

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

NAME: Martin Dovčiak

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:	EFB 202	Ecological Monitoring and Biodiversity Assessment †	-	35	2
FALL:	EFB 535	Flowering Plants: Div, Evol, Syst.	3	19	1
	EFB 797	Global Change Ecology	1	10	-
SPRING:	EFB 445	Plant Ecology & Global Change	3	32	-
	EFB 645	Plant Ecology & Global Change	3	15	-

Notes: † Two-day Plant Ecology & Taxonomy portion (2 sections) of this team-taught field course at CLBS.

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>
	EFB 420	Internship/Env&Forest Bio	3	1
	EFB 899	Masters Thesis Research	21	4
	EFB 999	Doctoral Thesis Research	2	1

3. Continuing Education and Extension (short courses, workshops, etc.)—None.

4. Guest Lecture Activities

	<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
	EFB 210	Diversity of Life I	3 + 1 laboratory
	EFB 326	Diversity of Plants (SUNY-ESF)	1

II. STUDENT ADVISING

- A. Number of undergraduates for whom you are the student's official advisor 15 and unofficial advisor 6
- 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

Completed students:

1. Portia Osborne, M.S. Ecology, December 2011.
Thesis: Plant community response to disturbance in old fields in central New York: Applications to management of a rare snake.
2. María Elena Gutiérrez Lagoueyte, M.S. Conservation Biology, May 2012.
Thesis: Vegetation-environment relationships under current and future climate in the páramos, tropical high mountain ecosystems of Colombia.

In Progress:

3. Juan Carlos Álvarez-Yépiz, Ph.D., since August 2008 (Ph.D. Candidate since May 2011).
4. Jay Ward Wason, III., Ph.D., since August 2011.
5. Stephen Langdon, M.S., since August 2010.
6. Keith Cardinali, M.P.S., since January 2011.

CO-MAJOR PROFESSOR

In Progress:

7. Juliana Quant, M.S., since August 2009 (with D. Leopold).
8. Monica B. Berdugo Moreno, Ph.D., starting in August 2012 (with R. Kimmerer)

MEMBER, STEERING COMMITTEE (other than those listed above)

1. Mason Heberling (Ph.D., Syracuse University, J. Fridley)
2. Andrew Siefert (Ph.D., Syracuse University, M. Ritchie)
3. Patrick Raney (Ph.D., D. Leopold)
4. Yazmin Rivera (Ph.D., T. Horton)
5. Jon Cale (Ph.D., J. Castello)
6. Scott Sveiven (M.S., D. Leopold)
7. Bettyjo Jivoff (M.S., D. Leopold)
8. Frances Jean More Delaney (M.S., D. Leopold)

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

1. Daniel Nicholson (Ph.D. candidacy exam, chair, PBE)
2. Artem Treyger (Ph.D. defense, examiner, FRNM)

III. RESEARCH COMPLETED OR UNDERWAY

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

- Demonstration of Ecosystem Management Options (DEMO) study in the Pacific Northwest (1 %).
- Mechanisms of coexistence in the ancient cycad *Dioon sonorense*, northwestern Mexico (2 %).
- Restoration of early successional habitat for an endangered rattlesnake through prescribed burning (3 %).
- Effects of changing climate on páramos, tropical high mountain ecosystems of Colombia (3 %).

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)

- PI: USDA CSREES/McIntire-Stennis. Forest change in the Adirondacks over 40 years. \$25,563; 2011-12. (Jay Wason III, PhD student, supported by this grant from August 2011 till August 2012)
- PI: NSRC. Global change fingerprints in montane boreal forests: Implications for biodiversity and management of the northeastern protected areas. \$89,497; 2012-14. (will support Jay Wason III, starting in August 2012).
- PI: CONACYT. Global ecotones under climate change: developing a general theory of climate-vegetation interactions across tropical, temperate, and boreal ecotones. \$5,250; 2012. (partial support for J.C. Álvarez-Yépiz, travel, and equipment).
- Co-PI: National Park Service. Appalachian Trail MEGA-Transect Study. Total budget: \$747,242; 2010-13. (\$49,310 supports SUNY-ESF graduate student, J. Quant, and field vegetation studies by SUNY-ESF).
- Co-PI: Picker Interdisciplinary Science Institute, Colgate University. Whole-ecosystem restoration through liming of acidified tributary streams in the Honnedaga lake basin in the Adirondack Mountains. \$70,000; 2012–13 (\$5,000 will support SUNY–ESF field studies in summer 2012).
- Co-PI: NSRC. Impacts of acidic deposition and soil calcium depletion on terrestrial biodiversity and food webs. \$149,831; 2010–13 (support for Cheryl Bondi, PI/MP: C. Beier).
- Co-PI: USDA CSREES/McIntire-Stennis. Coupling local-scale climate change and forest ecosystems. \$81,271; 2010-12 (support for Daniel Bishop, PI/MP: C. Beier).
- Co-PI: USDA CSREES/McIntire-Stennis. Characterization of montane forests using remote sensing. \$79,453; 2010-12 (support for graduate student in ERE, PI/MP J. Im).

