

Duke Forest Citizen Science Program

ENVIRON 245 Project Brief Fall 2017
Client: Sara Childs,
Director of Duke Forest

*Benchmarking for a Herpetofauna Citizen
Science Program in the Duke Forest*
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Background: Amphibians and reptiles, collectively known as *herpetofauna*, are increasingly important today considering their populations are key indicators of the effects of climate change on wildlife. By collecting data at identified sites over time, Duke Forest staff can learn more about the herpetofauna that currently exist and learn how to better manage the forest so that they thrive. Unfortunately, the Duke Forest staff is not large enough to collect the kind of comprehensive data necessary to make a difference.

This is where citizen science comes in! Generally, citizen science is research conducted by volunteers to gather information for a scientific database. Indeed, this project aims to harness the power of volunteers to create a useful set of data that Duke Forest can use to better manage and understand herpetofauna populations in the future. This citizen science program will train volunteers to monitor the numbers of amphibians and reptiles at specific sites in the forest.

Research Question: How can Duke Forest use current citizen science programs and volunteer input to design a feasible and useful herpetofauna-monitoring citizen science program?

Objectives:

- Use benchmarking research about other citizen science programs to help create a new program for Duke Forest
- Understand volunteer interests and capacities to determine the feasibility of a Duke Forest citizen science project



Marbled salamander found at
Duke Forest wildlife survey site.
Photo credits: Krista Stark

Approach

CONNECTION TO SUSTAINABILITY:

Environmental: By using citizen science data, researchers and land managers can better understand the status of herpetofauna in the Duke Forest, how human development and climate change affect them, and whether management interventions can be designed to bolster their populations.

Social: Duke Forest will consider volunteer interests when planning the program to make it a better experience. Also, citizen science is a way for people to get involved in the forest and become part of the scientific community.

Economic: Citizen science permits the collection of data on a wide scale through volunteer efforts, which makes the data collection economically feasible.

DATA & ANALYSIS:

Benchmarking Research

- **Purpose:** To provide baseline information about existing herpetofauna citizen science programs that Duke Forest can use to guide their program design
- **Process:** Data on eleven herpetofauna citizen science programs were collected from program websites to find information on training, data collection, data sharing, and volunteer relations.
- **Analysis Method:** The data were thematically coded into categories of training, data collection, sharing data, and volunteer relationships as well as subcategories based on previous research about the aspects that citizen science program designers should consider such as training format and data collection.

Survey on Volunteer Interests and Capacity:

- **Purpose:** to gauge if potential volunteers have interest in and time for a citizen science program
- **Process:** A 20 question Qualtrics survey with conditional logic was posted on the Duke Forest Facebook and sent to the existing volunteer base through the Duke Forest listserv.
- **Analysis Method:** Seventy-one respondents' results to the volunteer interest and capacity survey were analyzed using Excel functions. Averages of the data collected using sliding scales were calculated for reference. Much of the information was translated into graphs for the report so that it would be more accessible.

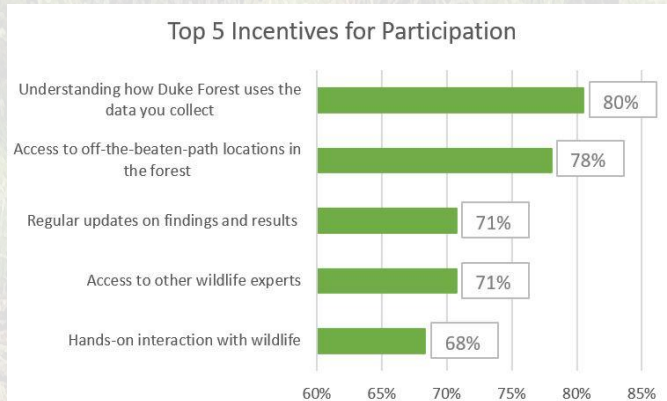
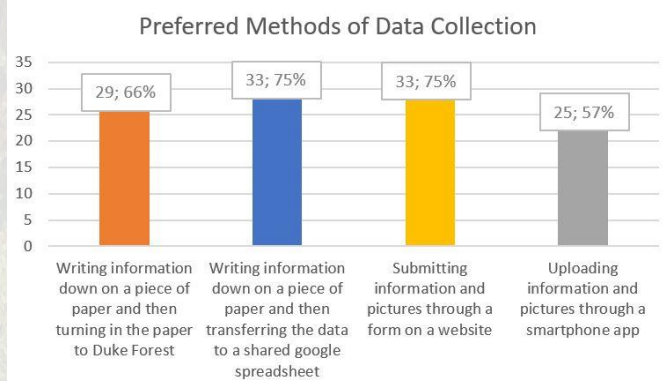
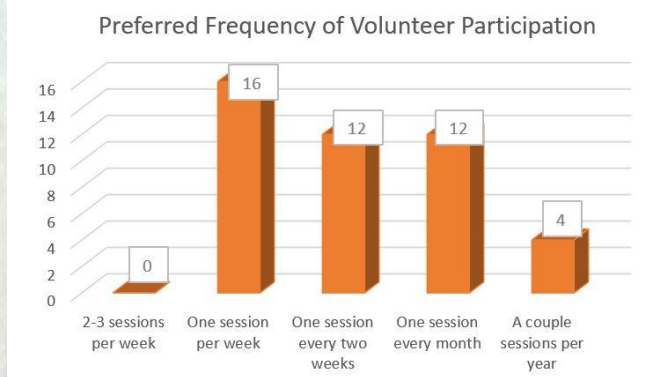
Interviews with Sara Childs and Nicolette Cagle:

