

Design Your Own Native Plant Landscape



Presented by

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Design Process

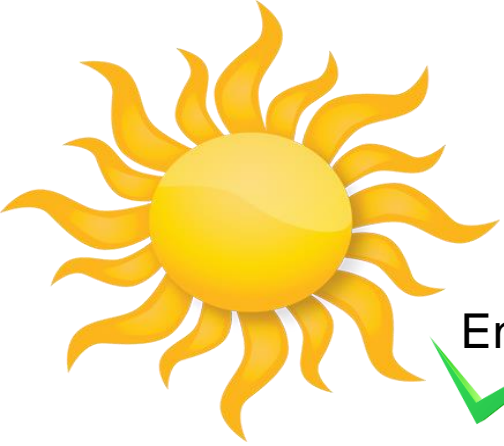
1. Basics of Habitat Design for Humans and Wild Things
2. Site Measuring and Analysis
3. Developing a Plant Palette
4. Basic Planting Design
5. Maintenance Considerations



Phacelia bolanderi

PLANTS ARE THE BEGINNING OF EVERYTHING

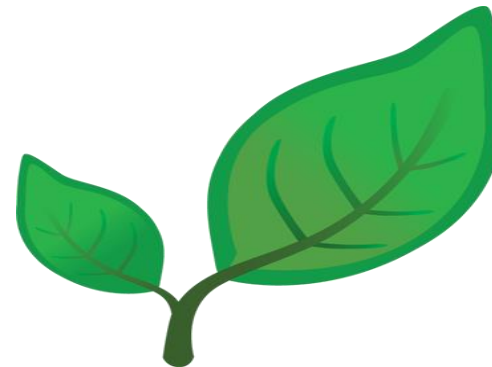
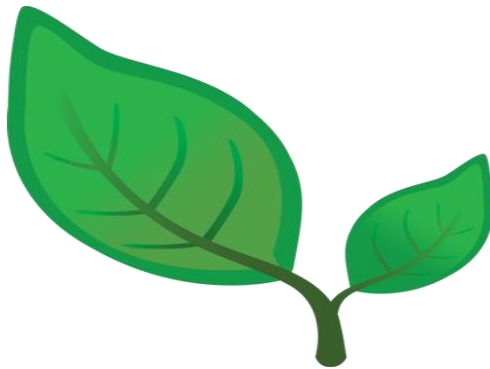
(plants are the primary producers of food and the *basis of the food chain*)



Energy from the sun...



...is converted by plants (first trophic level) into food that is eaten by insects and other animals (second trophic level).



