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Level: Beginner

Introduction

This field guide is intended to be a tool for the identification and monitoring of floral visitors, in particular, native bees in the urban gardens and farms of the Puget Sound Region. The relatively compact size of the guide was purposeful in that we hope you take this guide with you into the garden when you are working, or on trips around the region. Before getting started with the pictures and identification, let's go over some basics about this field guide, and the proper way to assess bees.

How to Use the Guide

Bees and other floral visitors are notoriously difficult to identify in the field. Details on how best to observe floral visitors can be found at the front of the guide, while pictures and habitat information are sandwiched in the middle. The final section includes a data sheet and details for tracking your observations over time.

Please, read each section carefully.

Making Observations

When:

The best time to make observations of bees is at temperatures greater than 70° Fahrenheit, and wind speeds less than 5 mph. Bees will be harder to observe in windy conditions, and may not visit flowers when temperatures are too cool.

Where:

For the purpose of data collection, we ask that you only make observations of bees or other flower visitors on flowers in a garden. You may also see bees on leaves or on the ground. These bees may be resting, or looking for a place to nest.

How:

Bees and other floral visitors are easily disturbed. Avoid sudden movements, loud noises, or casting your shadow over them. Observe bees first, then less mobile flower visitors like beetles and bugs. Flies will often come back if disturbed, but other insects may not.

Classification

To simplify classification, we've created 5 groups of bees and 6 groups of floral visitors. Use these groups for your observations and notes. Example images of each group can be found in Section I. Only classify floral visitors to the level at which you are most confident.

Groups of Bees:

Honey bees (HB)

Bumble bees (BB)

Other large bees (OLB)

Green bees (GB)

Small bees (SB)

Groups of Other Floral Visitors:

Butterflies (BTF)

Wasps (W)

Bugs (BG)

Flies (F)

Beetles (BTL)

Spiders (S)

Recording Data

Data sheets are at the back of the guide.

We recommend photocopying the data sheets and replenishing these as you need more. *Before starting your observations, take note of the date, time, and location.*

Step 1:

Pick a spot in a garden where you can clearly see a plant and its flowers. Sit or stand stationary near this plant and record any floral visitors you may see. *If you observe the same plant or plants multiple times over a year, or over many years, this will give us the best information about what types of floral visitors are important for those plant groups.*

Step 2:

If the floral visitor is a bee, and you can confidently classify it, then note the bee group. *Make sure to use the pictures, habitat information, sizing guide, and other details in Section II, to substantiate your observations.*

Step 3:

If possible, photograph the floral visitor and plant. If your camera has a macro mode, use that setting. Otherwise, try to take pictures that are in focus. Bees will fly away if you get too close, so experiment with the distance that is appropriate. Every bee is a little different! When photographing the plant, take a picture of the flower, leaf, and where the leaf attaches to the stem. *Pictures are not necessary, but they help us to verify your observations.*

Step 4:

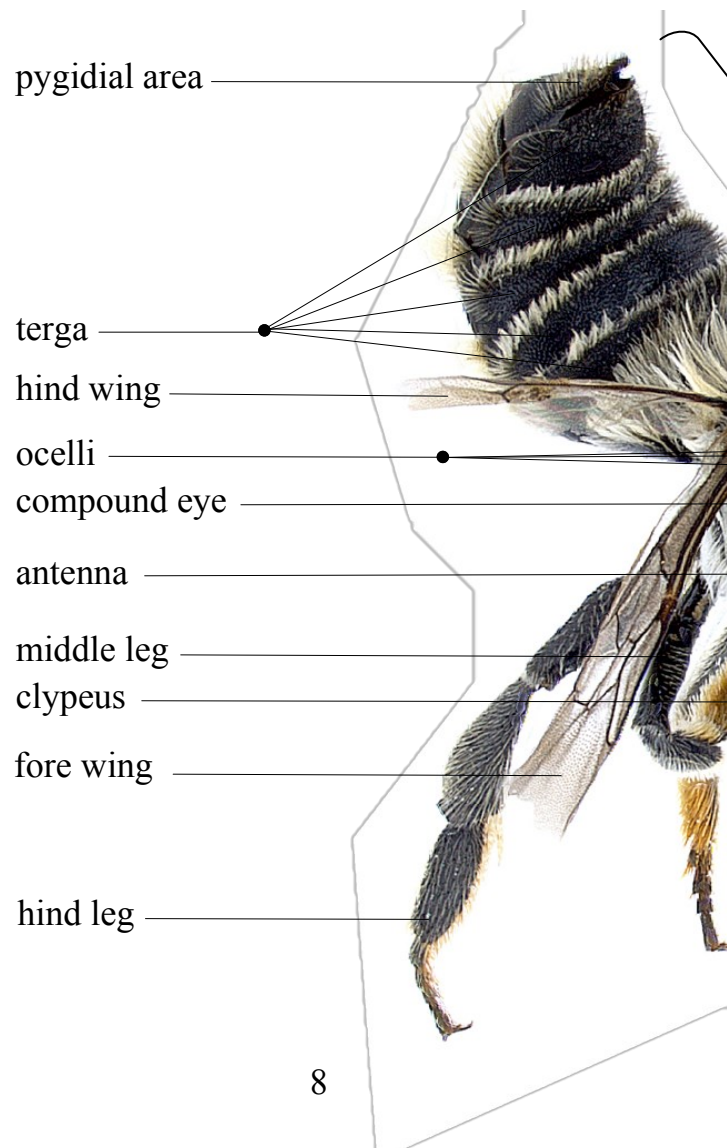
Add additional notes about the site, plant, and floral visitor. Your notes are very helpful in the monitoring process and will allow you to build a more complete data set.

