Floral Associations documented in the:

CALIFORNIA
BUMBLE BEE ATLAS

Dylan Winkler
Wildlife Diversity Program
California Department of Fish and Wildlife

XERCES SOCIETY
for Invertebrate Conservation

CALIFORNIA
DEPARTMENT OF
FISH & WILDLIFE

Overview

1. Importance of Native Bees
2. Bumble Bees (*Bombus*)
3. Community Science & the Atlas
4. Rare Plants and Bees
5. Join the Project!

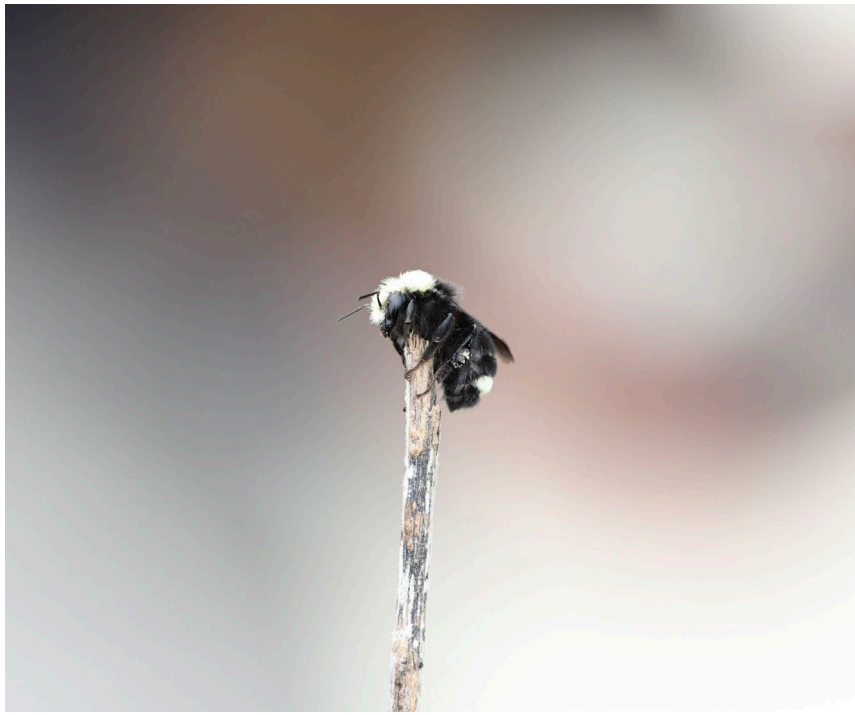


Photo: Patricia Simpson

Acknowledgements

CALIFORNIA BUMBLE BEE ATLAS

Thank you to the volunteers!

Thanks Leif Richardson, Hillary Sardiñas, Rich Hatfield

Thank you to the Bees

Photos: Leif Richardson

Hillary Sardiñas

Rich Hatfield

Funding and Support

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

WILDLIFE & SPORT FISH RESTORATION

Project Leads

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

XERCES SOCIETY for Invertebrate Conservation

Importance of Native Bees as Pollinators

- 87% of flowering plants are pollinated by animals
  - Ollerton et al. 2011
- Wild bees are vital to wild and crop plant pollination
  - Garibaldi et al. 2013

Photo: Dylan Winkler

Why are bees so important for pollination?

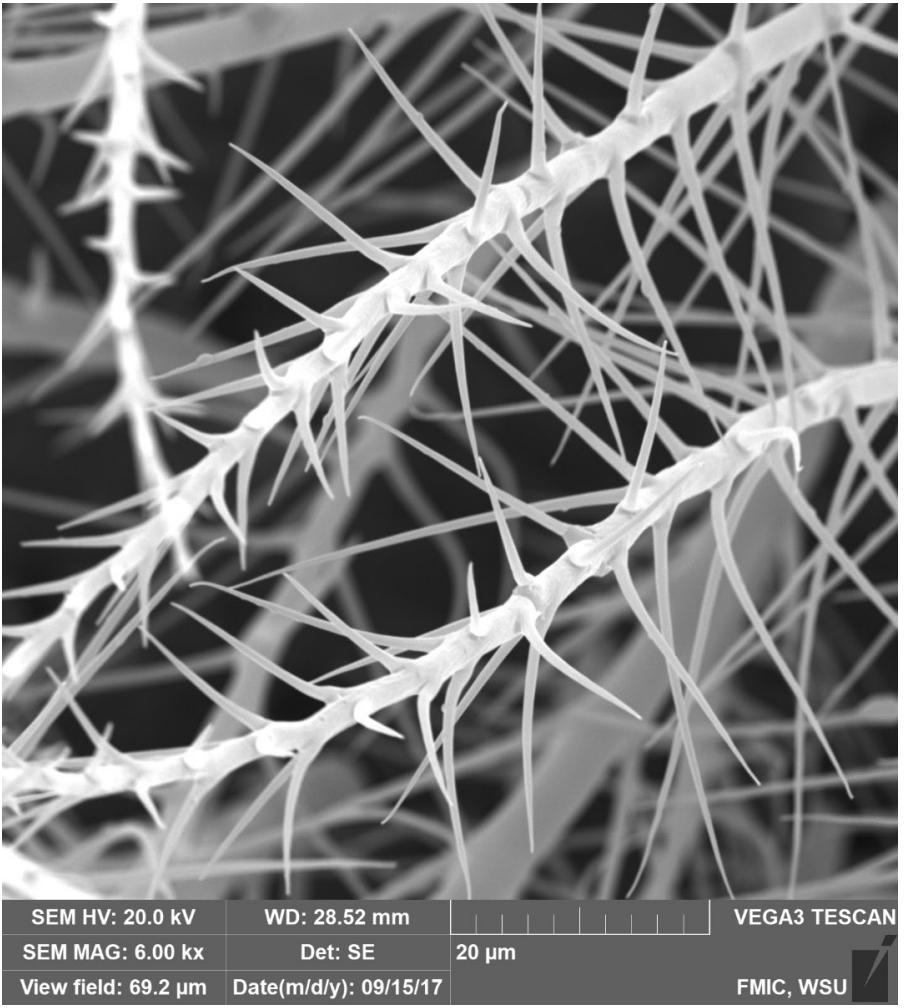


Image: Megan Asche, macronature.com

- Scopa – bristles of hair to carry pollen
- Bees eat Pollen

Photo: Rollin Coville, Pennsylvania Native Bee Survey

Why study Bumble Bees?

Photo: Mace Vaughn

Photo: Xerces Society

20,000+ global Bee Species

~1% are Bumble bees

Photo: John D Reynolds

Illustration from: When did Bumblebees reach South America? - Williams et al. 2022

Bumble Bees are:

Abundant

Widespread

Charismatic

Bumble Bees are: **Social***

- Annual Colonies
- Nests of 50-200+
- Queens, Workers, Males
- Foraging multiple months of the year