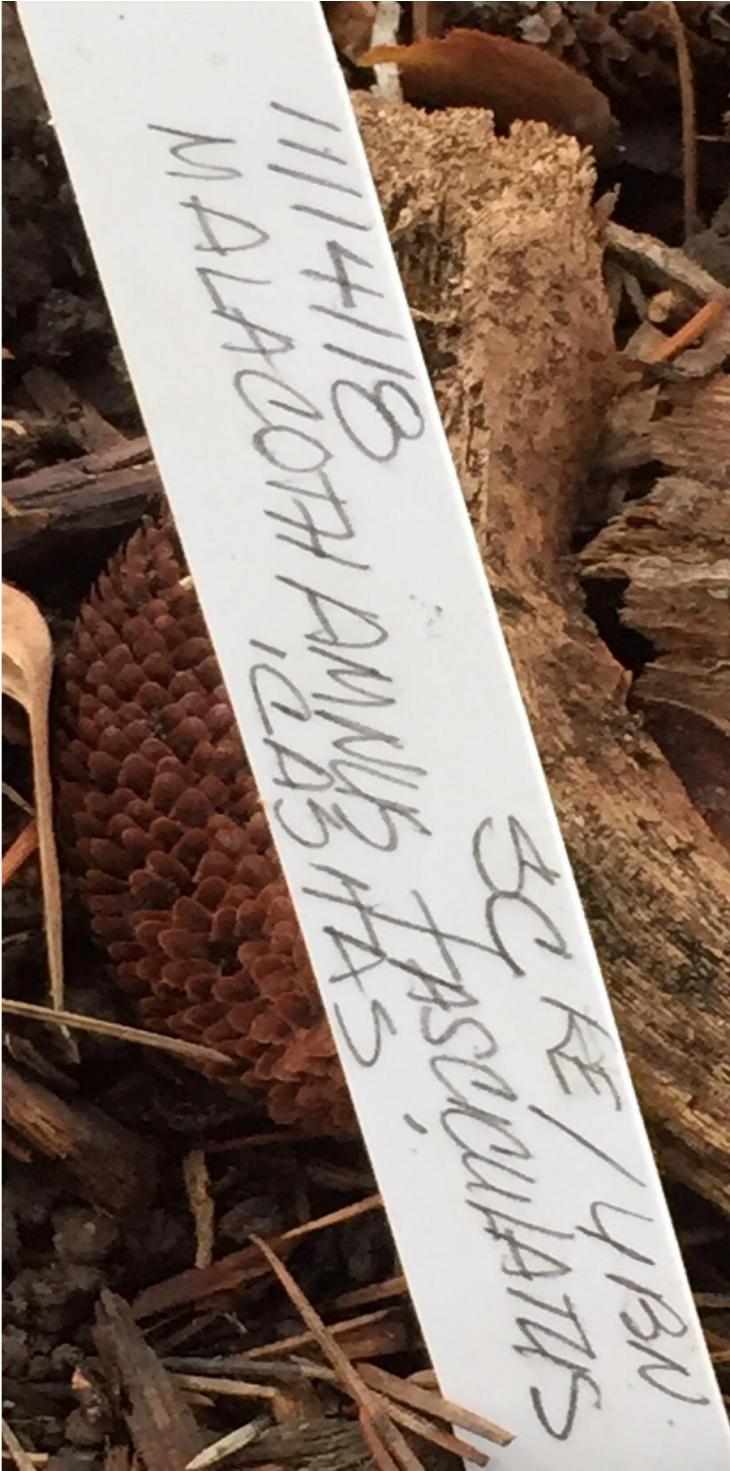
Floral and vegetative resources



- Insects provide food for baby birds and other animals.
- 37% of animal species are plant-eating insects.
- Many other animals rely on insects as food to access the sun's energy stored in plants.