Step 5:

Submit your observations, images, and notes about your garden to our website, and track your pollinators over time!

Parts of the Bee

Insects are generally broken down into three segments, the head, thorax, and abdomen. The head is home to sensory appendages including the eyes and antennae. The mouth of the insect is located on the head too. Almost all insects are bilaterally symmetrical, meaning they have the same appendages on both sides of the body. Bees have two sets of wings, a



Section I: Color Plates

In this guide, each bee group represents many different species. *The only exception to this is the honey bee.* We've included some of the most common bees for each group that you may see in this region. There are at least 20 different genera of bees in the South Puget Sound, and likely dozens of species. These plates are not intended to be a taxonomic identification guide, but rather a means to familiarize yourself with the native bees of our region. Common names are given, and Latin names are included to Genus or Species.

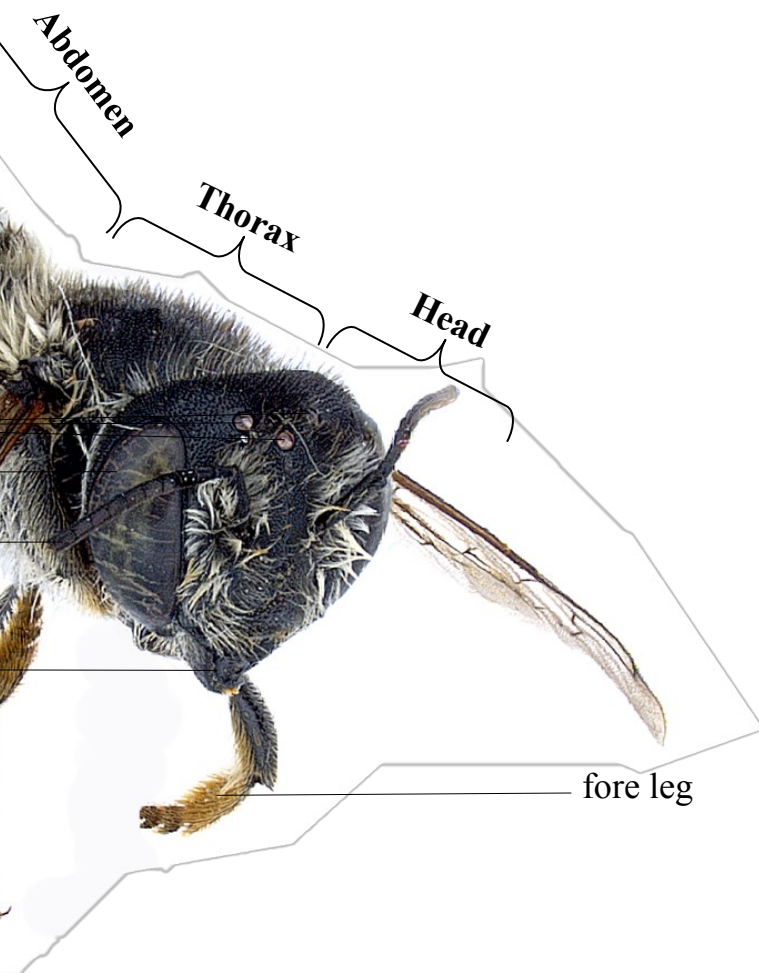
Key Characteristics:

Some images have arrows which point to key characteristics. Those characteristics are described below the picture.

