

Collating hand-netted wild bee survey data in the Oregon Coast Range to inform experimental landscape-scale floral enhancements



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Background

- The Pacific Northwest is home to over 500 bee species₁, including several bumble bees (*Bombus* spp.) that are proposed for federal ESA listing₂
- Forests managed for timber production may provide bee habitat in post-harvest patches₃ where annual forbs and flowering shrubs are dominant until canopy closure₄



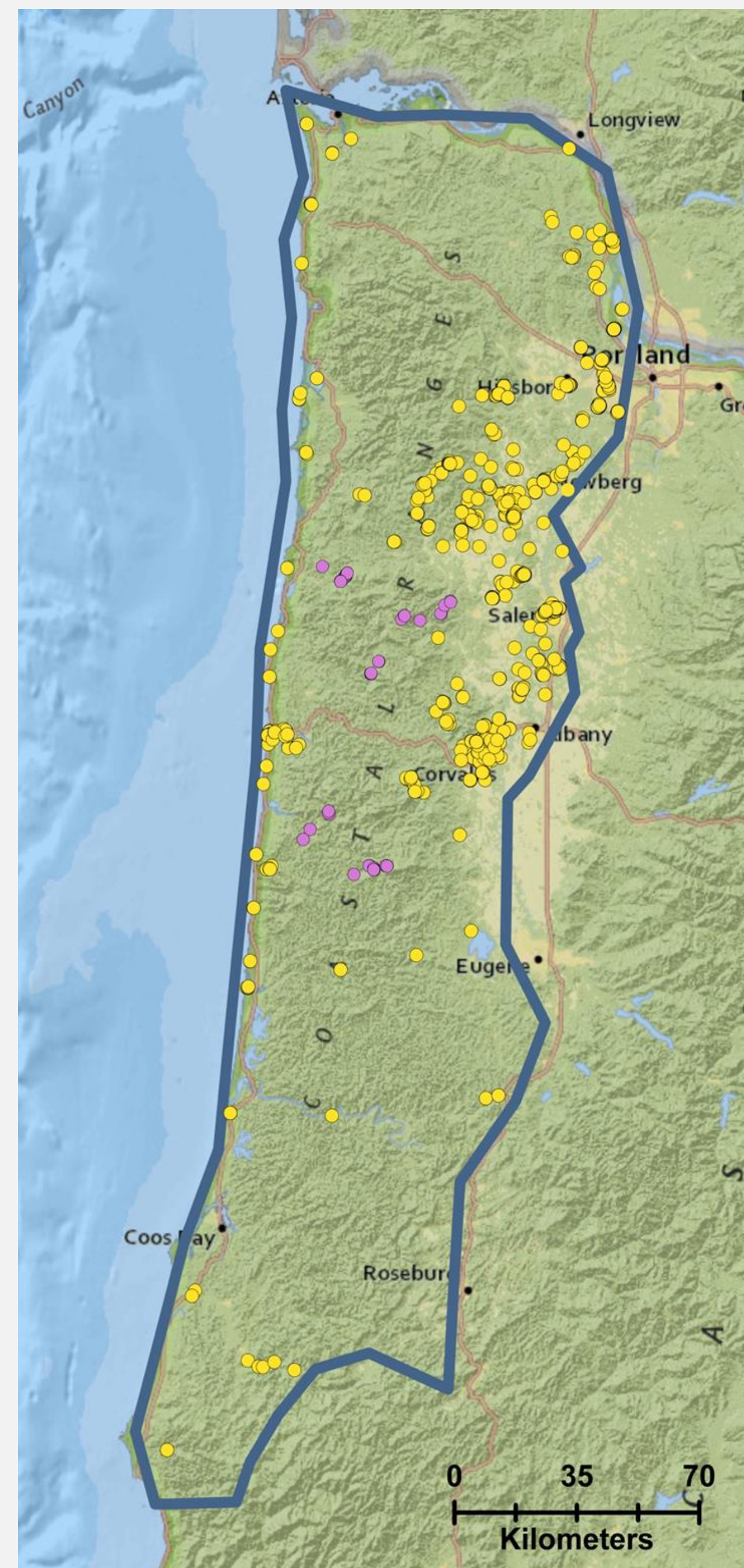
Bombus vosnesenskii



Ceratina acantha

- Bloom phenology is key to pollinator conservation - wild bee life stages are dependent on brief foraging periods (days to weeks) when resources must be available₅
- Planting or seeding native forbs and shrubs with phenology in mind may enhance pollinator diversity and abundance in regenerating forests₆

Data Sources



**Oregon Bee Atlas
2018 - 2019:**



Statewide survey project coordinating citizen science volunteers following a standardized collection protocol