PLANTS ARE NOT HABITAT DECORATIONS--PLANTS ARE FOOD



Site Analysis and Site Measuring

Note site qualities to evaluate for specific functions and opportunities:

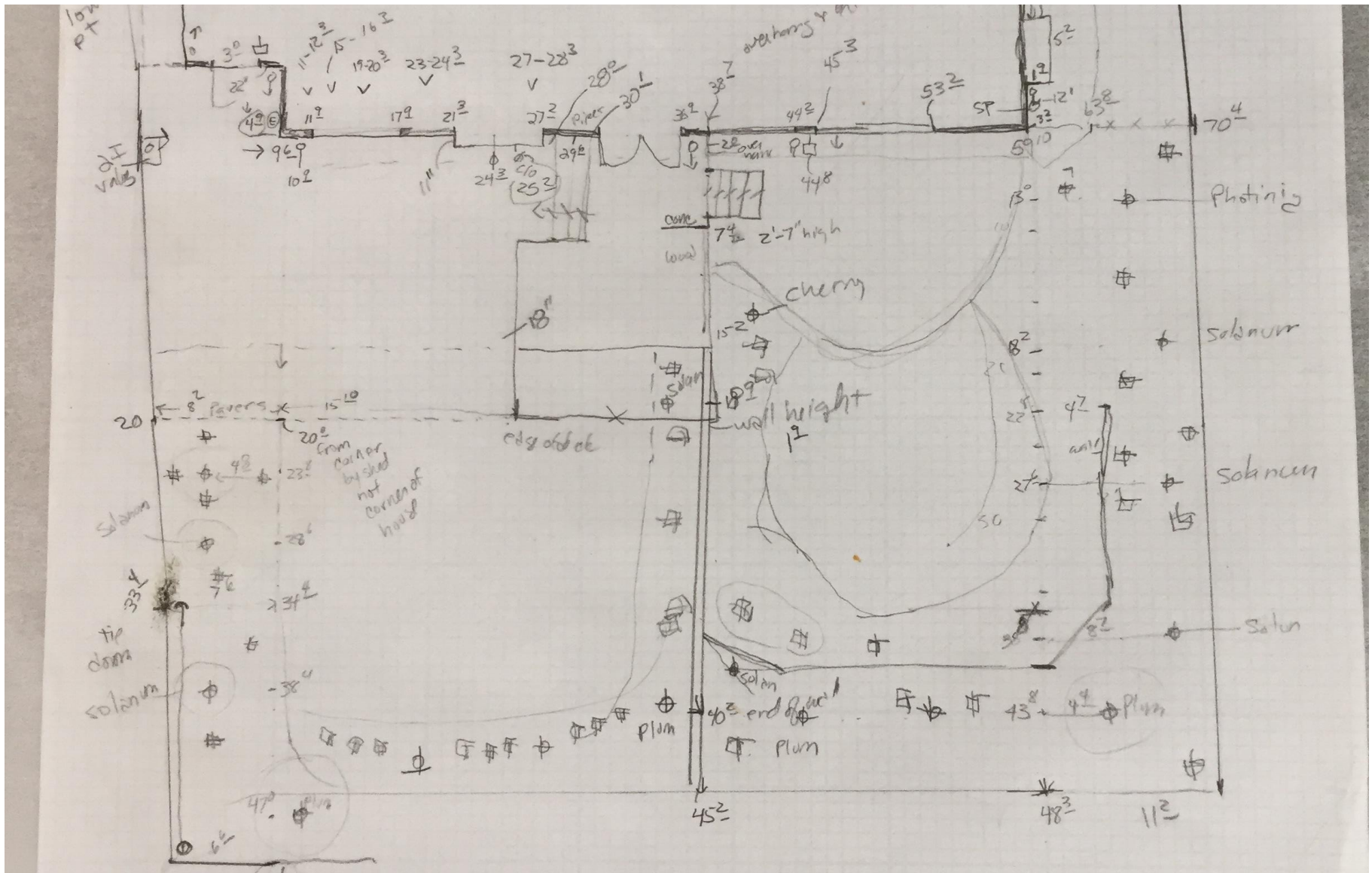
North? Sunny, warm spots? Shady cool spots?
Glare
Wind
Noise
Slope
Smell
Views
Access