Additional Information:

For additional information on each group, see the group description pages.

hind wing and fore wing, and three pairs of legs. The legs and wings are attached to the thorax which is the center of locomotion of insects. Bees may or may not have legs that are modified for carrying pollen. In honey bees, this is called the corbicula, or pollen basket. Additional markings or groups of hairs are often found on the abdomen of the insect. Many bees carry pollen on the underside of the abdomen instead of on the leg.



Honey bees (HB)



Common Name: honey bee

Family: Apidae

Genus: *Apis*

Species: *Apis mellifera*

Key Characteristic: flattened hind leg

Group Description: p. 24

Bumble bees cont. (BB)



Common Name: yellow bumble bee

Family: Apidae

Genus: *Bombus*

Species: *Bombus fervidus*

Key Characteristic: yellow body, single black band between wings

Group Description: p. 26

Bumble bees (BB)



Common Name: tricolored bumble bee

Family: Apidae

Genus: *Bombus*

Species: *Bombus mixtus*

Key Characteristic: three distinct colors, orange rear end

Group Description: p. 26



Common Name: yellow-faced bumble bee

Family: Apidae

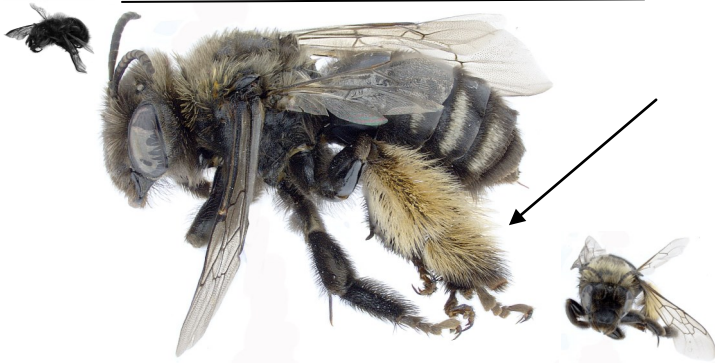
Genus: *Bombus*

Species: *Bombus vosnesenskii*

Key Characteristic: yellow face, mostly black body

Group Description: p. 26

Other large bees (OLB)



Common Name: long-horned bee

Family: Apidae

Genus: *Melissodes*

Key Characteristic: very hairy hind leg

Group Description: p. 28

Other large bees cont. (OLB)



Common Name: sand/mining bee

Family: Andrenidae

Genus: *Andrena*

Key Characteristic: non-descript black abdomen, sometime with lighter thorax

Group Description: p. 28



Common Name: digger bee

Family: Apidae

Genus: *Habropoda*

Key Characteristic: long antenna are common

Group Description: p. 28



Common Name: mason/leaf-cutter bee

Family: Megachilidae

Genus: *Osmia*

Key Characteristic: blue shiny body, hair on bottom of abdomen

Group Description: p. 28

Other large bees cont. (OLB)



Common Name: mason/leaf-cutter bee

Family: Megachilidae

Genus: *Anthidium*

Key Characteristic: thick hair on bottom of abdomen

Group Description: p. 28

Green bees cont. (GB)



Common Name: sweat bee

Family: Halictidae

Genus: *Lasioglossum*

Key Characteristic: bright blue/green body

Group Description: p. 30

Green bees (GB)



Common Name: sweat bee

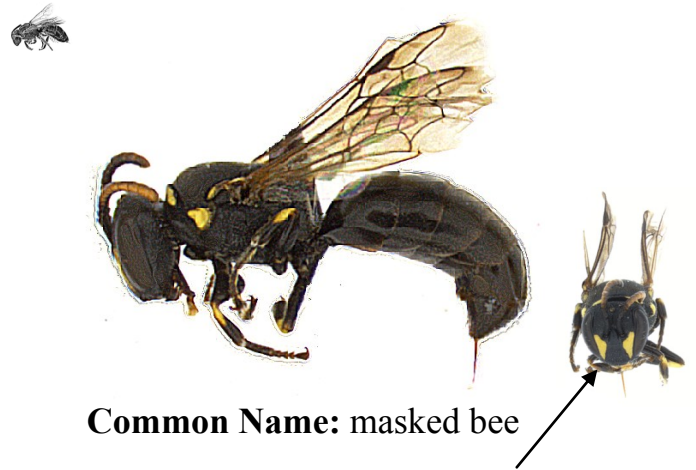
Family: Halictidae

Genus: *Agapostemon*

Key Characteristic: green to black head and thorax, green to black striped abdomen

