Summer 2016 submission.

Begin preparation and composition of NSF preliminary proposal investigating mercury cycling and speciation in dimictic and meromictic lakes for January 2016 Biology Core programs solicitation.

Collection of Lake Ontario lake trout in collaboration with Dr. Brian Lantry of USGS biological station in Oswego to characterize individual predator foraging efficiencies and population structure.

Complete research manuscript investigating the long-term biological responses of Lake Ontario lake trout to the multiple non-indigenous species invasions that have occurred between 1984 – 2008.

Continue modeling simulation for determining ecological efficiencies of Great Lakes top predators

c. University, professional society, and public service

Senior editor – Bulletin of Environmental Contamination and Toxicology

2. Fall Semester 2015

a. Course(s) to be offered

EFB400/600 (Toxic Health Hazards)

EFB797 (Adaptive Peaks; Co-taught with Dr. Shannon Farrell)

ENS470 (Environmental Risk Assessment)

b. Proposed research activity

MS research conducted by Caitlin Slife

Develop mercury speciation project with Syracuse University collaborators

Personal research/data analysis determining top predator ecological efficiencies

Continue composition of NSF CAREER grant application for Summer 2016 submission.

Continue composition of NSF preliminary proposal investigating mercury cycling and speciation in dimictic and meromictic lakes for January 2016 Biology Core programs solicitation.

c. University, Professional society, and public service
Senior editor – Bulletin of Environmental Contamination and Toxicology
Cranberry Lake Biological Station Advisory Committee
Various departmental, College and public outreach service requirements as they arise throughout the academic year.

3. Spring Semester 2016

a. Course(s) to be offered
EFB496/611 (Special topics in environmental toxicology)
EFB797 (Adaptive Peaks; Co-taught with Dr. Shannon Farrell)

b. Proposed research activity
MS research conducted by Caitlin Slife
MS research conducted by Nicole Saveedra

Personal research/data analysis determining top predator ecological efficiencies

Submit NSF preliminary proposal investigating mercury cycling and speciation in dimictic and meromictic lakes for January 2016 Biology Core programs solicitation.

c. University, professional society, and public service
Senior editor – Bulletin of Environmental Contamination and Toxicology
Cranberry Lake Biological Station Advisory Committee
Various departmental, College and public outreach service requirements as they arise throughout the academic year.