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

- Co-PI: US EPA. Assessing impacts of nitrogen deposition across large spatial scales. SUNY-ESF/ Dovčiak portion of the award request is \$93,024 (includes 1.5 yrs of RA support), 2012-14 (submitted).
- PI: NYS DEC. Evaluation of deer impacts on forest regeneration in New York State. Total award request will be ~\$100,000 (includes 1.5-2 yrs of post-doctoral funding). Duration: 2013–14 (in preparation).

3. Research Proposals submitted, but rejected (include information as in B.1., above)—None.

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

- Frelich LE, Peterson RO, **Dovčiak M**, Reich PB, Vucetich JA, Eisenhauer N. (in press). Trophic cascades, invasive species, and body-size hierarchies interactively modulate climate change responses of ecotonal temperate-boreal forest. *Philosophical Transactions of the Royal Society*.
- Halpern CB, Halaj J, Evans SA, **Dovčiak M**. (in press). Level and pattern of overstory retention interact to shape long-term responses of understories to timber harvest. *Ecological Applications*.
- Beier CM, Stella JA, **Dovčiak M**, McNulty SA. 2012. Local climatic drivers of changes in phenology at a boreal-temperate ecotone in Eastern North America. Climatic Change DOI: 10.1007/s10584-012- 0455- z.
- Beier CM, Woods AM, Hotopp KP, Gibbs JP, Mitchell MJ, **Dovčiak M**, Leopold DJ, Lawrence GB, Page BD. 2012. Changes in faunal and vegetation communities along a soil calcium gradient in northern hardwood forests.

Canadian Journal of Forest Research 42, 1141–1152.

- Westerband A, **Dovčiak M.** (submitted). Aspect influences soil moisture and species coexistence in semi-arid pinyon-juniper woodlands of the southwestern United States. *Plant Ecology*.
- Osborne P, **Dovčiak M**, Gibbs JP, Patrick DA. (submitted). Prescribed fire conserves the eastern massasauga rattlesnake, *Sistrurus c. catenatus*, by creating diverse early-successional habitat. *Endangered Species Research*.
- Brown J, **Dovčiak M.** (submitted). Forest re-growth after clear-cutting moderates microclimate but amplifies vegetation edge-effects in deciduous forests of the eastern United States. *Biological Conservation*.

B. Non-refereed Publications.—None.

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

- North American Forest Ecology Workshop, annual meeting, Roanoke, VA (2011). “Forest communities along acid deposition, soil, and climate gradients of the Appalachian Trail” (co-author, presented by J. Quant).
- Northeast Natural History Conference, annual meeting, Syracuse, NY (2012)
 1. “Forest communities along acid deposition, soil, and climate gradients of the Appalachian Trail” (co-author, presented by J. Quant).
 2. “Overstory and understory tree communities and light environment in an old growth forest” (co-author, presented by M. Holdrege).
- Student Conference on Conservation Science, American Museum of Natural History, NY (2011)
 1. “The role of facilitation in the persistence of cycads” (co-author, presented by JC Álvarez-Yépiz).
 2. “Climate change effects on páramo vegetation in Colombian Andes ” (co-author, presented by ME Gutiérrez Lagoueyte).

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

- Syracuse Botanical Club (Nov. 2011). “Plant Invaders & Natives of North America & Europe” (invited; ~ 20 in audience).

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.