Group Description: p. 30

Small bees (SB)



Common Name: masked bee

Family: Colletidae

Genus: *Hylaeus*

Key Characteristic: yellow markings on face

Group Description: p. 32

Small bees cont. (SB)



Common Name: sweat bee

Family: Halictidae

Genus: *Halictus*

Key Characteristic: hairy hind legs and striped abdomen

Group Description: p. 32

Small bees cont. (SB)



Common Name: sand/mining bee

Family: Andrenidae

Genus: *Panurginus*

Key Characteristic: non-descript black body

Group Description: p. 32



Common Name: cuckoo sweat bee

Family: Halictidae

Genus: *Sphecodes*

Key Characteristic: red abdomen, black head and thorax

Group Description: p. 32



Common Name: small carpenter bee

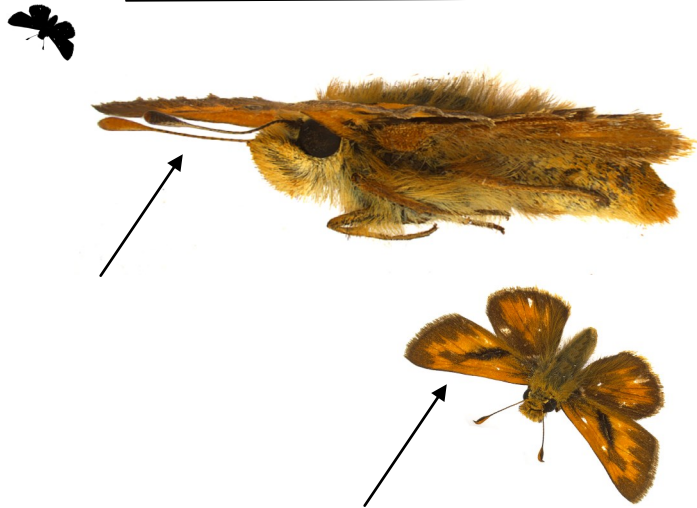
Family: Apidae

Genus: *Ceratina*

Key Characteristic: protrusion at end of abdomen

Group Description: p. 32

Butterflies (BTF)



Common Name: skipper butterfly

Family: Hesperidae

Key Characteristics: clubbed antennae,
scale covered wings

Flies (F)



Common Name: hover flies

Family: Syrphidae

Key Characteristics: one set of wings,
very large eyes

Wasps (W)



Common Name: common wasp

Family: Vespidae

Genus: *Vespula*

Species: *Vespula vulgaris*

Key Characteristic: obvious pinched
abdomen, aggressive looking

Bugs (BG)



Common Name: stink bugs

Family: Pentatomidae

Key Characteristics: triangular area be-
tween leathery wings

Beetles (BTL)

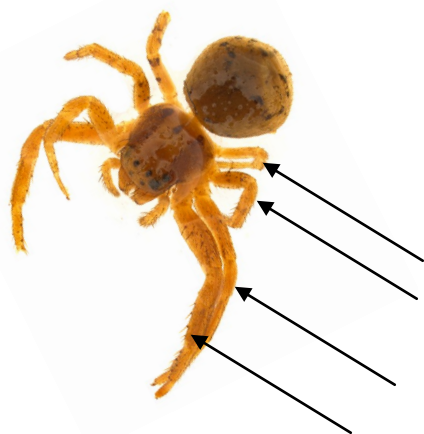


Common name: chafer beetle

Family: Scarabidae

Key Characteristics: hardened front wings, distinct mouthparts

Spiders (S)



Common Name: crab spider

Family: Thomisidae

Key Characteristics: four pairs of legs

Section II: Group Descriptions

Sizing and Shape Guide: Size and shape

are often useful tools to identify bees.

Each group description includes an sizing guide for your reference.