These qualities are factors in goal-setting and program development, which lead to concept design.



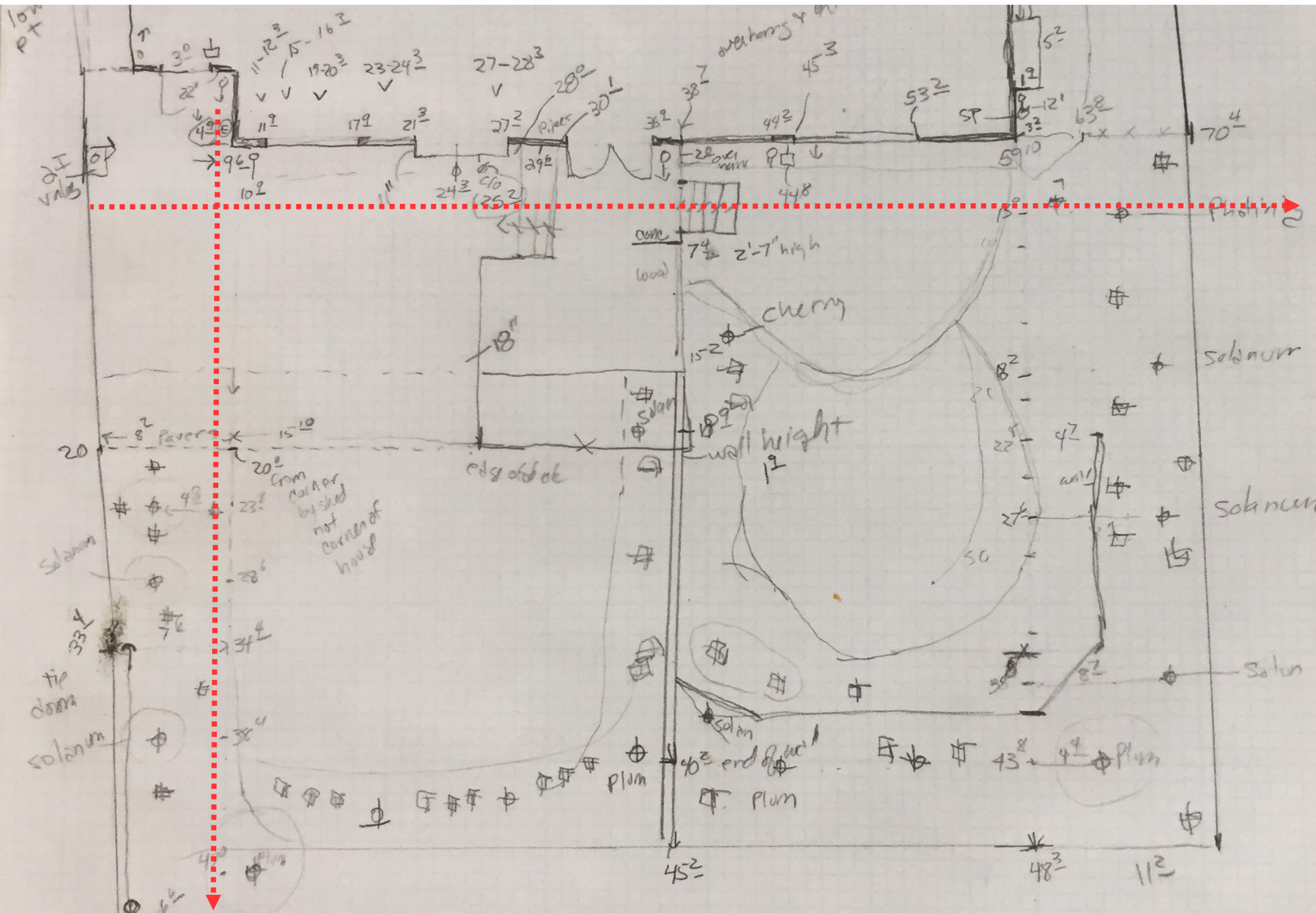
Site Measuring

1. Using graph paper makes it easy to draw to scale. 1 square can = 1 foot.
2. Lay out base tapes. Leave in place for the majority of measuring.
3. Take inventory: Make notes of locations on the graph paper of trees, edges of lawn, hardscape, utilities, fences, down spouts, existing lighting, electrical outlets, buildings and notable features of them.
4. Make notes of views, slopes, adjacent properties. Which way is North?



Detail of Measuring Nomenclature

- 1. Mark direction of measure at the start of base tape
- 2. Use a consistent nomenclature and marks



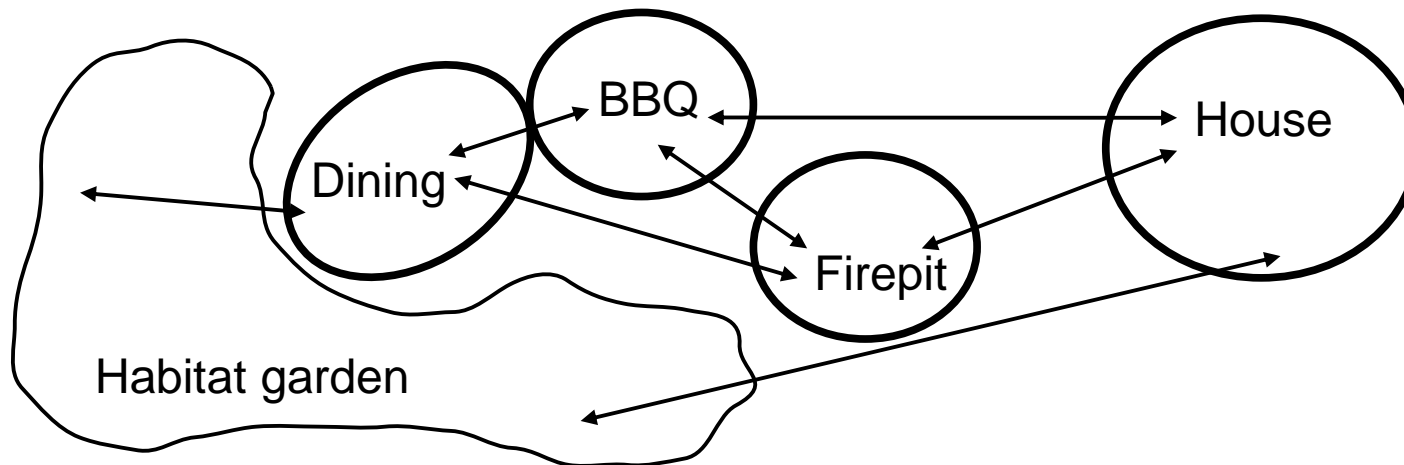
FORM FOLLOWS FUNCTION

How will you use the area?