- **Purpose:** to gain a professional perspective on the importance of data collection on herpetofauna in the Duke Forest as well as how this data collection process would work.
- **Process:** Sara Childs and Nicolette Cagle were asked a series of questions about the citizen science generally and also the proposed Duke program specifically.
- **Analysis Method:** The interviews were coded based on common themes such as understanding herpetofauna, lack of data on herpetofauna populations, and data collection details.

| Name | Date Conducted | Interviewers | Selected Quote: |
|-----------------|------------------|---|---|
| Sara Childs | November 7, 2017 | Krista Stark, Elizabeth Allen | "The more we understand about what amphibians and reptiles there are in the forest...the better able we are to design management practices that help promote and increase their populations." |
| Nicolette Cagle | October 7, 2017 | Elizabeth Allen, Andie Kolarova, Tatiana Tian | "Citizen science is valuable for a number of reasons. Scientifically, citizen science is allows us to collect data on a scale that we never could just in academia alone." |

Results

SELECTED SURVEY RESULTS



SELECTING BENCHMARKING RESULTS:

11 citizen science programs were benchmarked.

Training

Nine citizen science programs include specific online resources that volunteers can use to identify herpetofauna. These resources are in the form of searchable databases, species pictures, or species identification handouts.

Data Collection

Nine of the programs have information online specifying how volunteers should collect the data during the citizen science program in order to keep the results consistent and the data valid. Frequently, this information was listed as a step-by-step process with clear instructions.

To ensure quality data, five programs have specific data collection protocols that volunteers use. Six programs require images for species confirmation. One program has expert herpetologists review the species identification information before it becomes available.

There are options for data input to be online for ten programs, through an app for four programs, and on physical data sheets for four programs.

Five programs list that they want volunteers to work a certain amount within the peak months to ensure important data exists. One program wants results once every three months. Five programs have no explicit time frames and can be completed individually whenever desired.

Sharing Data

Five websites provide the information collected from the citizen science program with exact locations removed to protect species. One program lists all the data collected. Five programs only use the information internally and thus do not provide any information access.

Volunteer Relationships

These citizen science programs have various methods of sustaining volunteer interest. Seven at least have a Facebook page that posts program update, though some of these are organization-based and not program-based. Three specify that they have newsletters, and three have email lists that provide information about related projects.

Recommendations

Based on the survey results, benchmarking data, and interview information, these are recommendations for the Duke Forest Citizen Science program:

Training

- Create 2-3 hour training sessions or shorter sessions over multiple days.
- Provide safety instructions to ensure that both herpetofauna and volunteers are kept safe throughout the program.
- Provide both in-person species identification training and online resources (Example: <http://herpsofnc.org>) that participants can use later on to facilitate their data input.
 - Consider providing extra resources for volunteers to learn more in-depth about herpetofauna in the Duke Forest if they want to.
- Provide contact information for volunteers who have questions, concerns or comments about the program.

Data Collection

- Create a data input system that would enable a consistent data inflow.
- Provide online resources describing the step-by-step process of data collection to ensure the consistency and quality of data.
 - Consider creating a standardized data collection sheet or online form including specific questions (prompts such as weather conditions and transect site number) that need to be recorded during each volunteer session.
- Encourage volunteers to monitor sites between 1-4 times a month.
- Consider creating a hardcopy version of the species identification information with a dichotomous key so that volunteers can identify species easily while still in the forest.

Relationship with Volunteers

- Ensure that volunteers understand how the collected data is being used.
 - Stay in contact with volunteers through a monthly newsletter or email listserv
 - Post about this program on the Duke Forest social media.
- Make a specific page or section on the Duke Forest website for information on the citizen science program.
 - Ensure the website is easy to use so that essential information is accessible.

Acknowledgements:

We would like to thank:

- **Sara Childs**, Director of Duke Forest
- **Nicolette Cagle**, Lecturer in the Nicholas School of the Environment
- **Duke Forest volunteers** who participated in the survey
- **Charlotte Clark and Tavey Capps**, ENV 245 Instructors



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