Sizes:

Large



Medium



Small



Shapes:

Narrow



Robust



Round



Seasonality and Range Maps:

In addition to size, all bees have a unique geographic distribution that changes over the course of

the season. Us-

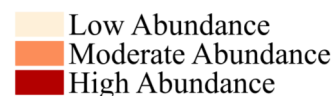
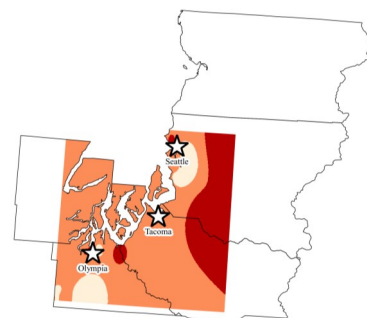
ing previously

collected data,

we were able

to prepare a bar

chart for each group, and generate a series



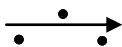
of maps that show the abundance of each bee group over the course of any given season. The charts and maps can be used as a reference.


Pollen Carrying Device:

Bees collect pollen as a food source. They inadvertently pollinate plants in the process. Pollen can be carried in two regions on bees, either on the legs, or belly.

Flight Pattern:

Bees and other insects can sometimes be identified by how they fly. You will notice that some bees are methodical, moving from one flower to the next and never going backwards. Other bees may be smooth fliers, lazily move between plants, or erratic, approaching a flower, then leaving and coming back.

Methodical: 

Smooth: 

Erratic: 

Honey bees (HB)



Group Description: Honey bees are medium to large in size, and usually range in color from orange to yellow. The honey bee has stripes on its abdomen, and the thorax is often fuzzy. Beware, there are many flies that mimic honey bees.

Shapes and Sizes: 

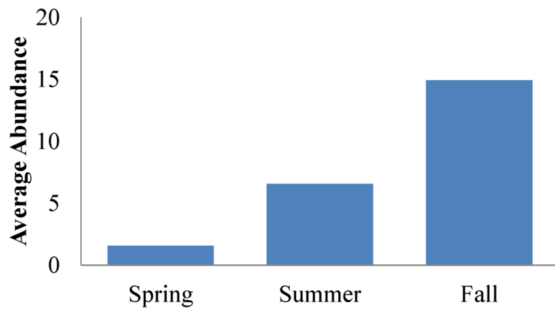
Pollen Carrying Device: Large flattened plates can be found on the hind legs for carrying pollen.

Plants Visited: Honey bees collect pollen from many different plant groups. Our research suggest that over a season, honey bees may visit upwards of 90 different plant groups. Some of the most frequently visited are smartweed, sunflower, white clover, squash, borage, tomatillo, oregano, cilantro, and sow thistle.

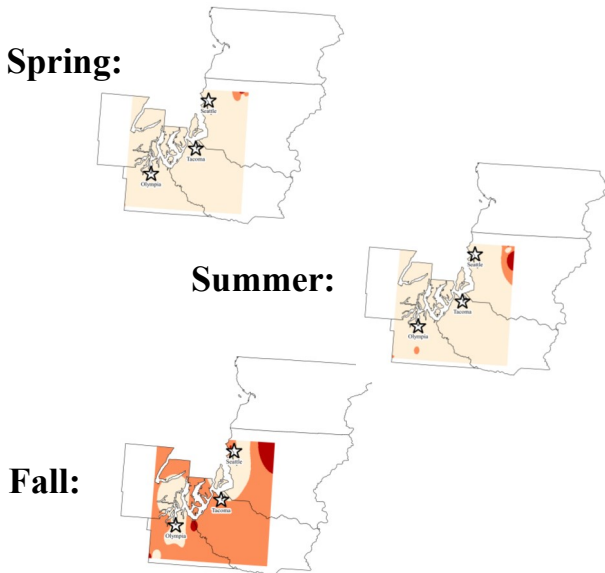
Flight Pattern: Methodical 

Seasonality: Honey bees are typically managed by humans and have year round

colonies. In the spring, these colonies begin quite small, and steadily build over the season. Honey bees may be most abundant in the fall.



Range: In the early part of the spring and summer seasons, honey bees may be localized mainly near areas of management. As the season progresses, we see that honey bees become much more ubiquitous throughout the landscape. In the fall, honey bees are highly abundant, particularly in rural areas.

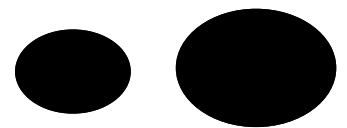


Bumble bees (BB)



Group Description: Bumble bees have bodies that are generally covered in thick fuzzy hair. This hair can be black, yellow, orange, or even white. Bumble bees are medium to large in size with a round or robust body shape.

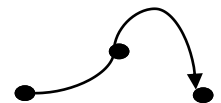
Shapes and Sizes:



Pollen Carrying Device: Like honey bees, bumble bees have a flattened plate on the hind leg for carrying pollen.