- Worked with the National Park Service (incl. Great Smokey Mts. NP, Shenandoah NP, and Delaware Water Gap) to document how acid deposition may have affected ecosystems along the Appalachian Trail.
- Worked with the New York State Department of Environmental Conservation to adapt prescribed fire as a management tool for restoring summer habitat of endangered eastern massasauga rattlesnake in Cicero Swamp Wildlife Management Area, New York.
- Worked with Shingle Shanty Preserve and Research Station in the Adirondacks, New York, to develop their ecological research and monitoring program.
- Responded to various inquiries from the public (e.g., Pheasants Forever Inc., Syracuse Botanical Club).

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)

- Appalachian Trail Mega-Transect Research Consortium (member)
- Mountain Research Initiative Expert Database (member)
- H.J. Andrews Experimental Forest LTER Program, OR (collaborator)
- Demonstration of Ecosystem Management Options (DEMO) Study (collaborator)

2. Professional Society Membership

- Ecological Society of America

3. Other Professional Activities

a. Editorial activity—None.

b. Reviewer

<u>Journal(s)</u>	<u>No. of manuscripts</u>
Biological Conservation	1
Ecology	1
Ecosphere	1
Functional Ecology	1
Journal of Ecology	2
Journal of Vegetation Science	2
Landscape Ecology	2
New Forests	1
Oikos	1
Plant Ecology	1
Restoration Ecology	1
 <u>Agency</u>	 <u>No. of proposals</u>
NSRC/USDA FS	11 full proposals, 25 pre-proposals

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
• Hardy L. Shirley Faculty Mentoring Colloquium,	1/12/2012,	Syracuse

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

- University of California Webinar on NSF Data Management Plans (2012)
- NSF Webinar on Proposal Submission Guidelines (2011)
- US Fish & Wildlife Service, Vulnerability to climate change in the northeastern US, webinar (2011)
- US Forest Service Climate Change Atlas Webinar (2011)

D. Foreign Travel (Where, When, Purpose)

- Visit to Technical University in Zvolen, Slovakia (August 14-20, 2011) to discuss new collaborative opportunities stemming from the past studies of woody colonization of abandoned mountain meadows in Carpathians. Currently we are preparing an invited paper for the special issue of Biodiversity & Conservation that deals with diversity patterns in European grasslands across multiple taxa, regions, and scales (Wiezik M, Svitok M, Dovčiak M, Wieziková A. Shrub encroachment alters composition and diversity of ant communities in abandoned grasslands in western Carpathians. *Biodiversity & Conservation*.

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

- Invertebrate Conservation Biology Faculty Search Committee, member
- Chair, Committee for Robert Burgess Graduate Scholarship in Ecology.
- Graduate Program Advisory Committee, member.
- EFB greenhouse collections development with Terry Ettinger and others (ongoing)

B. College-level

- Graduate Program in Environmental Science–Ecosystem Restoration (founding member)
- Teaching evaluation of a faculty member for Promotion & Tenure Committee, SUNY-ESF (December 2011)
- Beech Working Group (founding member)
- Center for Urban Environment (core faculty member)
- Council for Geospatial Modeling and Analysis (member)

C. University-wide, including Research Foundation – None.

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.

Students: As a part of our *Ecological Monitoring and Biodiversity Assessment* (EFB 202) offered in summer at CLBS, I taught 35 students how to assess/monitor vegetation and identify plant species. In the Fall, I was very pleased to teach my usual *Flowering Plants: Diversity, Evolution, and Systematics* (EFB 535) to a doubled audience relative to the previous years (i.e., 19 rather than 9 students that the course averaged in the past). The increased enrolment likely reflected well-advertised addition of field trips to local state and city parks which allowed students to observe plants in their habitats for the first time in this course. The significant additional work with preparing field trips was worth it based on positive student end-of-course surveys (mean score of 4.5), doubled enrolment, and many positive student comments. Course details are on a public website (<http://www.esf.edu/efb/dovciak/EFB535.htm>). I also developed and taught a new graduate seminar, *Global Change Ecology* (EFB 797), to 10 graduate students who enjoyed it based on their positive comments and end-of-course surveys (mean score of 4.5) and I contributed to our new team-taught Diversity of Life I (EFB 210) by developing and teaching three lectures and a laboratory on flowering plants. In the Spring, I taught my usual *Plant Ecology and Global Change* (EFB 445/645) which now attracts close to 50 students compared to ~30 in my first year and receives good student end-of-course evaluations (mean score 4.1). Course details are on a public website (<http://www.esf.edu/efb/dovciak/EFB445-645.htm>). In addition to courses, I gave a guest lecture in *Diversity of Plants* (EFB 326) and advised 21 undergraduates (incl. NSF-UMEB, NSF Envir. Scholar, and CSTEP students) and 7 graduate students (incl. two who completed their MS degrees). I served on steering or examination committees for another 10 graduate students (incl. two at Syracuse Univ.). My advisees were successful: in addition to graduations, several received departmental awards, presented at research conferences, and one co-authored a paper in *J. Veg. Sci.* and received funding to participate in a networking workshop in Arizona.

