ANNUAL REPORT: June 1, 2015 – May 31, 2016
(i.e., Summer 2015, AY 2015-2016)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

*****PLEASE DO NOT INSERT TABLES FOR ANY CATEGORIES*****

NAME: _____Hyatt Green_____

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

	Course No.	Title	Credit Hrs.	No. Students	No. of Lab. Sections
SUMMER:					
FALL:	**EFB 303:**	**Intro. to Environmental**	**4**	**48**	**2**
SPRING:	**EFB 505:**	**Microbial Ecology**	**2**	**9**	**0**

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)

Course No.	Title	Credit Hrs.	No. Students
EFB 796	**R and Reproducible Research**	**2**	**24**

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

4. Guest Lecture Activities

Course No.	Title	No. of Lectures
EFB 211	**Diversity of Life**	**1**

II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor __**17**___ 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)

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

III. RESEARCH COMPLETED OR UNDERWAY

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

Microbial Source-tracking on Onondaga Creek (ongoing), NY, 5% time spent
Distribution of Members of the Vertebrate Microbiome, 5% time spent (complete, paper published)

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)

Source: SUNY-ESF, Center for Applied Microbiology
Title: Identification of Fecal Contaminants on the Onondaga Lake Shoreline
Total Award: $4,600
2015-2016 Award: $4,600
Award period: Jul 1, 2015 to June 30, 2016

Source: State Wildlife Competitive Grants Program, US Fish and Wildlife Service
Title: Multistate Recovery Actions For The Bog Turtle And Associated Headwater Wetland Species Of Greatest Conservation Need
Total Award: $117,000
2015-2016 Award: $28,393
Award period: Oct 1, 2015 to June 30, 2018

Source: SUNY-ESF Seed Grant
Title: Microbial Dark Matter in Green Lake, NY
Total Award: $6,666
2015-2016 Award: $6,666
Award period: June 1, 2016 to May 31, 2017

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

Source: Utah Division of Water Quality
Title: *E. coli* Source Identification in Emigration Canyon, UT
Total Award: $159,297
Award period: June 1, 2017 to May 31, 2020

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

Source: 2016 Great Lakes Research Consortium Small Grants Program
Title: Testing of Novel eDNA Methods for Assessing Bog Turtle (Clemmys [=Glyptemys] muhlenbergii) Populations in Upstate New York

Total Award: $12,283
Award period: March 1, 2016 to March 1, 2017

Source: 2016 Great Lakes Research Consortium Small Grants Program
Title: Estimating Human Health Risks of Fecal Contaminants Entering Onondaga Lake Watershed
Total Award: $14,908
Award period: March 1, 2016 to March 1, 2017

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

Fisher, Jenny C, A Murat Eren, Hyatt C Green, Orin C Shanks, Hilary G. Morrison, Joseph H. Vineis, Mitchell L. Sogin, and Sandra L. McLellan (2015). Comparison of sewage and animal fecal microbiomes using oligotyping reveals potential human fecal indicators in multiple taxonomic groups. *Applied and Environmental Microbiology* 81.20. Cover image, pp. 7023–33.

Green, Hyatt C, Jenny C Fisher, Sandra L McLellan, Mitchell L Sogin, and Orin C Shanks (2015). Identification of specialists and abundance-occupancy relationships among intestinal bacteria of *Aves*, *Mammalia*, and *Actinopterygii*. *Applied and Environmental Microbiology* 82.5, pp. 1496– 1503.

B. Non-refereed Publications

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

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.

Onondaga Lake Watershed Bacterial Trackdown Working Group

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

American Society for Microbiology

3. Other Professional Activities

a. Editorial activity

Journal (s)	Responsibility
Other (books, symposia, etc.)	

b. Reviewer

Journal(s)	No. of manuscripts
Journal of Applied Microbiology	**2**

Agency	No. of proposals
Other	

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.	Date	Place

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

D. Foreign Travel (Where, When, Purpose)

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

Disease Ecologist/Epidemiologist Search Committee, Spring 2016
EFB Open House, Biotech major representative, Spring 2016

B. College-level

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.

Benefits to Students: Fall 2015 was my first offering of EFB 303: Introduction to Environmental Microbiology, an essential component of the Environmental Health major previously taught by professors Nakas and Castello. As usual, ESF students were amazing to work with and I hear they enjoyed the lecture and labs very much. Overall, I spent 8.5 hours of face time with students per week. We are very luck in Upstate NY to have many rich examples of diverse microbial lifestyles and applications. Students observed some of the rare extremophile bacterial taxa or "microbial dark matter" we have submersed in local meromictic lakes by making Winogradsky columns. I hooked students up with Onondaga County's Dept. of Water Environment Protection to analyze official local ambient water samples from Onondaga Creek during our segment on water quality. Although the methods varied slightly, student data agreed with County data collected from the same samples with an R^2 of 0.86—nice work guys! We also toured Saranac brewery's (Utica, NY) analytical lab and anaerobic digesters. I look forward to continue growing the course and bringing real research to the students. Spring 2016 was my first offering of EFB 505: Microbial Ecology, a undergrad/grad course for those interested in going deeper into the broad field environmental microbiology. We discussed important/recent primary research in an effort to get students *thinking like microbial ecologists*. I'm excited about the dynamic between these two microbiology courses and how they may play off of each other in the future. Spring 2016 was also my second offering of EFB 796: R and Reproducible Research, a grad class that maxed out capacity even though I nearly tripled capacity from the previous year. Although I will continue to make minor adjustments to the course and try to keep up with R's rapidly increasing capabilities students seem to love the content and format in general. I also gave one guest lecture in Diversity of Life II on the Human Microbiome.

