

APPLICATION FOR  
SCIENTIFIC STUDY IN  
BAXTER STATE PARK

1. **TITLE:**  
Inventory of the ants of Baxter State Park, with a focus on communities above treeline
  
2. **NAME OF RESEARCHER:**  
Aaron M. Ellison
  
3. **RESEARCHER'S CREDENTIALS:**  
See attached *Curriculum vitae* and additional details at <http://harvardforest.fas.harvard.edu/aaron-ellison>.
  
4. **BENEFITS TO BE DERIVED FROM RESEARCH:**  
Our recent review of ant species diversity and sampling intensity of New England found that there are 132 known ant species in New England. Statistical estimators suggest at least 21 more occur but have not yet been recorded. A number of these are boreal species that are likely to occur at high elevations in Baxter State Park. At the same time, our analysis showed that interior Maine is one of the least-sampled areas of New England, and therefore the expected “return on investment” in terms of detecting new species for the region is quite high for samples collected in Piscataquis County.  
The proposed 5-day sampling and inventory of ants in Baxter State Park will:
  - a. Increase the understanding of the baseline biological diversity of the park;
  - b. Provide new information on ant species diversity in understudied and little-sampled regions of the State of Maine;
  - c. Produce two sets of vouchered specimens, one to be accessed with the Maine State collection in Augusta (ELMF) and the other to be accessed at Harvard’s Museum of Comparative Zoology (MCZ), that will be a permanent record of the findings of the survey and will be available to future researchers;
  - d. Provide educational opportunities by linking the survey with the following week’s course on Ants of New England to be held at the Eagle Hill Institute in Steuben, Maine;
  - e. Provide detailed information on ants in rare plant communities above treeline, including Heath Alpine Ridge, Windswept Alpine Ridge, Alpine Snowbank, and Sedge Meadow that can be used to further inform management alternative for trail relocation proposed for the Abol and Hunt trail intersection near Thoreau Spring<sup>1</sup> (Weihrach 2010).

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<sup>1</sup> Doug Weihrach (2010) *Sedge meadow at Thoreau Spring: options to reduce impacts*. Report to Baxter State Park, November 2010.

5. DETAILED DESCRIPTION OF RESEARCH:

Summary:

During a five-day period (July 9 – 13, 2013), the lead researcher (Ellison) together with ~6 members of the Maine Entomological Society, will collect ants in plant communities above treeline at Baxter State Park using a combination of hand-collecting, sifting/sorting/drying of leaf litter, and attracting ants to baits (Pecan Sandies cookies). Ants will be collected into ethanol-filled vials; during the subsequent week's course at Eagle Hill (Steuben, ME), specimens will be dried, mounted, and identified. Identifications will be confirmed at the MCZ, and voucher specimens will be deposited at ELMF and MCZ. A summary report, including text, data, and metadata, will be filed with the State Park, and all data will be made publicly available through the Harvard Forest Data Archive (<http://harvardforest.fas.harvard.edu/data-archive>), in Dataset HF-147 (The Ants of New England).

Details

*Methods of collection* – Ants will be collected in plots of fixed size in different vegetation community types with a combination of hand-collection, litter sifting, and baiting. These three methods generally yield >90% of the local ant fauna in northeastern regions<sup>2</sup> and do not cause soil disturbance or unwanted by-catch associated with pitfall traps. Plot size will depend on area available within each plant community type, but will not exceed 50 × 50 m to minimize impacts on rare plants and rare plant communities (Ellison is also a knowledgeable botanist, and likely will be accompanied on the expedition by Elizabeth Farnsworth, Senior Research Ecologist at the New England Wild Flower Society). We will collect ants within the plot for 1 person-hour, yielding a quantitative measure of collecting effort (specimens per area-time); note that if six people are participating, we would spend only 10 minutes collecting in a given plot (6 people × 10 minutes each = 1 person-hour). During the collection period, we will visually search for individual ant nests, and collect not more than 3 workers from each nest we encounter. Nest locations will be photographed and logged with portable GPS units. After we complete our visual searching, we will set out baits (12-g of crumbled cookies on a white index card) and leave them for 30 minutes to attract ants. Workers found at baits will be collected. Finally, we will collect 1 L of leaf litter (if leaf litter is available in a plot; unlikely, for example, in a fellfield) into a ziploc bag. Litter will be returned to our basecamp, sifted, and then suspended in Winkler sacks to extract small, cryptic ants. Ants collected by all three methods will be stored in labeled vials filled with 95% Ethanol.

6. AREA(S) OF THE PARK FOR THE RESEARCH:

Based on consultation with Park Naturalist Jean Hoekwater, Maine State Entomologist Charlene Donahue, and Stefan Cover, Assistant Curator of ants at

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<sup>2</sup> Aaron M. Ellison, Sydne Record, Alex Arguello, and Nicholas J. Gotelli (2007) Rapid inventory of the ant assemblage in a temperate hardwood forest: species composition and sampling methods. *Environmental Entomology* 36: 766-775.

Harvard's Museum of Comparative Zoology, we propose to sample in the areas above treeline on Mount Katahdin and the peaks along the (North) Traveler Trail (North Traveler, The Traveler, Peak of the Ridges). If time and weather permits, we will also sample above treeline on North Brother. These extensive areas of arctic/alpine habitat are the most likely areas to yield ant taxa new to Maine and new to New England, and are areas of important management concern for Baxter Park. Collection and identification of new species for Maine or New England in these localities could be used to guide ongoing and planned management of these high-elevation areas.

7. **IMPACT ON THE PARK:**

Walking to and on sites and collecting ants are likely to cause minor disturbance to vegetation and soil surfaces. Wherever possible, we will establish temporary sample plots adjacent to established trails. Because we will not be using pitfall traps, we will not dig deeply into the soil. Similarly, without using pitfall traps, hand-collecting, baiting, and litter sampling also virtually eliminates by-catch of non-target species (i.e., anything other than ants). Our focus will be on ground-foraging ants and ants nesting under rocks or fallen wood. Any object moved during searching for ants will be replaced immediately. Plant-aware members of the research team (Ellison, Farnsworth) will ensure we avoid disturbance or damage to rare, threatened, or endangered plants.

8. **BUDGET:**

Lead researcher Ellison will provide all sampling equipment and supplies: ethanol-filled vials, GPS units, baits, sieves and Winkler sacks for litter collection; flagging, *etc.* Team members will be responsible for their own food and camping gear as needed. We are also able to cover any costs associated with park entry, park use, or camping/accommodations.

9. **TIMETABLE FOR RESEARCH AND COMPLETION OF APPLICATION:**

**Field work:** July 9 – 13, 2013

**Sorting and preliminary identification of specimens:** July 14-20, 2013

**Final identification of specimens, voucher preparation, and database creation:** July 20 – Dec. 1, 2013

**Delivery of final report and recommendations to Baxter Park authorities:**  
Dec. 31, 2013.

DATE: 15 November 2012