Community Engagement Fellows Program
Project Report, July 2016

Project title: The Pollinators of Whatcom County, a Citizen-Science Project

Background: Many of the foods we love and depend on are literally the fruits of the labor done by pollinators. But pollinators are in trouble the world over, and climate change is expected to hasten the decline of many of them. The United Nation's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released a report in 2014 that documented a decline in both wild and managed pollinators across the globe.

Climate change may produce a mismatch in the timing (phenology) of the bloom season and the lifecycle and migration patterns of some pollinators, which could doom the plant and/or the pollinator to extinction. Any attempt to protect these populations must begin with an understanding of the pollinators and their host plants in each specific ecosystem.

What are the main pollinators of crop and native plants in Whatcom County and the Pacific Northwest, and how are they faring as the effects of climate change manifest themselves? Nobody knows.

Objectives: The goal of this citizen-science project is to identify Whatcom County pollinators (mainly insects, but also birds and other animals); document the phenology of plant-pollinator interaction (which plant species is visited by which pollinator and when); identify any changes in the abundance of pollinators, and any changes in the pattern of plant-pollinator interaction over the years.

Methods: The project enlists research biologists, university and high school students and teachers, nature enthusiasts, gardeners, hikers, GIS experts, geographers, computer scientists, and all who care about the natural wealth of Whatcom County, to observe and record plant-pollinator interactions in the area. To begin with, we plan to track the phenology of plants and pollinators in the subalpine and alpine

meadows of Mt. Baker area (meadow monitoring) over a decade, starting in spring 2015.

The long term goals are to create a computer database of Whatcom County pollinators and their interactions with wild and cultivated plants. Volunteers will upload their observations (including photos) of plant-pollinator interactions (with or without a tentative ID), at the project website (hopefully hosted at WWU). Trained volunteers, mainly students, will curate the submissions, especially to confirm ID, and project participants will sort the data to (a) produce a catalog of Whatcom County pollinators, (b) identify plant species visited by each pollinator, (c) record the phenology of pollinator activity and bloom phenology of relevant plant species, (d) look for patterns of change in plant-pollinator interaction from year to year, especially as correlates of weather variables.

The data will be made available to the community and to researchers worldwide. If the project starts off well, funding will be sought from private as well as government sources, to recruit part-time or full-time professionals who can coordinate the project, do outreach, organize the database, lead the curation effort, and help disemmante what we learn from the project.

Outcomes so far:
An undergraduate student, Beth Skoff, prepared scanning electron (SEM) images of pollen collected by the meadow monitors from native subalpine and alpine species, with the objective of ultimately creating an online pollen atlas of species native to the Pacific Northwest. Entomologist Jim Davis and I also recorded light microscope images of more than 20 different alpine species.

During the 2015 field season, 12 researchers and members of the community (meadow monitors) set up 8 transects in subalpine and alpine meadows in the Mt. Baker area to record all plants (native or non-native), to quantify bloom production through the season, and to record pollinator visitation. In the current field season (spring to fall, 2016) 14 volunteers are participating in the project.

The six species of native bumblebees were the special focus. These species are: *Bombus melanopygus*, *B. flavifrons*, *B. sitkensis*, *B. vosnesenskii*, *B. occidentalis*, *and B. mixtus*. The first four species were

regularly observed. The western bumblebee (*B. occidentalis*) used to be the most common bumblebee in our area but has become rare in the last three decades. We were thrilled, therefore, to observe a specimen in the Huntoon Trail area of Mt. Baker just a few weeks ago (July, 2016). *B. mixtus* has always been rare in the study area we did not encounter this species. Many other types of pollinators, including honeybees, horse flies, hover flies, wasps, beetles, and butterflies were also observed on flowers in our study area.

The results from 2015 were very interesting, even though the season was dramatically accelerated and a warm spring was followed by a very dry summer because of one of the strongest El Nino on record. This year the spring thaw was delayed and a La Nina is developing, so comparing the phenology of the two years should yield fascinating insights. Some stories about the meadow monitoring program are currently hosted at this address: http://meadowstewards.blogspot.com/p/about-us.html.

The plan to house all the data at a dedicated website, hopefully hosted by WWU, is still being explored. Cost and the time needed to maintain the site and curate the data, especially over the long haul, are significant challenges.

I received many useful suggestions, and much inspiration, in my interactions with members of the CE Fellows program. The varied expertise (from GIS methodology to a deeper understanding of WWU administration) was especially useful in developing strategies for the next and biggest challenge, that of developing an interactive website focused on Whatcom County native plants and their pollinators.