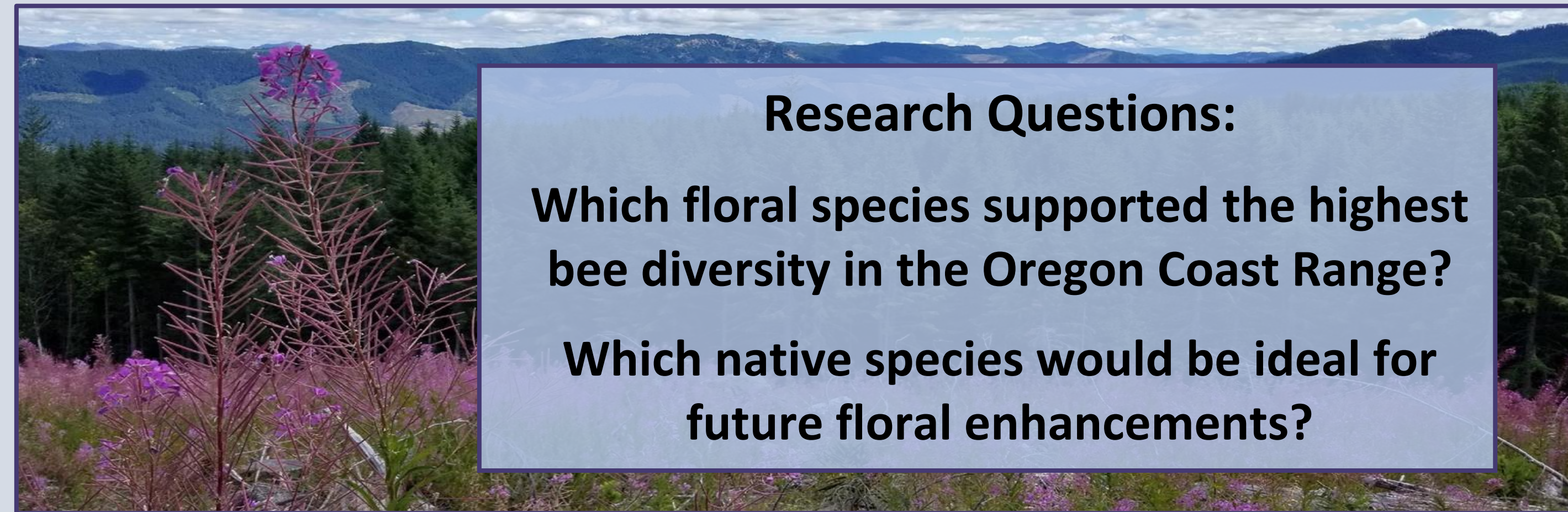
**NCASI Pollinator
Project 2020 - 2021:**



Research project surveying pollinator occurrence and preference (Oregon/California) using a Xerces Society standardized protocol in open/closed forest stands

Data

- We selected all records of hand-netted bees within the Coast range (+5km buffer)
- We selected bee records captured on an identified flower species
- We excluded managed, non-native pollinators (*Apis mellifera*)
- We compiled 7,456 records representing 165 bee species and 546 floral species



Phenology of the most common pollinator forage plants

Scientific name	Common name	March	April	May	June	July	August	September
<i>Heracleum maximum</i>	Cow parsnip			○	○	○	○	○
<i>Claytonia sibirica</i>	Miner's lettuce			○	○	○	○	○
<i>Eschscholzia californica</i>	California poppy			○	○	○	○	○
<i>Gaultheria shallon</i>	Salal			○	○	○	○	○
<i>Rhododendron macrophyllum</i>	Rhododendron			○	○	○	○	○
<i>Ceanothus thyrsiflorus</i>	Blueblossom ceanothus			○	○	○	○	○
<i>Iris tenax</i>	Oregon iris			○	○	○	○	○
<i>Sidalcea campestris</i>	Meadow checker-mallow			○	○	○	○	○
<i>Eriophyllum lanatum</i>	Oregon sunshine			○	○	○	○	○
<i>Potentilla gracilis</i>	Cinquefoil			○	○	○	○	○
<i>Gilia capitata</i>	Bluehead gilia			○	○	○	○	○
<i>Chamaenerion angustifolium</i>	Fireweed			○	○	○	○	○
<i>Prunella vulgaris</i>	Self-heal			○	○	○	○	○
<i>Spiraea douglasii</i>	Steeplebush			○	○	○	○	○
<i>Achillea millefolium</i>	Yarrow			○	○	○	○	○
<i>Symphoricarpos albus</i>	Snowberry			○	○	○	○	○
<i>Clarkia amoena</i>	Goatia			○	○	○	○	○
<i>Solidago canadensis</i>	Goldenrod			○	○	○	○	○
<i>Grindelia stricta</i>	Oregon gumweed			○	○	○	○	○
<i>Grindelia integrifolia</i>	Pudget Sound gumweed			○	○	○	○	○

Figure 1. The blooming periods of the native Coast Range forbs and shrubs with the most recorded pollinator interactions in our 2018-2020 data.