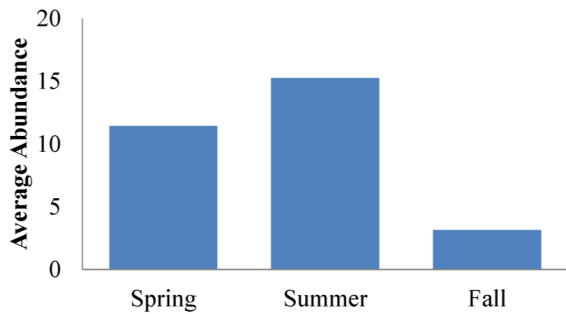
Plants Visited: Bumble bees can visit a wide range of garden plants. In our study, bumble bees visited approximately 75 different plant species. The most commonly visited plants were, lavender, tomato, phacelia, borage, comfrey, squash, tomatillo, flatweed, zinnia, pole bean, red cover, and sunflower.

Flight Pattern: Looping

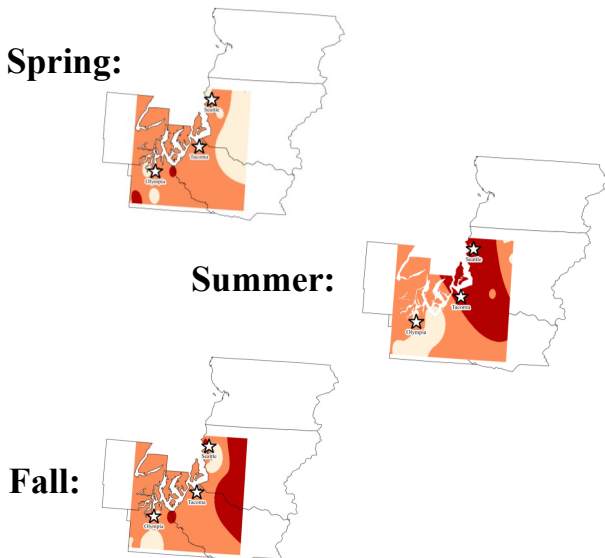


Seasonality: Bumble bee queens emerge in the spring of the year to begin foraging

and search for a new nest. These colonies can reach several hundred individuals by mid-summer. The colony will slowly dwindle as new queens are produced for the following year. By fall, only next year's queens will remain.



Range: Bumble bees are most abundant outside of urban areas in the early spring. By summer, this trend shifts and urban areas may have the most bumble bees. In the fall, the populations are more abundant in rural areas.



Other large bees (OLB)



Group Description: Other large bees (OLB) are a cosmopolitan group. For now, this group encompasses bees that are slightly smaller to slightly larger than the size of a honey bee. These bees can be in the families Apidae, Andrenidae, and Megachilidae. Body coloration will range from metallic blue to striped, or very dark in color. Some OLBs may have long antennae.

Shapes and Sizes:



Pollen Carrying Device: Other large bees may have hair on the underside of their abdomen for carrying pollen, while others may have very hairy hind legs.

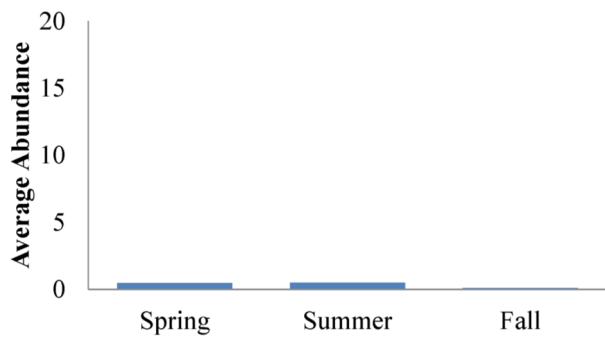
Plants Visited: Our data set is limited at this time., but the data does indicate that OLBs visit approximately 35 different plant groups. The most commonly visited were sunflower, calendula, cosmos, fringed quickweed, common oregano, cilantro, zinnia, and mayweed. Some

OLBs may visit early season fruit trees.

Flight Pattern: Smooth

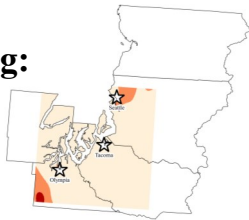


Seasonality: These bees are most common in the spring and summer, although, they may be much more rare than honey bees or bumble bees.