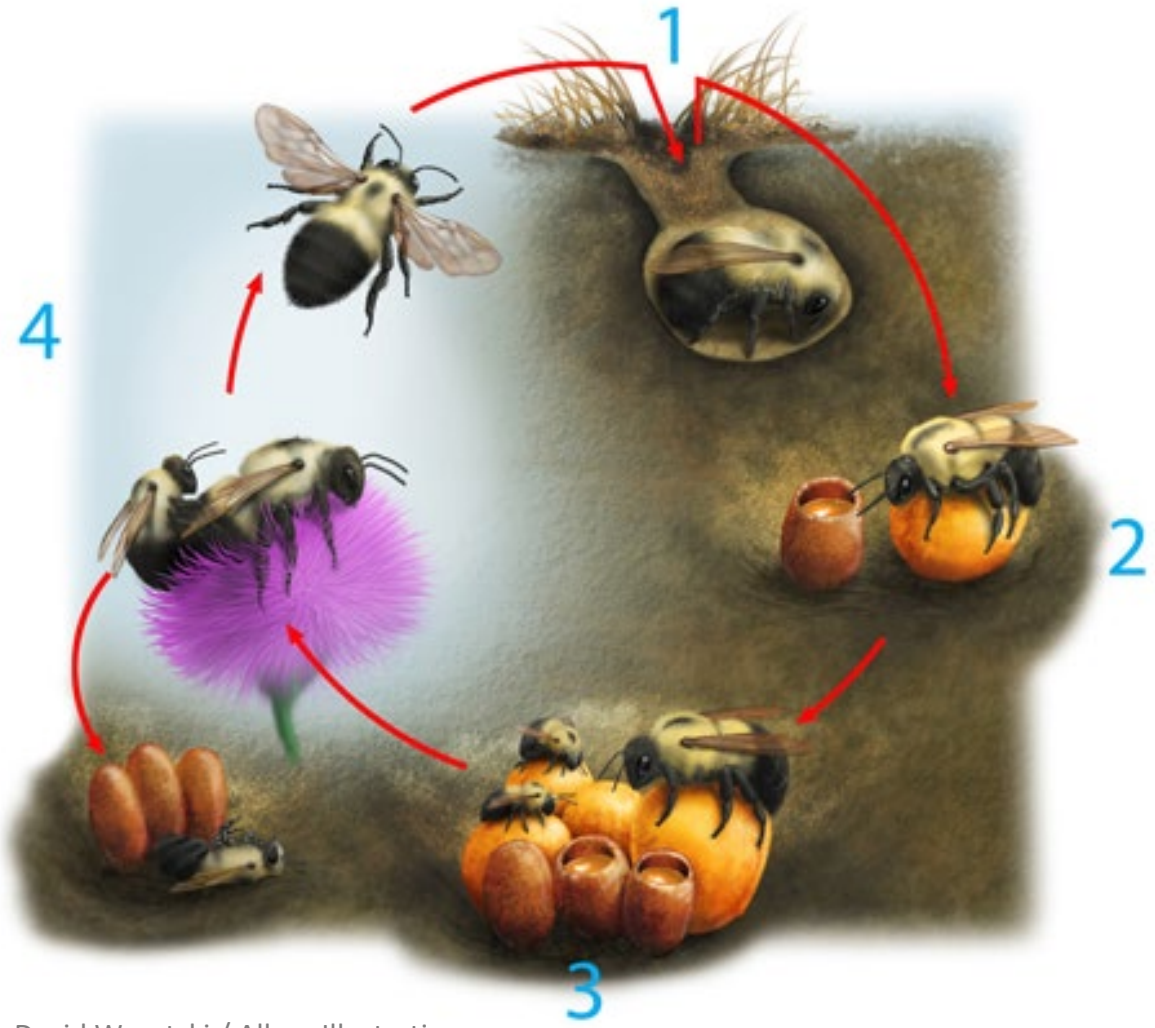
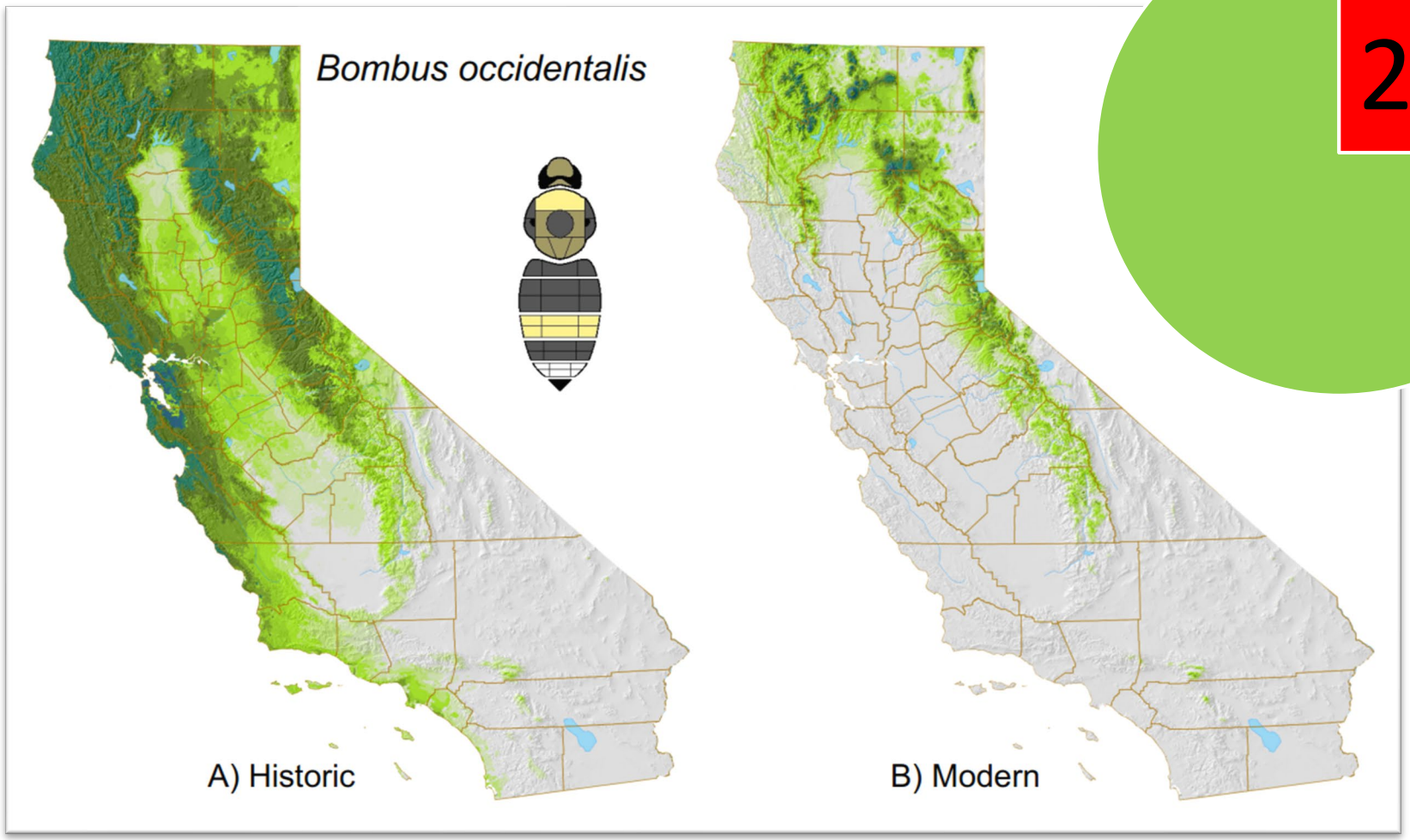


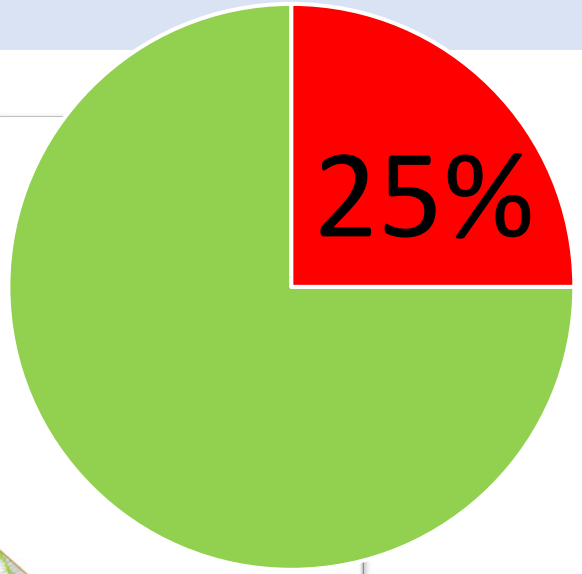
Image: David Wysotski / Allure Illustration

Bumble Bees are: **Generalists***

- Buzz-pollinating

Bumble Bees are: **Declining**





- of bumble bees in North America are threatened or declining
  - Cameron & Sadd 2022

Why Community Science?

- We want to learn more about Bumble Bees across the whole state
- California is too big!
- We need volunteers to help us survey

CALIFORNIA
BUMBLE BEE ATLAS

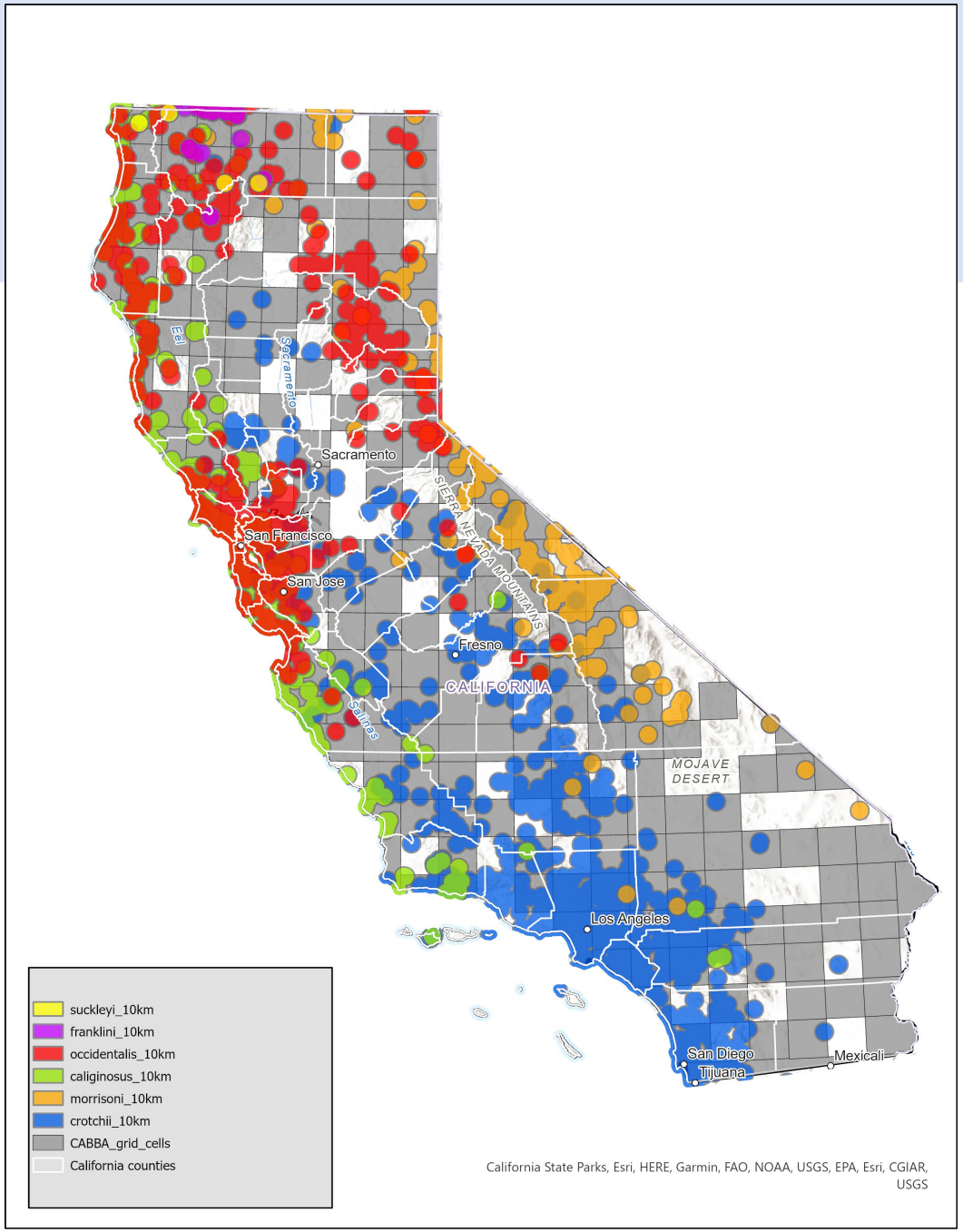
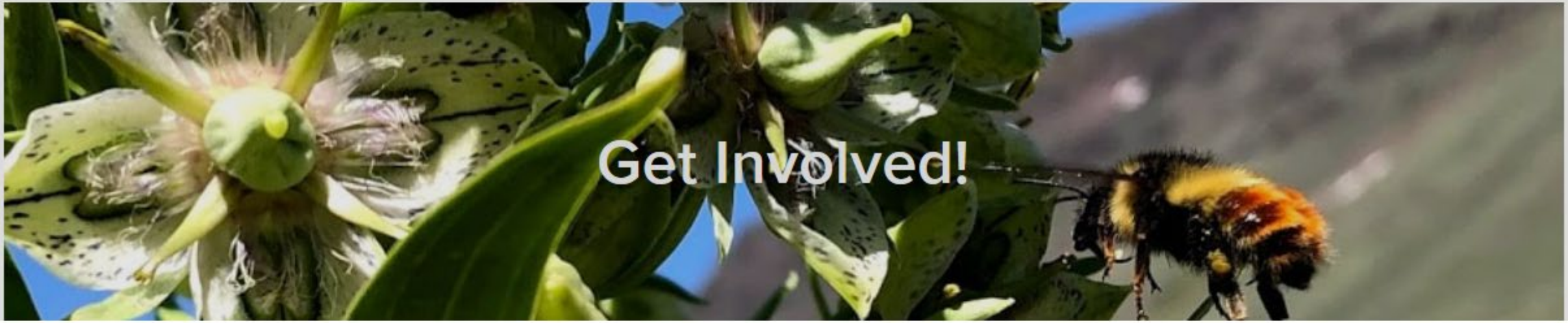


Figure: Leif Richardson

California Bumble Bee Atlas

Sign up! About Events Get Involved Submit Data Resources Permitting



What?