Departmental and University Service: Currently, I advise 17 EFB undergraduates, but hope to take on more next year as advising week is probably my favorite part of the term because I get to see students outside my role as instructor. I hope that my serving on the Disease Ecologist/Epidemiologist search committee with the first of many search committees. I also represented the Biotechnology major during Spring 2016 Open House.

Professional Advancement: I published two papers this period, one as a second author and one as first and corresponding, both in *Applied and Environmental Microbiology*. Our chapter in the fourth edition of the Manual for Environmental Microbiology was finally published. The bog turtle eDNA work funded by US FWS is going well. It is taking place within a large consortium of groups in NY, NJ, PA, MD, RI, and CT in an effort to protect bog turtle habitat. We are currently in the method development stage testing candidate assays against a DNA library in collaboration with researchers at SUNY-Oswego and USGS. We are working Sarah Hall (SU) to develop novel DNA extraction control methods. I am working with SUNY IP attorneys on the possibility of patenting the final validated methods. Onondaga Lake shoreline assessments funded by ESF's Center for Applied Microbiology are just beginning and should provide a better picture of the 'swimmability' of Onondaga Lake at a proposed beach site. Just upstream so to speak, we are working with Onondaga Environmental Institute in identifying the sources of harmful bacterial contaminants. OEI will submit samples for cultivation of indicators while my lab will do the molecular source identification. I am working with the researchers at Univ. of Buffalo and NY DOH to better identify funding opportunities and possible collaborations on NY water quality issues. Recently, my lab was selected to receive ESF Seed Grant funds to study the 'microbial dark matter' in Green Lake, NY. Interestingly, these elusive bacteria are hypothesized to play a role in the methylation of mercury. We will begin sampling and metagenomics prep work Summer 2016 in collaboration with Mark Teece (ESF) and Charley Driscoll (SU). This work is intended to further develop Green Lake as a test bed for a diversity of biogeochemical and microbiological research. I also anticipate doing some microbial source tracking in collaboration with Salt Lake County on the theologically important Emigration Creek outside of Salt Lake, Utah. While the current lab is not completely ideal for molecular work, I am positive we can keep generating good data until new facilities are completed.

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)

Out of all the new courses we could offer, we need to identify the ones that best prepare students for life after ESF. Our students are clamoring for a Field Microbiology course, which I am very interested in offering to such an outgoing group of students. It would be a great way to take advantage of all the microbial peculiarities in upstate NY. I've also been tinkering around with a Microbial Diversity course that would incorporate some computational tools for sequence analysis that students (mostly grads) desperately need.

The research opportunities are really endless. The White House recently announced the National Microbiome Initiative, which was kicked off with $121 million invested into microbiome research plus $400 million in financial or in-kind contributions from stakeholders or institutions. I hope to submit a wide range of proposals investigating various aspects of Earth's microbiome, which is receiving an increasing amount of public attention in recent years. There is also increased attention given to our aging infrastructure and prioritizing restoration/replacement efforts can be aided substantially by the use of molecular methods. We are also seeing a huge demand for eDNA methods for population assessment, but there are still many unanswered questions surrounding our ability to count numbers of individual from a few microliters of environmental DNA. We also have 'new' *phyla* of bacteria (they have been around for quite some time) in our water, in our soil, and in the air whose ecological function and evolutionary history are totally unknown. Understanding where and how such microbes make a living will certainly change our understanding of microbiology.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2016

   a. Course(s) to be offered

   b. Proposed research activity

   Continue Lab Improvement
   Microbial Source-Tracking on Onondaga Creek
   - **Water Sample Collection**
   - **DNA Extraction**
   - **qPCR**

   Onondaga Lake Shoreline
   - **Water Sample Collection**
   - **DNA Extraction**
   - **qPCR**

   Bog turtle eDNA method development
   - **Blood Sample Collection**
   - **DNA Extraction**
   - **qPCR**

   Microbial Dark Matter in Green Lake, NY
   - **Sample Sample Collection**
   - **DNA Extraction**
   - **qPCR**
   - **Metagenomic Sequencing**

   c. University, professional society, and public service

   Cranberry Lake student presentation judge

2. Fall Semester 2016

   a. Course(s) to be offered

EFB 303: Environmental Microbiology Lecture & Lab (4 cr)

b. Proposed research activity

Microbial Source-Tracking on Onondaga Creek
- **Water Sample Collection**
- **DNA Extraction**
- **qPCR**

Onondaga Lake Shoreline
- **Water Sample Collection**
- **DNA Extraction**
- **qPCR**

Bog turtle eDNA method development
- **Blood Sample Collection**
- **DNA Extraction**
- **qPCR**

Microbial Dark Matter in Green Lake, NY
- **Sample Sample Collection**
- **DNA Extraction**
- **qPCR**
- **Metagenomic Sequencing**

c. University, Professional society, and public service

3. Spring Semester 2017

a. Course(s) to be offered

EFB 796: R & Reproducible Research
EFB 505: Microbial Diversity (2 cr)

b. Proposed research activity

Bog turtle eDNA method development
- **Blood Sample Collection**
- **DNA Extraction**
- **qPCR**

Microbial Dark Matter in Green Lake, NY
- **Sample Sample Collection**
- **DNA Extraction**
- **qPCR**
- **Metagenomic Sequencing**

c. University, professional society, and public service