Networks of observed plant-pollinator interactions

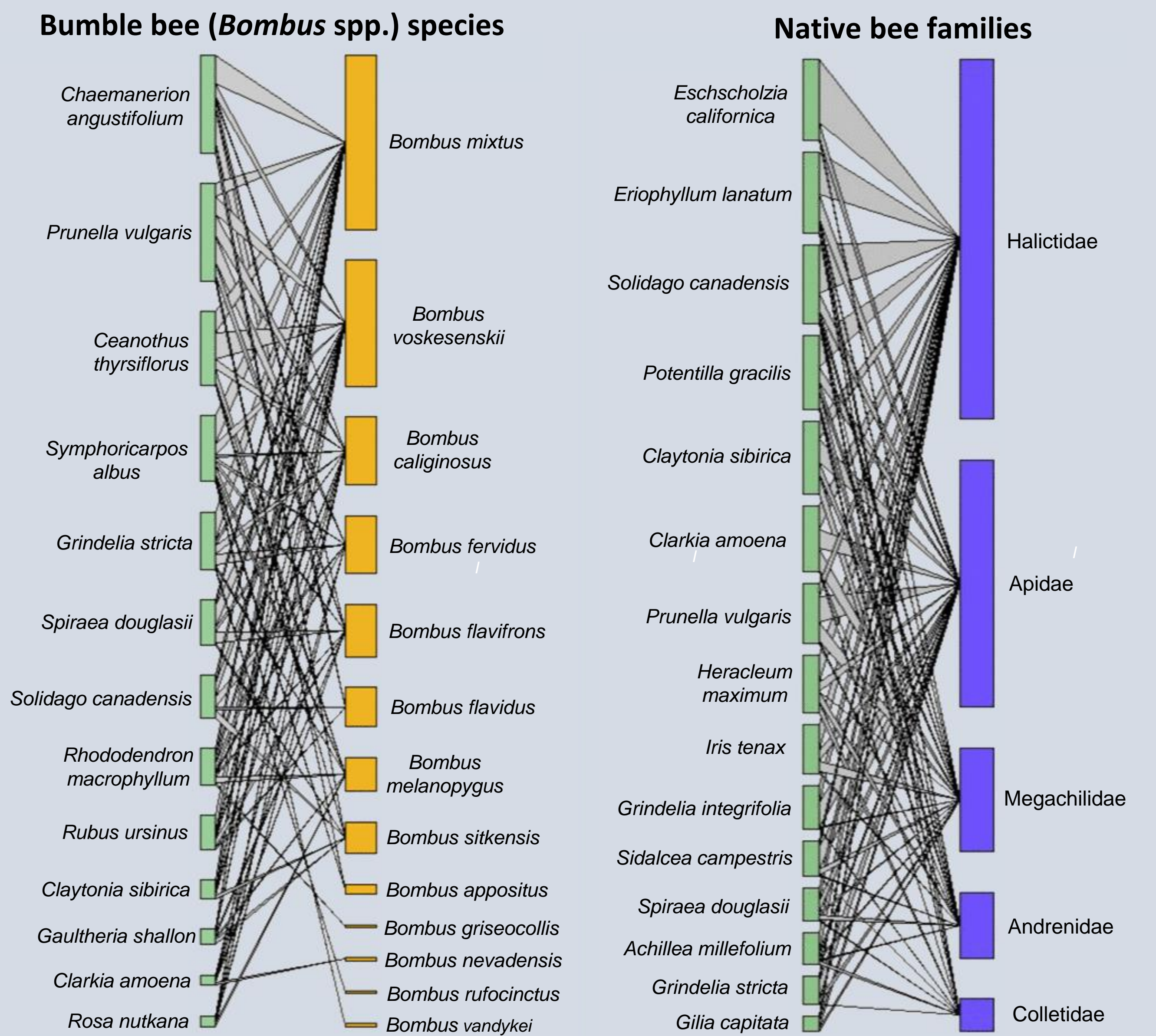


Figure 2. Plant-pollinator networks made from field observations of pollinators actively interacting with flowers (n = 921 and n = 1,486), with insect taxa on the right and native plant species on the left.