The California Bumble Bee Atlas is a collaborative project to track and conserve the bumble bees of California. The project joins similar inventory efforts in Oregon, Washington, and Idaho, collectively, the Western States Bumble Bee Atlas. Our goal is to gain a better understanding of the distribution of bumble bees throughout

- https://www.cabumblebeeatlas.org/

Atlas Highlights so far!

3 Years

>342

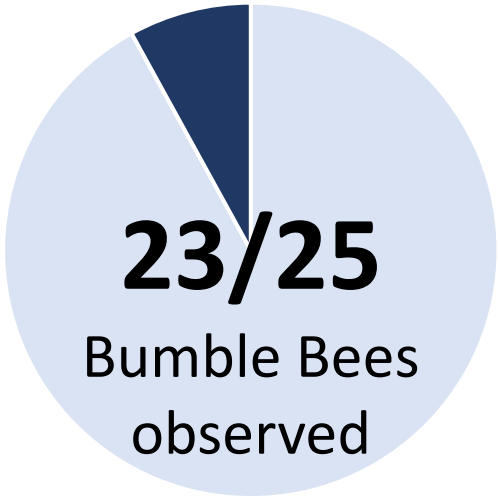
Forage plant genera

>18000

individual bee records

>1000

volunteers trained



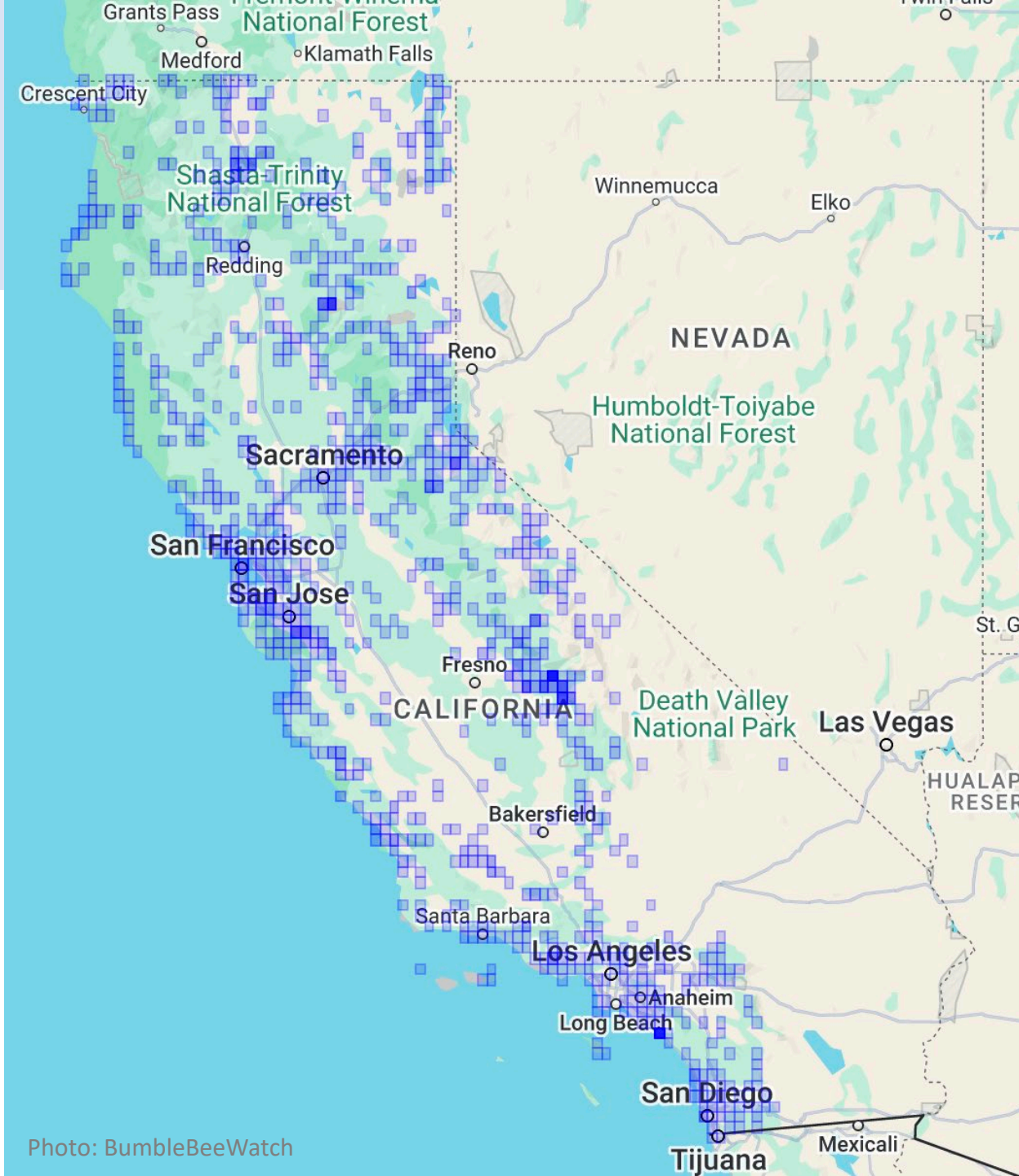
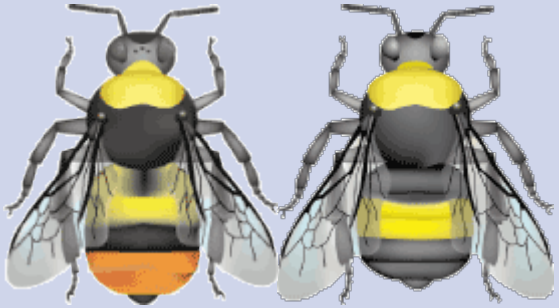


Photo: BumbleBeeWatch

Bombus franklini	*Bombus occidentalis*	*Bombus caliginosus*
		
Bombus suckleyi	***Bombus crotchii***	***Bombus morrisoni***
		

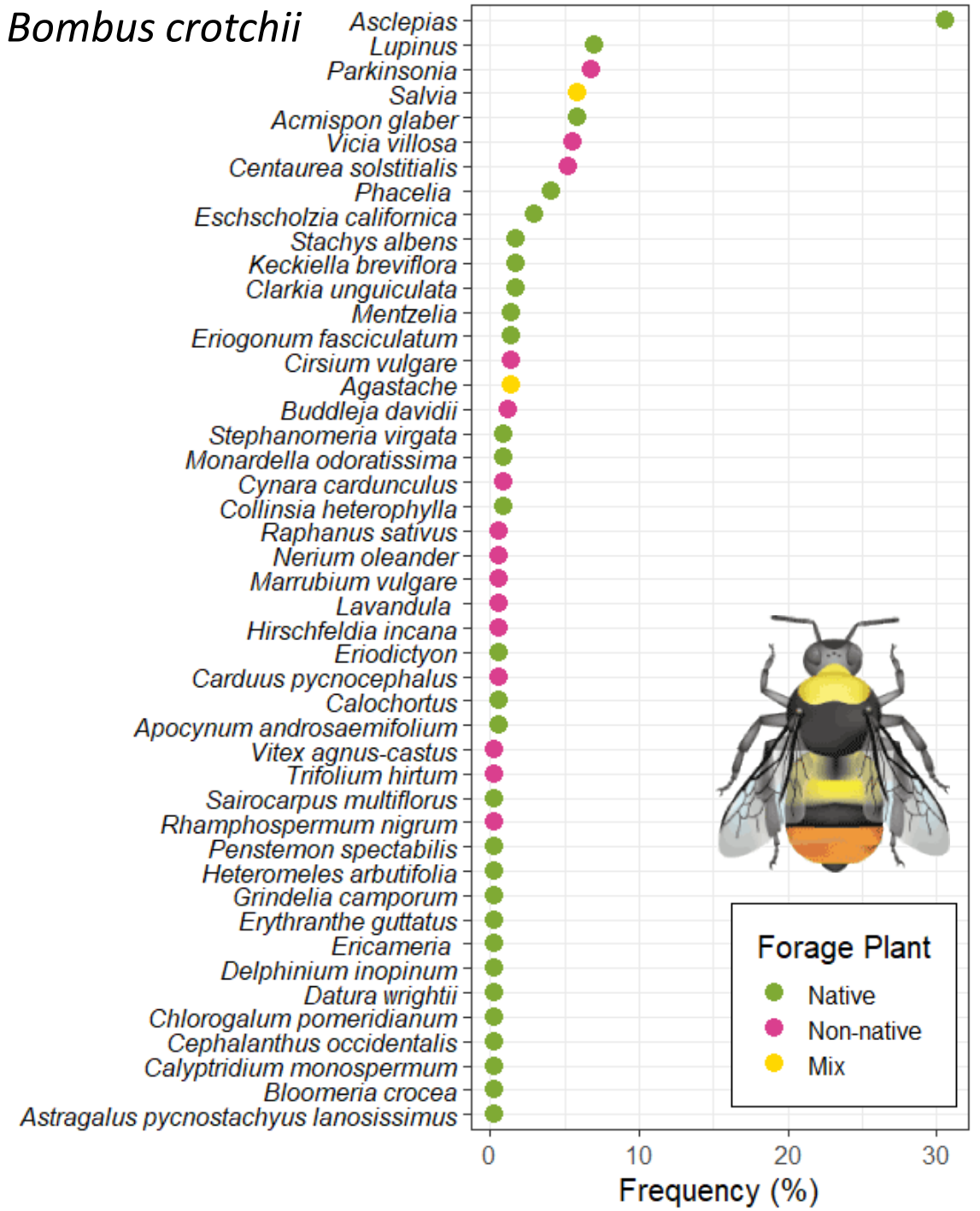
Bumble bee illustrations: Paul Williams (identification and color patterns) and Elaine Evans (bee body design).

