COLORADO STATE UNIVERSITY
EXTENSION

NATIVE BEE WATCH EXTENSION INTERN
ARAPAHOE COUNTY

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PROJECT INTRODUCTION

Outreach and Education

Native Bee Watch (NBW), like other community science programs, primarily engages adult populations. I aim to increase the reach of NBW by developing interactive educational materials and age-appropriate curriculum to engage younger audiences with bees and pollinator conservation.

Data Collection and Research

The data collected during monitoring sessions by community scientists provides invaluable data on the location and distribution of wild bee populations. Submitting photos from monitoring sessions allows the NBW team to assess the efficacy of volunteer training to minimize misidentification of target morphospecies groups. The analysis of this data supports citizen-science efforts while also providing insights into volunteer participation, accuracy, and demographics.

INTERNSHIP GOALS

Outreach and Education

1. Develop hands-on, educational tabling materials to increase engagement with children and young adults.
2. Develop age-appropriate curriculum for children ages 4 to 12 focused on Colorado's wild bee populations and their conservation.

Data Collection and Research

1. Contribute observational data from monitoring sessions to build on long-term data.
2. Describe volunteer participation and demographics using data from training sessions and photo submissions.

HOW DOES THIS APPLY TO YOUR EDUCATION

Research

Applied data collection, data management and organization, descriptive statistics, and community-science methodology and practice.

Outreach and Education

Applied experiential learning principles to develop age-appropriate educational materials and curriculum for a diverse range of audiences.

WHAT YOU DID

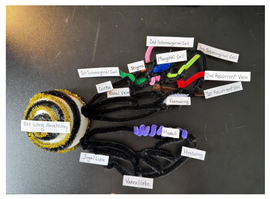
Outreach and Education

Interactive Learning Models

Pollen-Carrying Structures	Bee Wing Anatomy	Pollination Demonstration
Created 3D models of bees illustrating three major pollen-carrying structures: corbiculae, hind-leg scopa, and abdominal scopa.	Created an enlarged, color-coded bee wing highlighting key anatomical features.	Developed an interactive activity demonstrating how bees collect pollen and transfer pollen between flowers.

Figure 1. Interactive Learning Models






Experiential Learning Curriculum

Co-created lesson plans for two summer camps serving children ages 4 to 12. Topics included: (1) Bee anatomy, ecology, and life cycles, (2) Bee, fly, and wasp identification, (3) Challenges facing wild bee populations, (4) pollinator habitat and ecosystem function, and (5) Safe interactions with stinging insects.

Main Focus: Building confidence and knowledge through hands-on observation and exploration of the natural world.

Data Collection and Research

Field Monitoring

Participated in long-term monitoring of the CSU Trial Flower Garden and gained experience with:
(i) NBW monitoring protocols,
(ii) Plant identification,
(iii) Morphospecies identification, and
(iv) Field Observation and note-taking strategies



Volunteer Data Analysis

Analyzed 2023-2025 training and photo-submission data to examine: (i) Training and photo-submission participation, (ii) Years of participation in NBW, and (iii) volunteer demographics.






WHAT YOU LEARNED

Outreach and Education

Bees are an accessible form of wildlife for environmental education topics because they are visible, familiar, and readily found in both urban and rural environments.

Positive or negative experiences with bees shape how people interact with and perceive pollinators. Engaging people in observation and education can help promote further exploration of the natural world, as well as build interest in pollinator conservation.

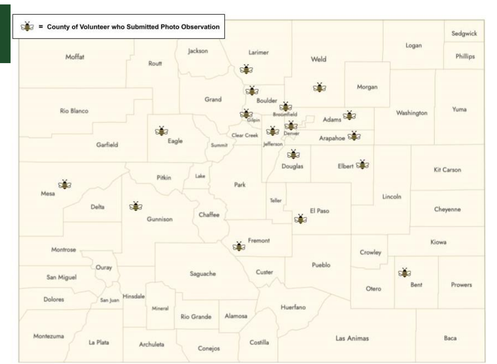
Data Collection and Research*

- Total of 691 unique individuals trained between 2023 and 2025
- 17 total Colorado counties represented
- 82 unique individuals submitted photo data
- 40.2% of individuals who submitted photo data hold Master Gardener status
- Volunteer Identification Accuracy to morphospecies: 88.97%
- Volunteer Identification Accuracy to taxa: 98.07%

* Results are from preliminary data analysis and have not been published or peer-reviewed

Table 1. Geographic Locations of Community Scientists

Top 10 Colorado Counties Represented:
1. Arapahoe (18 individuals, 22.2%)
2. Larimer (13 individuals, 16%)
3. Denver (9 individuals, 11.1%)
4. Douglas (6 individuals, 7.4%)
5. Jefferson (6 individuals, 7.4%)
6. Weld (6 individuals, 7.4%)
7. Mesa (5 individuals, 6.2%)
8. Boulder (4 individuals, 4.9%)
9. Adams (3 individuals, 3.7%)
10. Broomfield (3 individuals, 3.7%)



NEXT STEPS

Continuing Research on Bees and Human-Wildlife Conflict

Long-term Goal: Understand how attitudes towards stinging insects can be addressed to support both pollinator conservation and reduce human-wildlife conflict events.

Potential future directions for research include: (i) attitudes towards stinging insects, (ii) perceived risk and fear of stings and stinging insects, and (iii) how experiences with stinging insects influence conservation attitudes.