Department/College: My main contributions to the departmental/college national/regional profile were my involvement as a CoPI in a large multi-agency NPS-funded Appalachian Trail Mega-Transect Acid Deposition Effects Study (<http://science.nature.nps.gov/im/units/appa/projects/aciddep/aciddeposition.cfm>), my collaboration with state agencies such as the New York State Department of Environmental Conservation (in habitat management for the endangered eastern massasauga rattlesnake in Cicero Swamp Wildlife Management Area), and my continued service as a reviewer for major international peer-reviewed journals (14 manuscripts, 11 journals) and funding agencies (NSRC). I contributed within the College by participating as a founding member in one of the GPES Areas (Ecosystem Restoration), by contributing a teaching evaluation of a faculty member to the College Promotion & Tenure Committee, by arranging and co-hosting our Shifting Paradigms speaker (Peter Reich), and by continuing to serve as a core faculty member in the Center for Urban Environment and a founding member of ESF Beech working group. At the departmental level I contributed as a member of the faculty search committee for Invertebrate Conservation Biologist, and continued to serve as the Chair for the Selection Committee for the Burgess Graduate Scholarship in Ecology, member of the Graduate Program Advisory Committee, and by continuing to work with our greenhouse manager Terry Ettinger and others to develop our teaching collection.

Professional Development: This was a good year. As a lead PI, I received a 2-yr grant to study climate change effects on spruce-fir forests in the protected areas of the northeastern US (NY, VT, NH, ME) funded by NSRC (\$89,497) and a seed grant to extend this work to Mexico (\$5,250) funded by CONACYT. I co-authored four papers in well-regarded journals (*Philos.T.R.Soc.B*, *Ecological Applications*, *Climatic Change*, and *Can. J. For. Res.*, with impact factors 6.1, 4.3, 3.0, and 1.6, respectively) and co-authored three additional manuscripts submitted for review. I gave an invited seminar for the Syracuse Botanical Club and co-authored five research presentations given by my students at the North American Forest Ecology Workshop in Roanoke, Northeast Natural History Conference in Syracuse, and SCCS-NY/the American Museum of Natural History in New York City. I continue my collaborative studies of woody species invasions into montane meadows with colleagues at the Technical Univ. in Zvolen, Slovakia, and we are currently preparing an invited paper for *Biodiversity & Conservation*. I have graduated my third and fourth masters' students and recruited my third doctoral student. I continued as a CoPI on the NPS-funded Appalachian Trail MEGA-Transect

Study (\$747,242) and several smaller NSRC/McIntire-Stennis funded projects, and co-authored a new significant proposal to EPA with my AT MEGA-transect collaborators. Details about my research, publications, and teaching are on our lab website (<http://www.esf.edu/efb/dovciak>).

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)

My main plans and ambitions for the next year are to complete the development of my research program at ESF by (1) attracting additional research funding to support my fourth PhD student and a post-doc, (2) complete successfully all three of my current masters' students, (3) successfully wrap up the vegetation portion of the Appalachian Trail MEGA-Transect study (including preparing a new manuscript), (4) see through the publication of several papers currently in progress (this includes appropriate revisions and resubmissions for the three manuscripts submitted earlier this year and submitting five additional manuscripts), (5) develop my P& T package and sabbatical plans, (6) continue to contribute to *Diversity of Life I* (EFB 210) and to *Ecological Monitoring and Biodiversity Assessment* (EFB 202) at the Cranberry Lake Biological Station, (7) continue developing my main courses *Plant Ecology and Global Change* (EFB 445/645) and *Flowering Plants: Diversity, Evolution, and Systematics* (EFB 535), and (8) continue committee and public service and guest lectures as appropriate.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2012

a. Course(s) to be offered – None.