Rare Plants

Ceanothus ferrisiae	*Chorizanthe cuspidata var. villosa*	*Astragalus pycnostachyus var. lanosissimus*
		

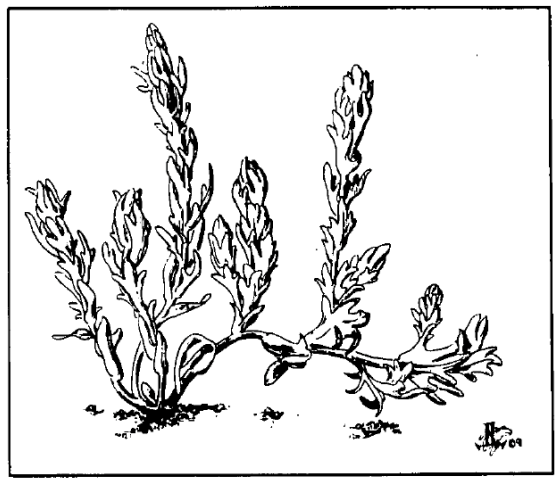
Photos from Bumble Bee Watch: Steve Rottenborn, LJ Moore-McClelland, Josie Lesage.

	CA Coastal Sage	Cascades	C. Basin&Range	Central Valley	Coast Range	E. Cascades	Klamath	N. Basin&Range	Sierra Nevada	S. Pine-Oak Mountains	No. Ecoregions
Lupinus	4			3	3		3		2		5
Cirsium					1	1	1	1			4
Phacelia			1			4			3		3
Vicia	2			2	4						3
Monardella		1							1		2
Salvia	1			1							2
Acmispon	3									2	2
Penstemon									5	1	2
Eriogonum		3							4		2
Sidalcea		2	5								2
Solidago		4				5					2
Stachys		5								5	2
Allium								2			1
Arnica			2								1
Aster							2				1
Ericameria						2					1
Rubus					2						1
Eriodictyon										3	1
Melilotus						3					1
Mertensia								3			1
Trifolium			3								1
Asclepias				4							1
Delphinium								4			1
Perideridia							4				1
Turricula										4	1
Wyethia			4								1
Castilleja								5			1
Centaurea				5							1
Eschscholzia	5										1
Hastingsia							5				1
Hypochaeris					5						1



Chloropyron

Conservation of the palmate-bracted bird's beak, *Cordylanthus palmatus*



Center for Conservation Biology
Department of Biological Sciences
Stanford University
Stanford, CA 94305-5020

Bird's beak requires the bees for pollination and the bees benefit from bird's beak as a food source" – Grewell 2005

Quote: Olson, J. J. (2012). A Conceptual Restoration Plan and Tidal Hydrology Assessment for Reconnecting Spring Branch Creek to Suisun Marsh, Solano County, California.

Rare plants and bees need each other

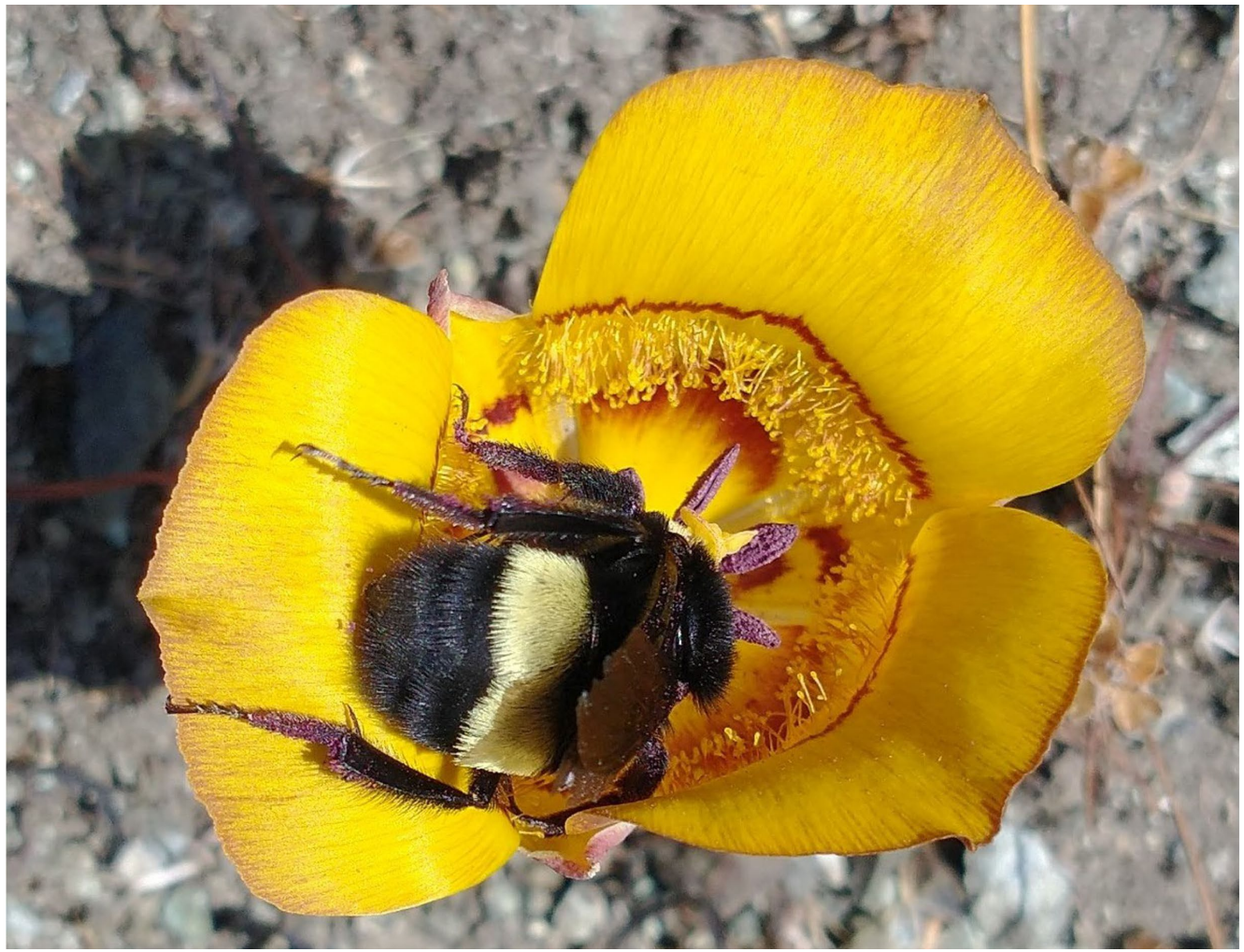


Photo from Bumble Bee Watch: Sara Snyder.

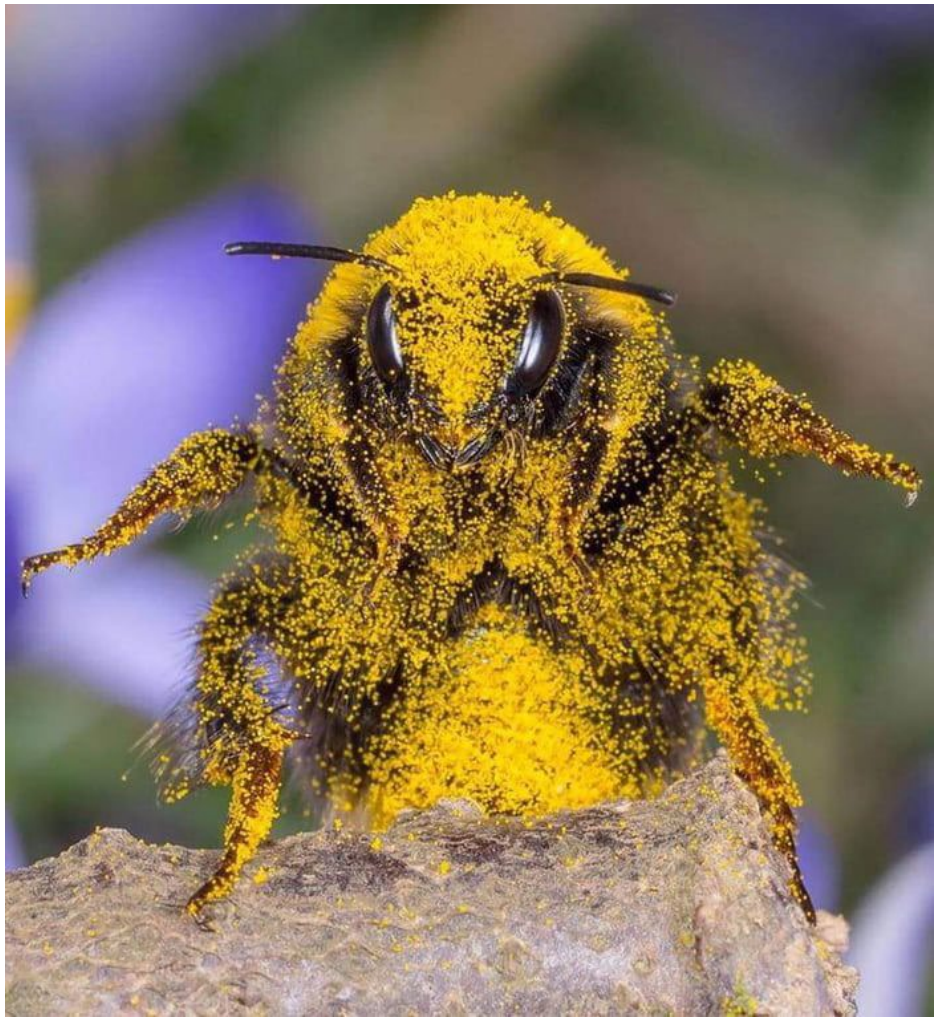
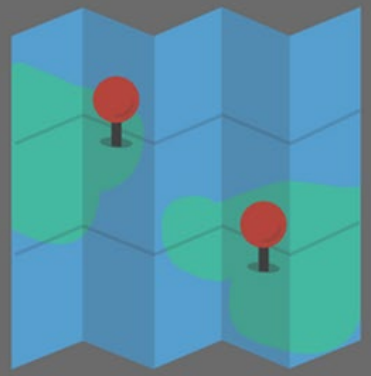


Photo: Kutub Uddin, West Sussex.