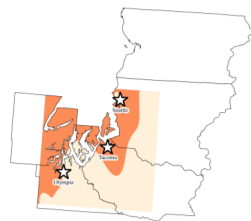


Range: Our data indicate that OLBs may be most abundant in urban areas during the summer months, while in the spring, some rural areas may have greater populations. By fall, these bees may not be widely found in the landscape.

Spring:



Summer:



Fall:



Green bees (GB)



Group Description: Green bees are narrow in shape and much smaller than a honey bee. These bees have a metallic green body, and sometimes a striped abdomen. Beware, some wasps can look like green bees.

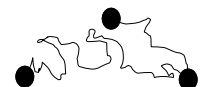
Shapes and Sizes:



Pollen Carrying Device: Look for hair and pollen on the hind legs. These bees will not carry large amounts of pollen on the bottom of their abdomen.

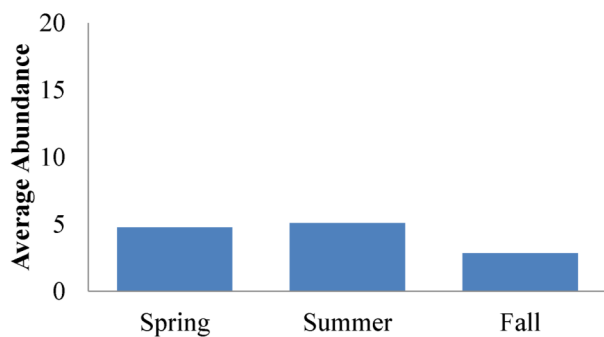
Plants Visited: Green bees may be much more selective in the plants they visit compared to any other group we have discussed thus far. Our results indicate that they may visit approximately 19 different plant groups, and may favor plants in the Asteraceae family. Examples of popular plants for green bees include cosmos, sunflower, and calendula.

Flight Pattern: Erratic

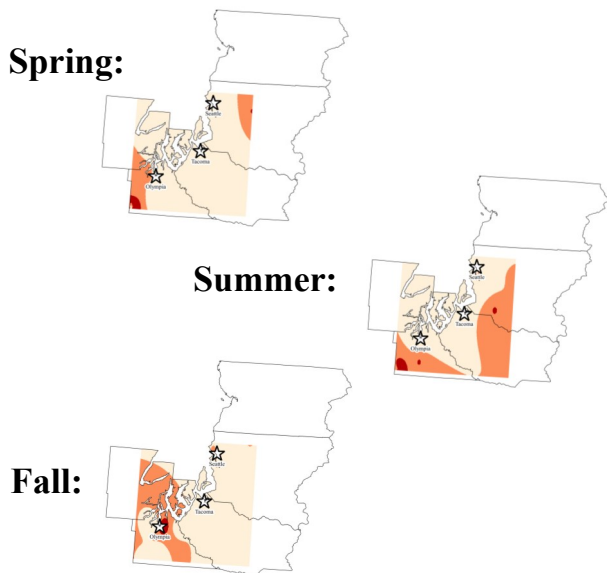


Seasonality: Green bees seem to be fair-


ly stable in their numbers throughout the season, although, they may be fewer in number than honey bees and bumble bees. These bees may also be more difficult to observe because of their erratic flight. Once you have a trained eye, you may begin to see them more often.



Range: In the spring and summer green bees appear to be most common in rural areas. Late in the season, this trend may shift and urban areas may see more green bees than the surrounding countryside.



Group Description: Small bees will typically appear to be black, but may have a black abdomen with white stripes. In some very rare cases, the abdomen of a very small bee will be red and hairless. These are the cuckoo bees. There are very tiny bees within this group that can be identified by a pointy abdomen.

Shapes and Sizes: 

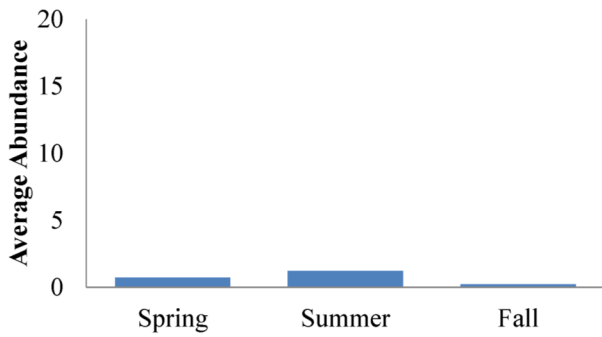
Pollen Carrying Device: Some bees within this group carry pollen on their hind legs. Cuckoo bees will not have a pollen carrying device at all.