b. Proposed research activity

- (i) Supervise vegetation work on the Whiteface Mtn. (funded by McIntire-Stennis Program).
- (ii) Initiate CONACYT funded research project with INECOL colleagues (Dr. Williams-Linera) along the elevational transects in Vera Cruz, Mexico.
- (iii) Develop a research proposal with NYS DEC (currently in progress)
- (iv) Advice vegetation analyses on the AT MEGA-transect study
- (v) Revise and resubmit as appropriate three papers that were submitted earlier this year:
 - Westerband A, Dovčiak M. Aspect influences soil moisture and species coexistence in semi-arid pinyon-juniper woodlands of the southwestern United States. *Plant Ecology*.
 - Osborne P, Dovčiak M, Gibbs JP, Patrick DA. Prescribed fire conserves the eastern massasauga rattlesnake, *Sistrurus c. catenatus*, by creating diverse early-successional habitat. *Endangered Species Research*.
 - Brown J, Dovčiak M. Forest re-growth after clear-cutting moderates microclimate but amplifies vegetation edge-effects in deciduous forests of the eastern United States. *Biological Conservation*.
- (vi) Complete and submit at least three from the five manuscripts in progress (below).
 - Dovčiak M, Evans SA, Halpern CB. Tree canopy removal causes different declines of forest bryophyte diversity and abundance in different microhabitats.
 - Dovčiak M, Ujházy K, Hrivnák R, Gömöry D. Patterns of tree invasions into grasslands: insights from demographic and genetic spatial analyses.
 - Wiezik M, Svitok M, Dovčiak M, Wieziková A. Shrub encroachment alters composition and diversity of ant communities in abandoned grasslands in western Carpathians.
 - Álvarez-Yépiz JC, Búrquez A, Dovčiak M. Coexistence mediated by ontogenetic shifts in plant-plant interactions: Insights from a rare cycad within angiosperm communities.

- Giencke L, Dovčiak M, Mountrakis G, Mitchell M. Spatiotemporal dynamics of beech bark disease: fine-scale patterns, mechanisms, and consequences of disease spread.

c. University, professional society, and public service
Committee service as appropriate.

2. Fall Semester 2012

a. Course(s) to be offered

- *Flowering Plants: Diversity, Evolution, and Systematics* (EFB 535)
- *Diversity of Life I* (EFB 210)- Flowering Plants section

b. Proposed research activity

- (i) Complete vegetation analyses and manuscripts on the AT MEGA-transect study
- (ii) Submit a pre-proposal to NSF (or NYSERDA) for funding a follow-up study build on the AT MEGA-Transect Study findings and vegetation plots.
- (iii) Complete any remaining manuscripts not completed in summer.
- (iv) If the pending EPA funding comes through, recruit a PhD student.
- (v) If the DEC funding under preparation comes through, recruit a postdoc.

c. University, Professional society, and public service

Continue current service in College-wide commitments—CGMA, GPES, CUE, and Beech Working Group, as well as departmental commitments such as chairing the Burgess Scholarship in Ecology and participating in Graduate Program Advisory Committee. Other service as appropriate.

3. Spring Semester 2010

a. Course(s) to be offered

- *Plant Ecology and Global Change* (EFB 445/645)

b. Proposed research activity

- (i) Submit AT MEGA-transect study manuscript(s).
- (ii) Prepare fieldwork related to expanding our current sampling from the Adirondacks across the four state area (NY, VT, NH, ME) of the northeastern US (the NSRC research project) in summer 2013.
- (iii) Submit a full proposal to NSF if invited.
- (iv) Complete any remaining manuscripts not completed in summer and fall.
- (v) Continue to develop funding.

c. University, professional society, and public service

Continue current service in College-wide commitments—CGMA, CUE, and Beech Working Group, as well as departmental commitments such as chairing the Burgess Scholarship in Ecology and participating in Graduate Program Advisory Committee. Other service as appropriate.