How to Participate

1: Adopt a Grid Cell

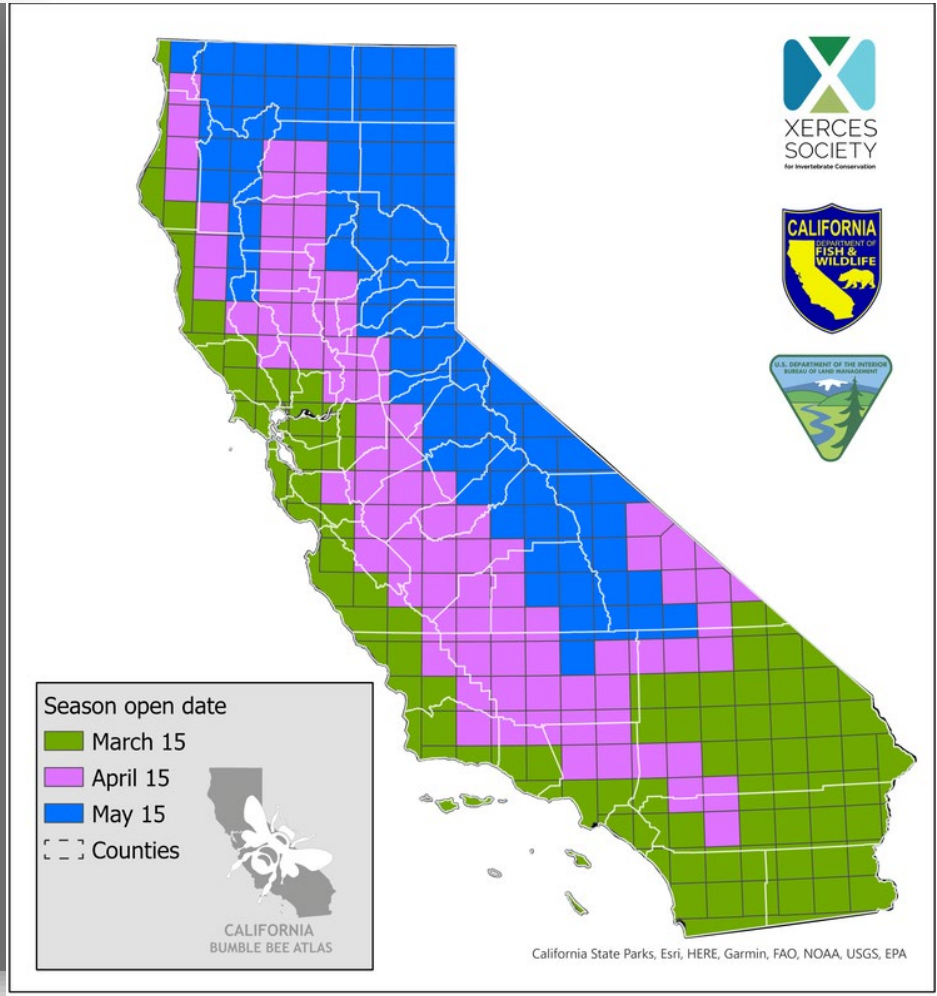


2: Survey for bumble bees

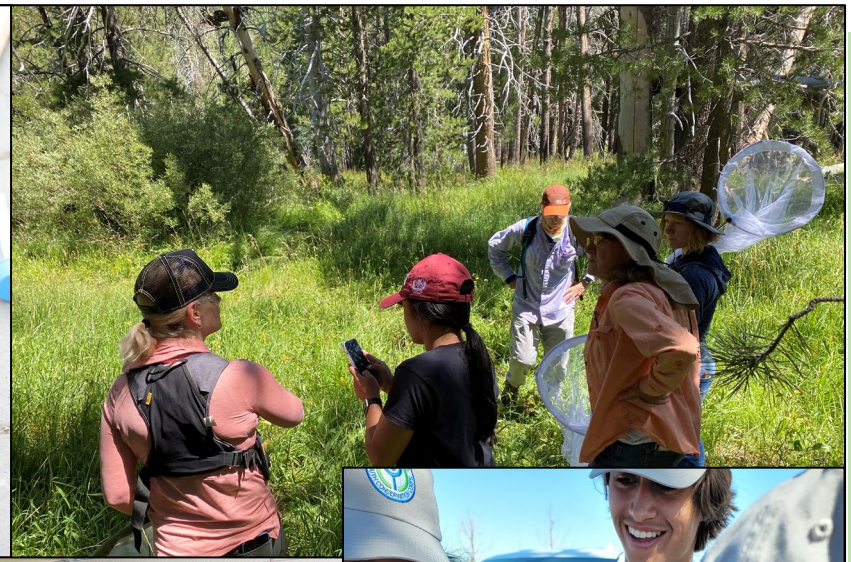
3: Submit your data online

BumbleBeeWatch.org

Photo: Bumble Bee Atlas/Xerces



Join Us! - https://www.cabumblebeeatlas.org/



Next Season Starts:

March 15, 2025

- Virtual Trainings
- In-person Events
- Workshops

Photos: Dylan Winkler

Join Us! - https://www.cabumblebeeatlas.org/

Thank you NorCal Botany!

Questions?

- My email: dylan.winkler@wildlife.ca.gov

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	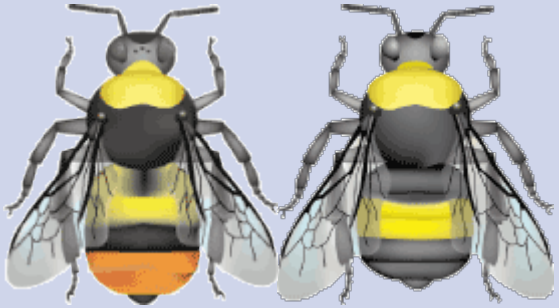	

Bumble bee illustrations: Paul Williams (identification and color patterns) and Elaine Evans (bee body design).

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	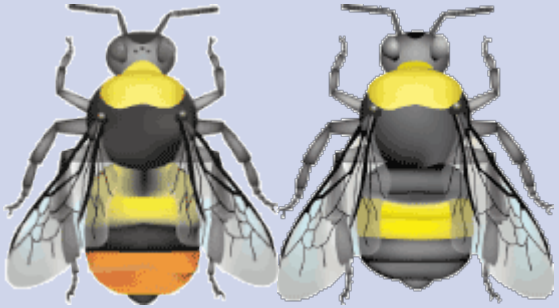	

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How to Get Involved

1. Register for the project: ***https://www.cabumblebeeatlas.org/***
2. Adopt a grid cell: ***https://www.cabumblebeeatlas.org/adoptagrid.html***
3. Watch our training workshop: ***https://www.cabumblebeeatlas.org/training-videos.html***
4. Take a quiz to get added to our Permit: ***https://tinyurl.com/CAbumblequiz***
5. Read about the project on our website and project manual. Get your gear together for next year!:

   https://www.cabumblebeeatlas.org/project-resources.html

Bumble Bees are: (relatively) **Easy to identify**

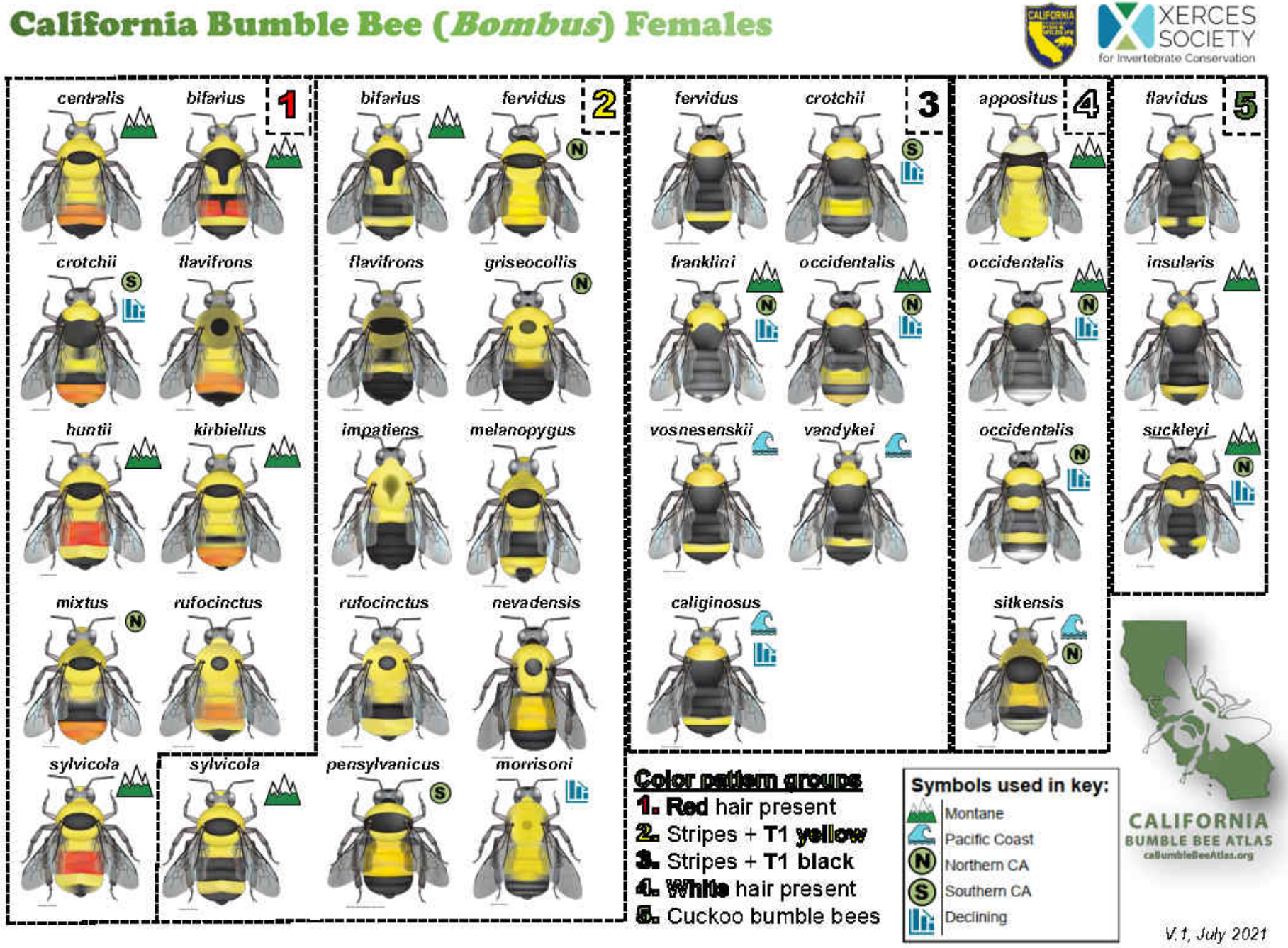
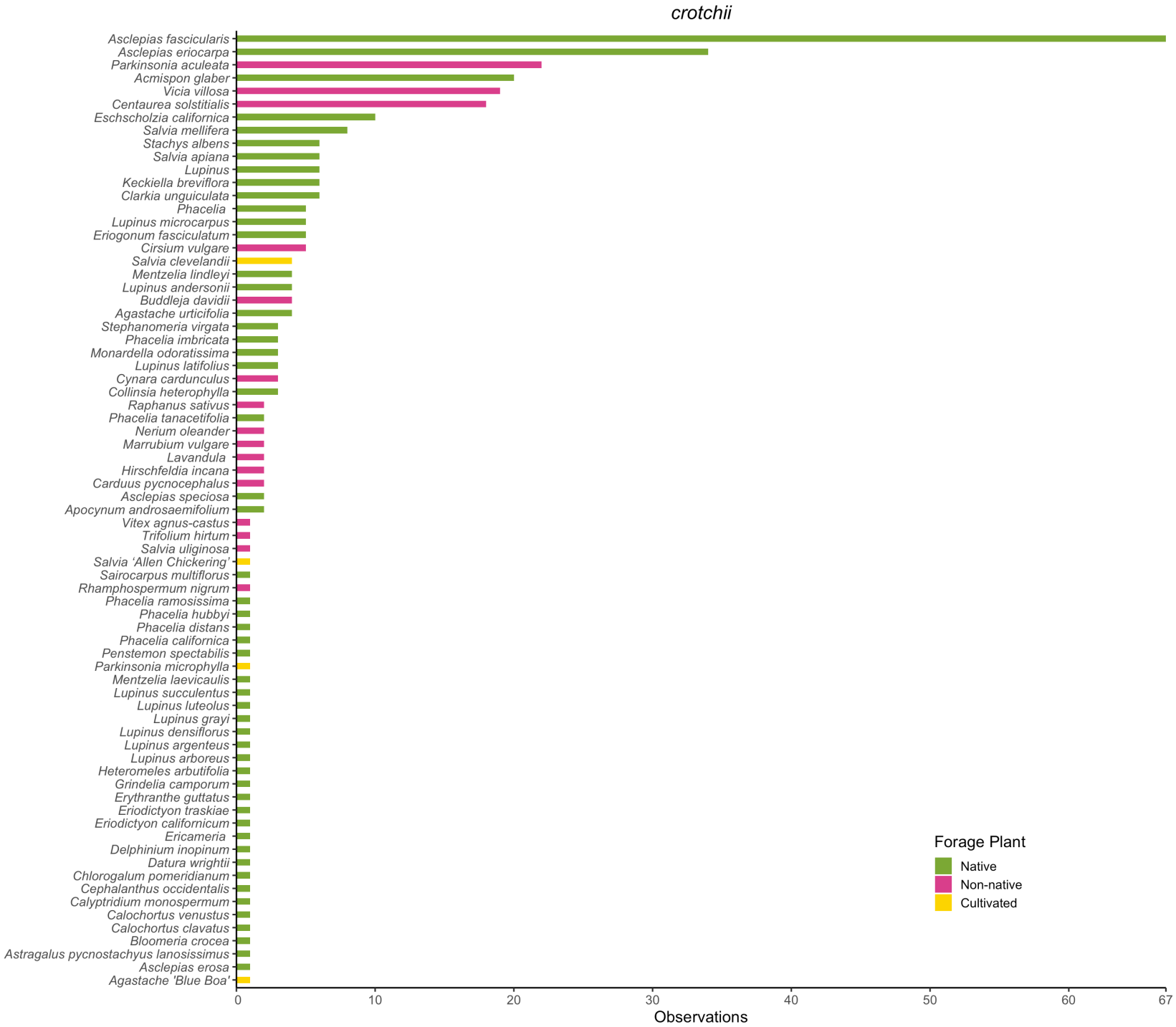
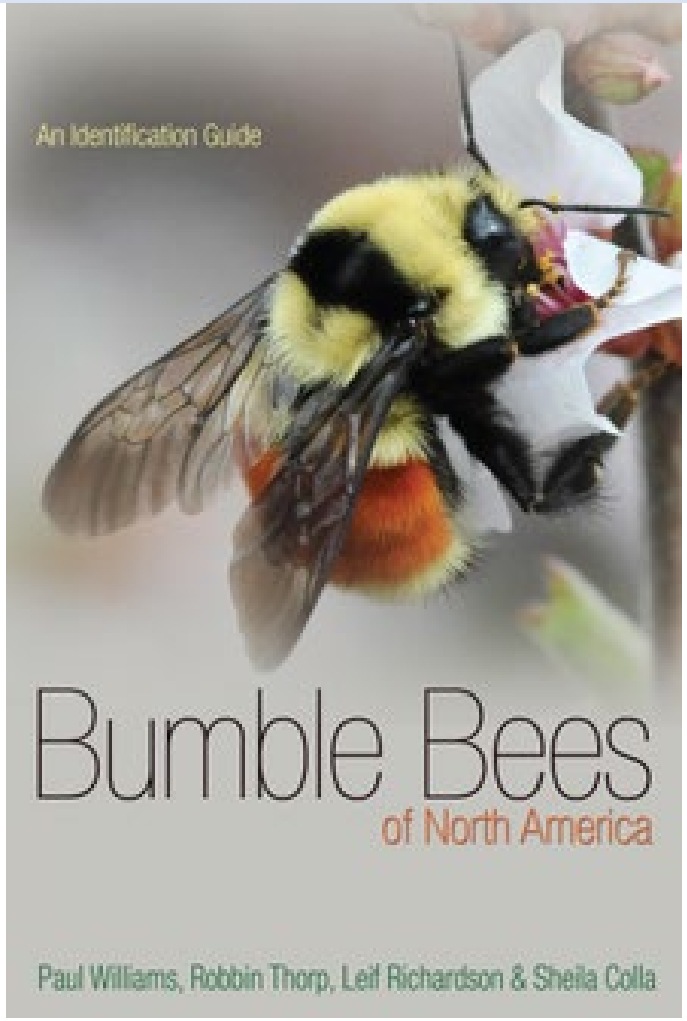