Forb species with the highest number of associated bee species

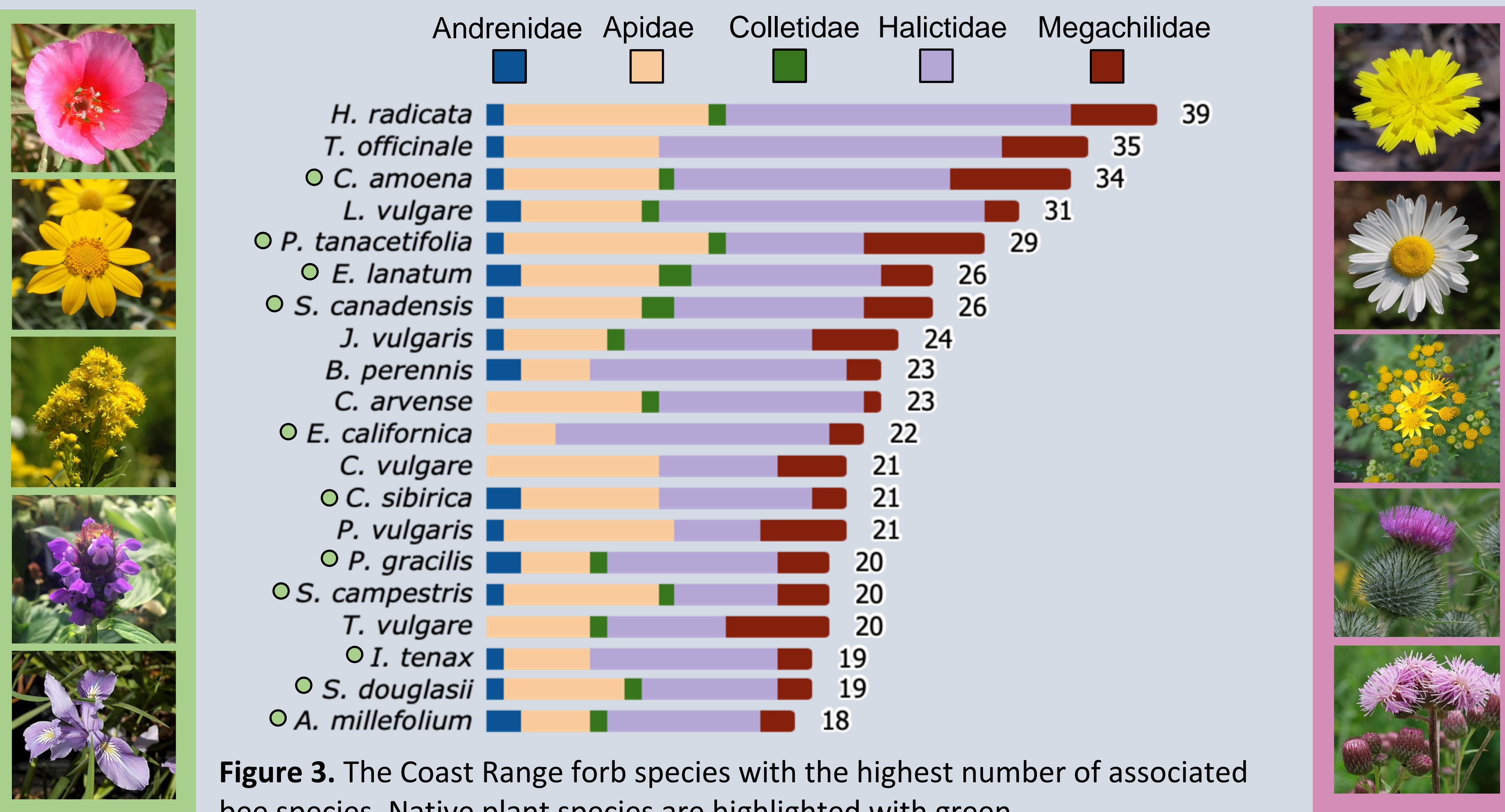


Figure 3. The Coast Range forb species with the highest number of associated bee species. Native plant species are highlighted with green.

Initial Observations

- Many bee species in the Coast Range appear to be foraging on nonnative flower species such as *H. radicata* (hairy cat's ear) and *T. officinale* (common dandelion)
- Early-season flowering species such as cow parsnip (*H. maximum*), California poppy (*E. californica*), and salal (*G. shallon*) may provide crucial resources for emerging queens and workers

Next Steps

- Further examine the preference for native vs non-native plants according to floral availability on the landscape
- Expand species interaction data through DNA analysis of pollen loads to create networks with 1.5-2 times more plant species than field observation networks₇
- Reference expanded plant-pollinator networks to select native plant species for restoration efforts in the Siuslaw National Forest starting in 2022

Acknowledgments

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Literature Cited

¹Buhl, ²US Fish and Wildlife Service, ³Korpela 2014, ⁴Mathis et al 2020, ⁵Mola and Williams 2018, ⁶Lee et al 2021, ⁷Artingstall 2020