Plants Visited: We've found small bees on approximately 41 plants in the South Puget Sound Region. These plants include flatweed, cilantro, buckwheat, calendula, borage, dill, sowthistle, fringed quickweed, smartweed, and many more.

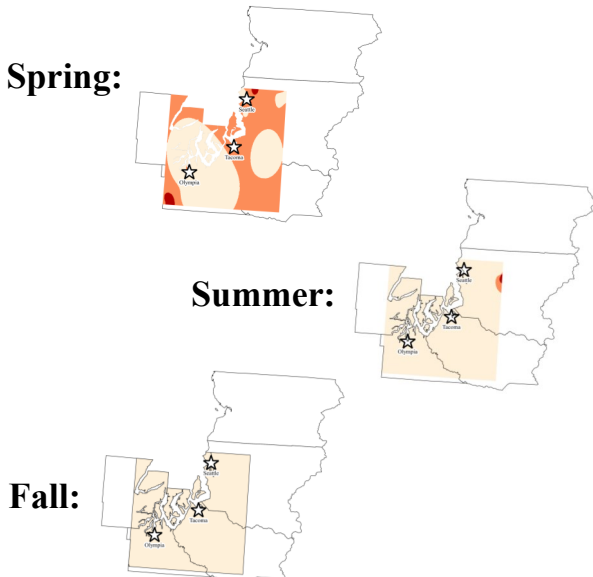
Flight Pattern: Erratic 












Seasonality: Small bees may be more commonly found in the spring and sum-

mer. These bees are difficult to observe because they move very quickly and fly in an erratic manner. Make sure to look closely at flowers when observing these bees, since they are quite small and easy to miss.



Range: In the spring, small bees appear to be most abundant in the Seattle Area, and rural areas south of Olympia. By summer and fall, small bees may be less abundant throughout the South Puget Sound Region.



Symbol	Category
	honey bee
	bumble bee
	Other large bees
	Green bees
	Small bees
	Butterfly
	Wasps
	Flies
	Bugs
	Beetles
	Spiders

2	B / W / F / BTF / BTL / BG	HB / BB / GB / OLB / SB
3	B / W / F / BTF / BTL / BG	HB / BB / GB / OLB / SB
4	B / W / F / BTF / BTL / BG	HB / BB / GB / OLB / SB
5	B / W / F / BTF / BTL / BG	HB / BB / GB / OLB / SB

Any other relevant information or observations:

Any comments or enquiries:

Please use one of the following options to enter your data:
 i) Enter directly onto the CSI: Bees! Website (www.nwpollinatorinitiative.org)
 ii) Enter by Post: Washington State University, ATTN: Elias Bloom, 166 FSHN PO Box 646382, Pullman, WA 99164-6382

Floral Visitor Code	Page Numbers	
HB	11, 24	Bee Groups
BB	11, 12, 26	
OLB	13, 14, 15, 28	
GB	15, 16, 30	
SB	17, 18, 32	
BTF	19	Other Floral Visitors
W	19	
F	20	
BG	20	
BTL	21	
S	21	



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Disclaimer: This material is based upon work supported by the National Science Foundation Graduate Research Fellow-

Date (eg. MM/DD/YY): _____/_____/_____
Duration of Observations: (eg. 4-4:30pm) _____

Your Name: _____ Email address: _____

Location of garden (GPS or street address): _____

Observation Number	Step 1	Step 2	Steps 3 and 4
	Floral Visitor Code	Bee Visitor Code	
Example	Bee=B Wasp=W Fly=F Butterfly=BTf Beetle=BTl Bug=BG Spider=Sp	Honey bee=HB Bumble bee=BB Other large bee=OLB Green bee=GB Small bee=SB	Photograph floral visitor and plant. Use the space below to describe the plant or insect.
1	B / W / F / BTf / BTl / BG	HB / BB / GB / OLB / SB	Bee was narrow, metallic, and collecting pollen from Cosmos in my garden.

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Elias H. Bloom is a Graduate Student of Entomology at Washington State University, Pullman, WA. He grew up in Nebraska where his family owns and operates a small-scale organic farm. Bloom taught Introduction to Horticulture, Plant Propagation, and Insect Identification at the University of Nebraska-Lincoln where he received his Bachelors of Science in Horticulture and Entomology. His current research at Washington State University seeks to evaluate the bee species of small, diverse, farms of western Washington, and develop techniques for augmenting habitat.

Thank You!