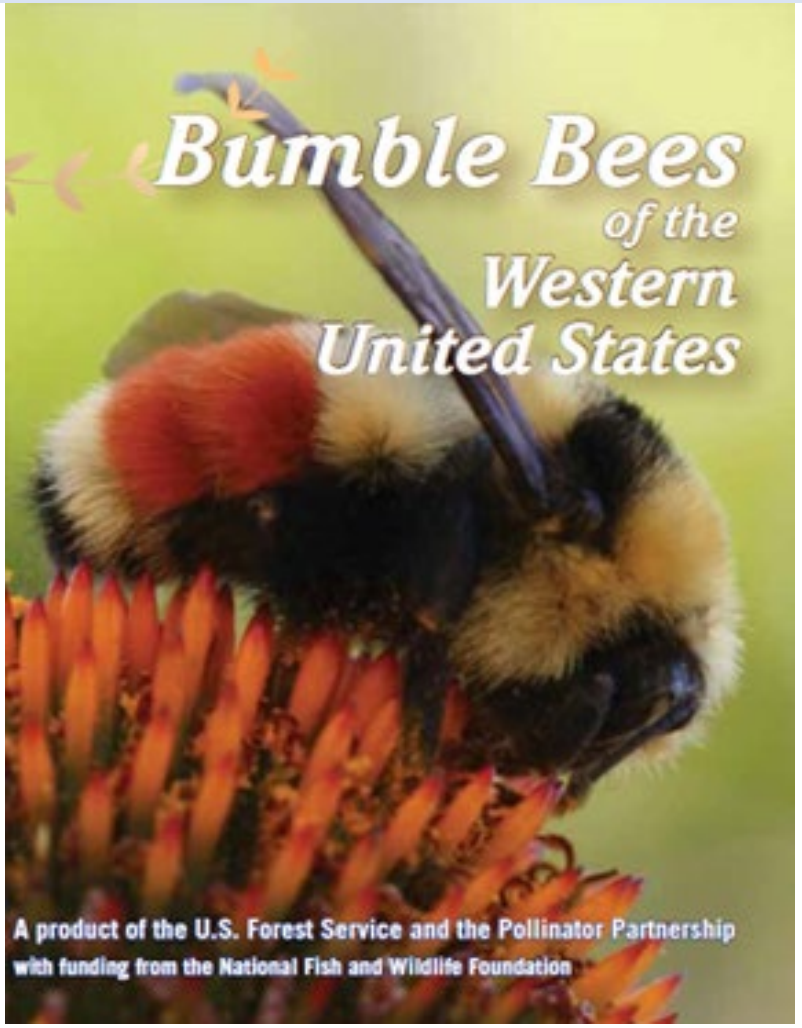
Figure: Xerces Society

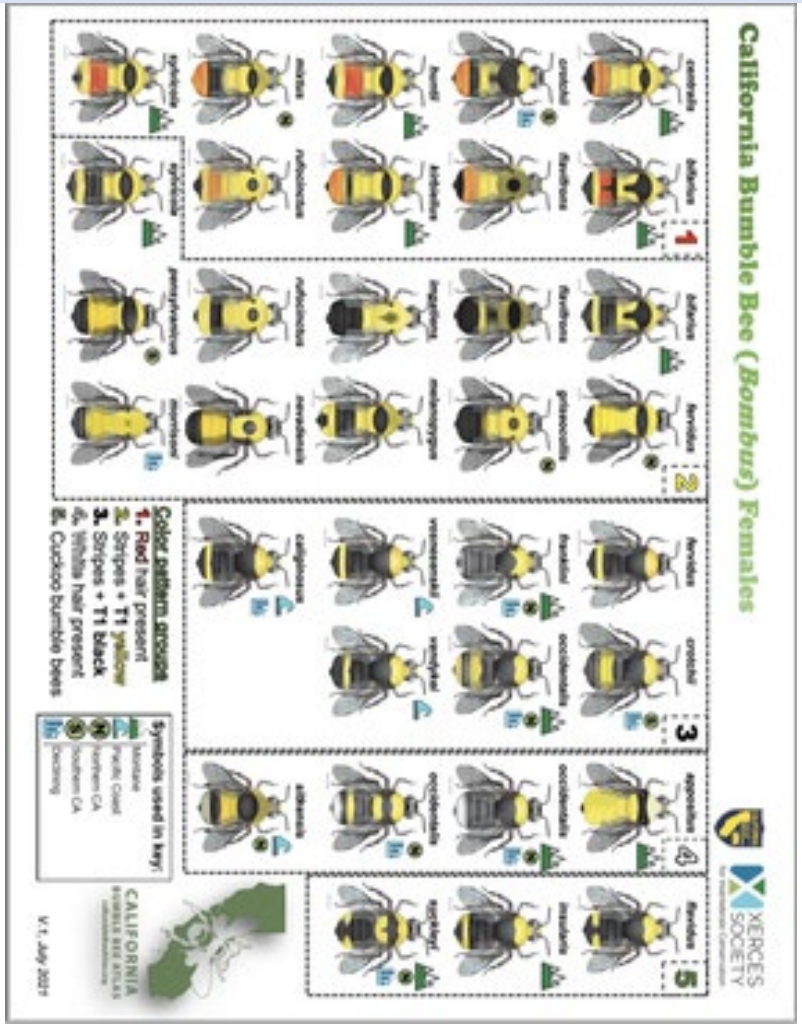
Crotchii


crotchii
Asclepias fascicularis
Asclepias eriocarpa
Parkinsonia aculeata
Acmispon glaber
Vicia villosa
Centaurea solstitialis
Eschscholzia californica
Salvia mellifera
Stachys albens
Salvia apiana
Lupinus
Keckiella breviflora
Clarkia unguiculata
Phacelia
Lupinus microcarpus
Eriogonum fasciculatum
Cirsium vulgare
Salvia clevelandii
Mentzelia lindleyi
Lupinus andersonii
Buddleja davidii
Agastache urticifolia
Stephanomeria virgata
Phacelia imbricata
Monardella odoratissima
Lupinus latifolius
Cynara cardunculus
Collinsia heterophylla
Raphanus sativus
Phacelia tanacetifolia
Nerium oleander
Marrubium vulgare
Lavandula
Hirschfeldia incana
Carduus pycnocephalus
Asclepias speciosa
Apocynum androsaemifolium
Vitex agnus-castus
Trifolium hirtum
Salvia uliginosa
Salvia 'Allen Chickering'
Sairocarpus multiflorus
Rhamphospermum nigrum
Phacelia ramosissima
Phacelia hubbyi
Phacelia distans
Phacelia californica
Penstemon spectabilis
Parkinsonia microphylla
Mentzelia laevicaulis
Lupinus succulentus
Lupinus luteolus
Lupinus grayi
Lupinus densiflorus
Lupinus argenteus
Lupinus arboreus
Heteromeles arbutifolia
Grindelia camporum
Erythranthe guttatus
Eriodictyon traskiae
Eriodictyon californicum
Ericameria
Delphinium inopinum
Datura wrightii
Chlorogalum pomeridianum
Cephalanthus occidentalis
Calyptridium monospermum
Calochortus venustus
Calochortus clavatus
Bloomeria crocea
Astragalus pycnostachyus lanosissimus
Asclepias erosa
Agastache 'Blue Boa'
0
10
20
30
40
50
60
67
Observations
Forage Plant
Native
Non-native
Cultivated

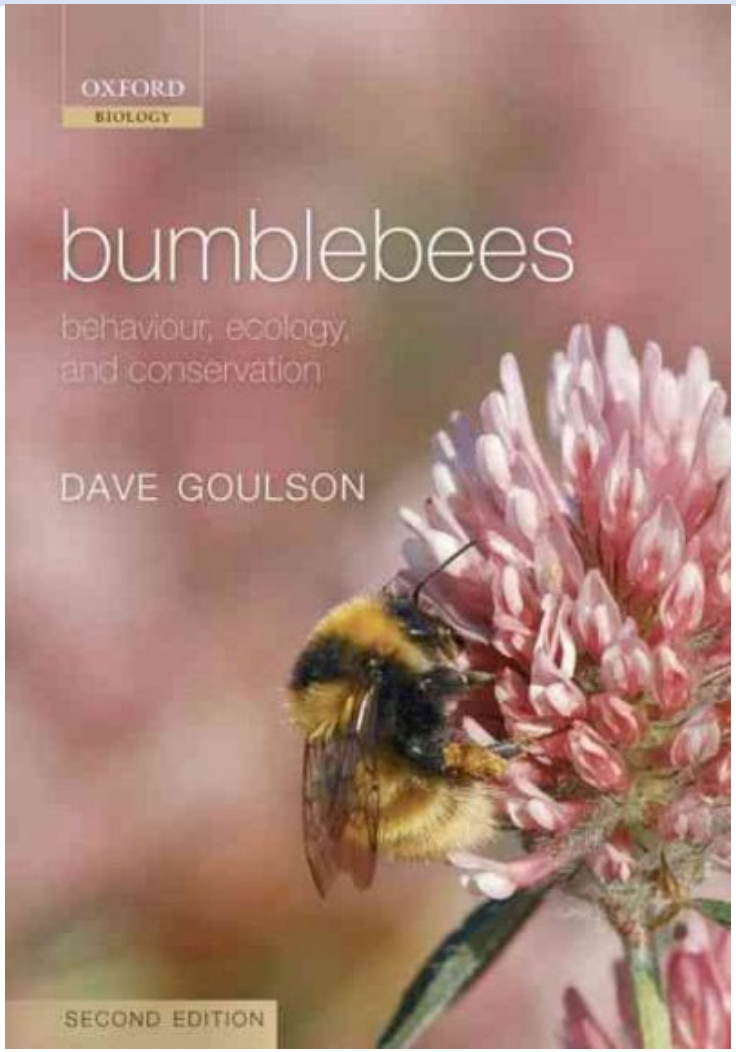
ID Resources

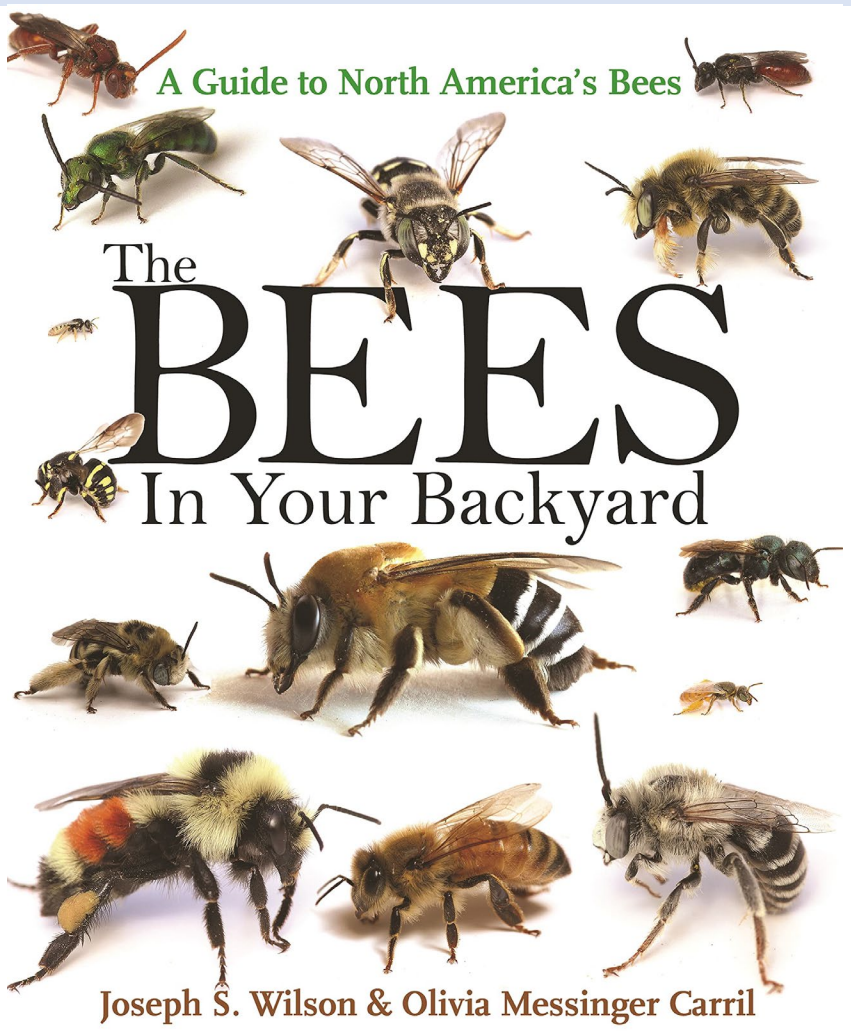


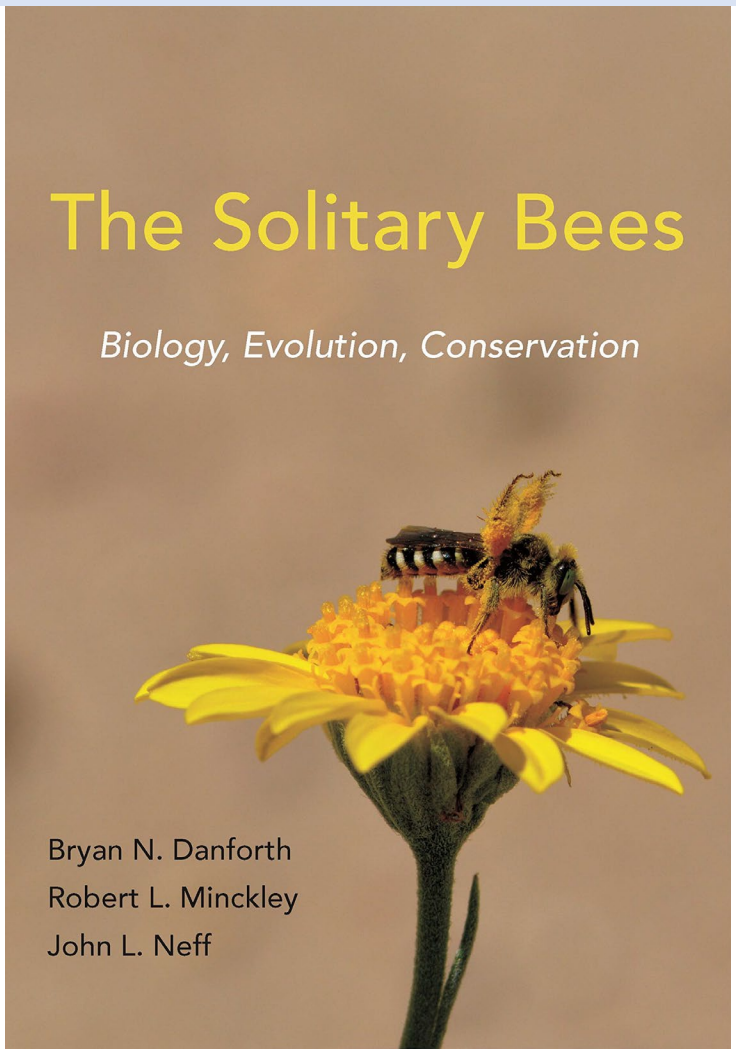




Book Resources

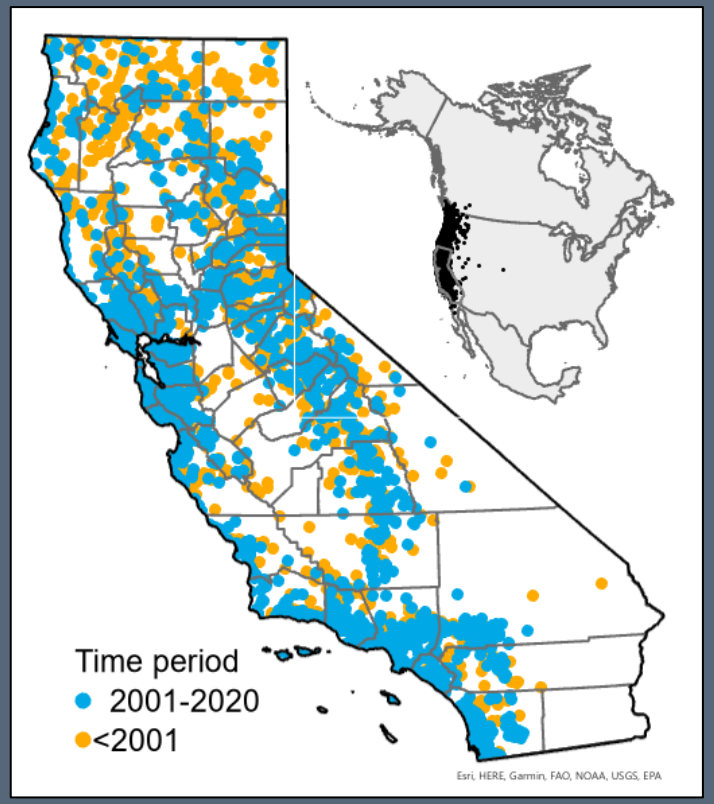


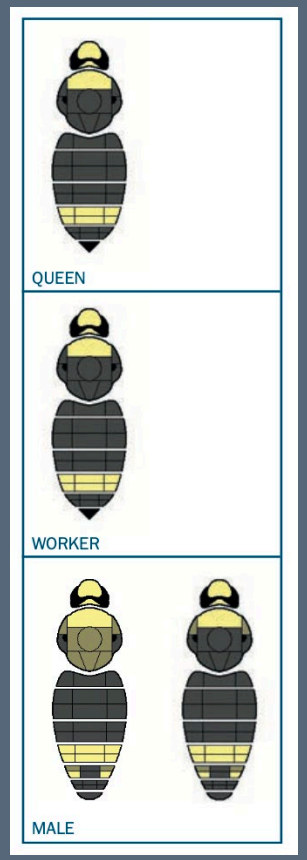




Bombus vosnesenskii

Most similar to: *caliginosus, vandykei, fervidus, occidentalis*





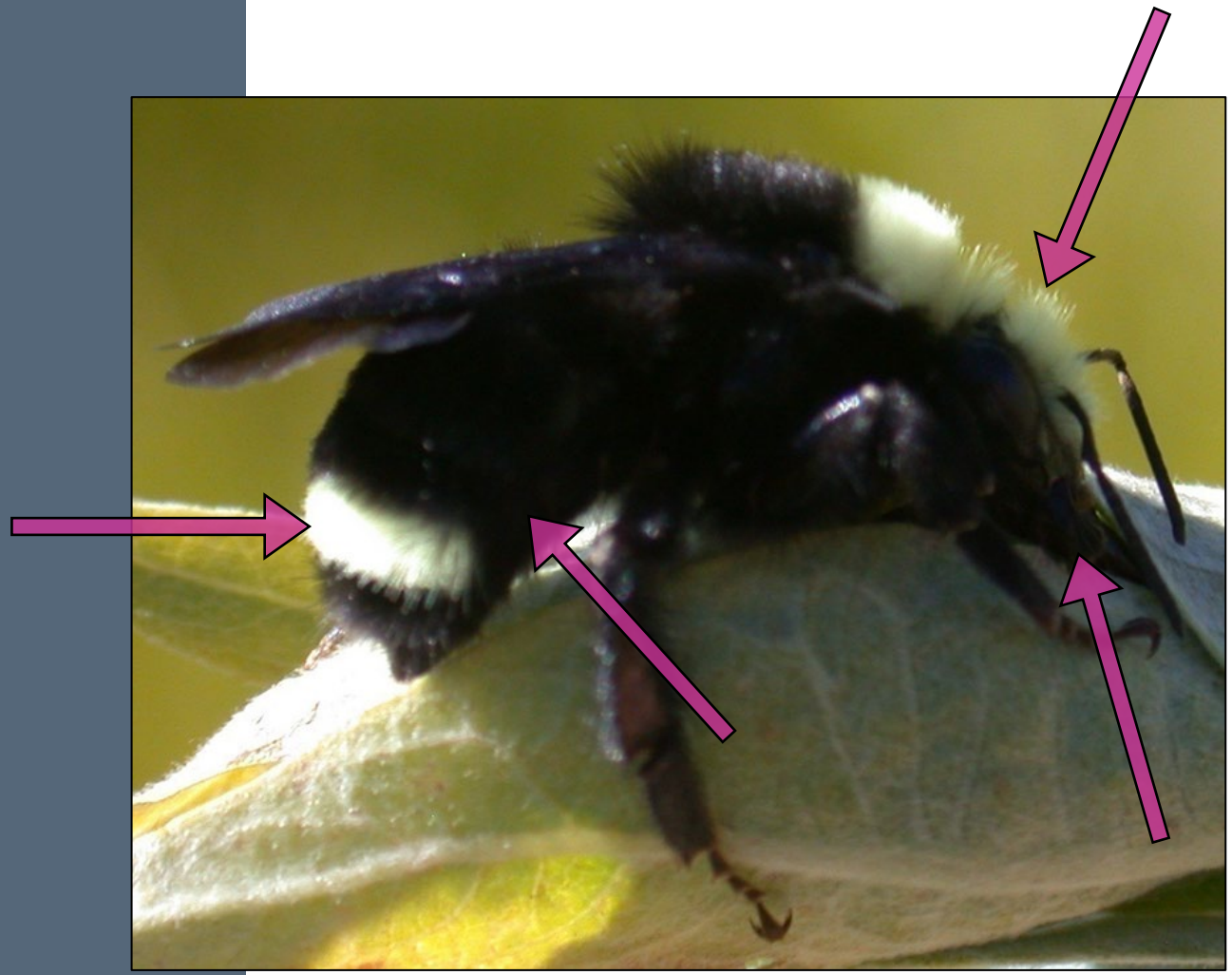


Photo: Rich Hatfield (Xerces Society); diagrams: Williams et al. 2014