Functional diagrams

List the functions for the spaces you want.

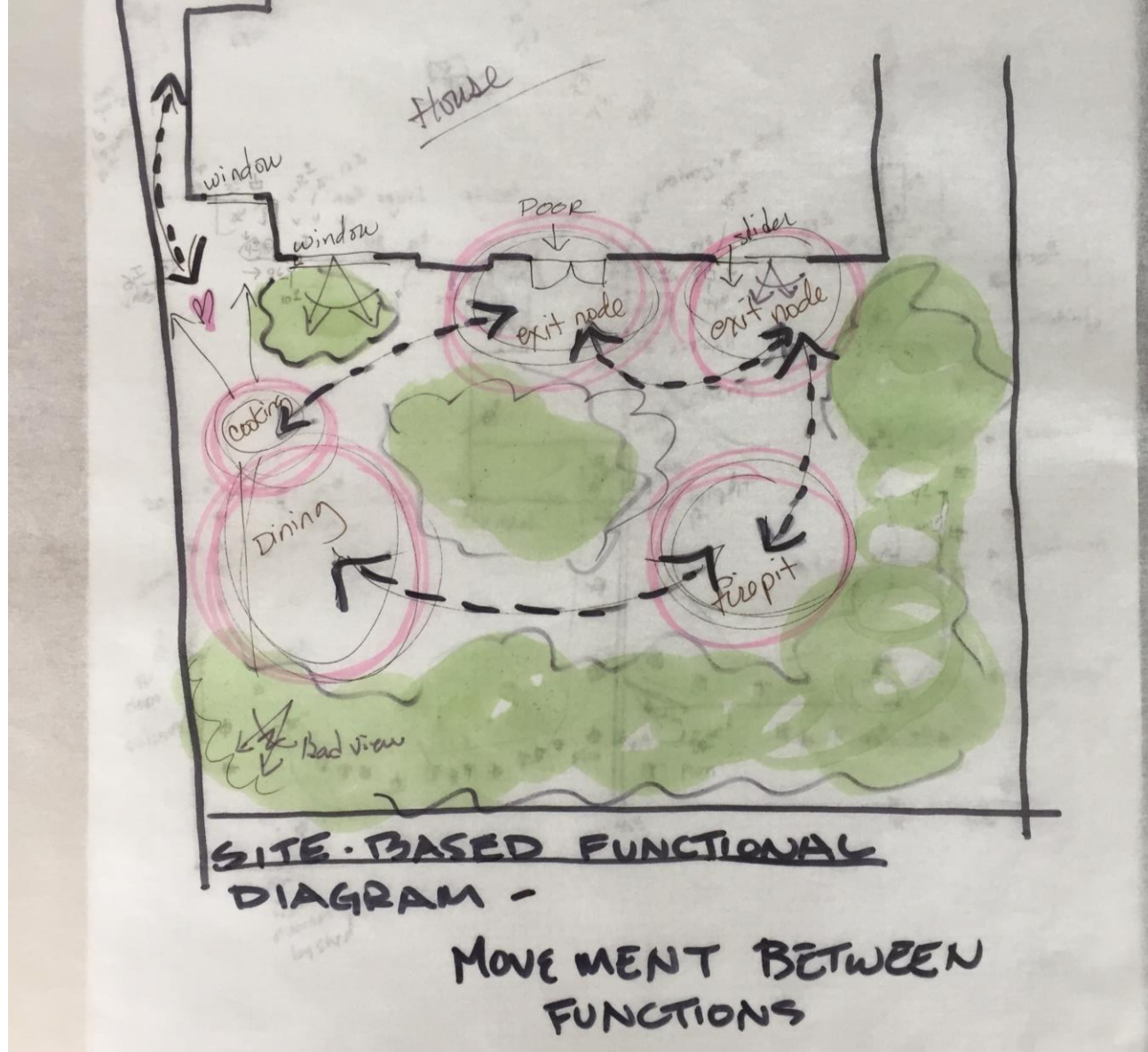
Basically freehand bubbles (“bubble diagram”) to organize the spaces—based on the analysis and movement between them.



Look at size of area (big enough for...), relationships to each other (for example, bbq next to dining area).

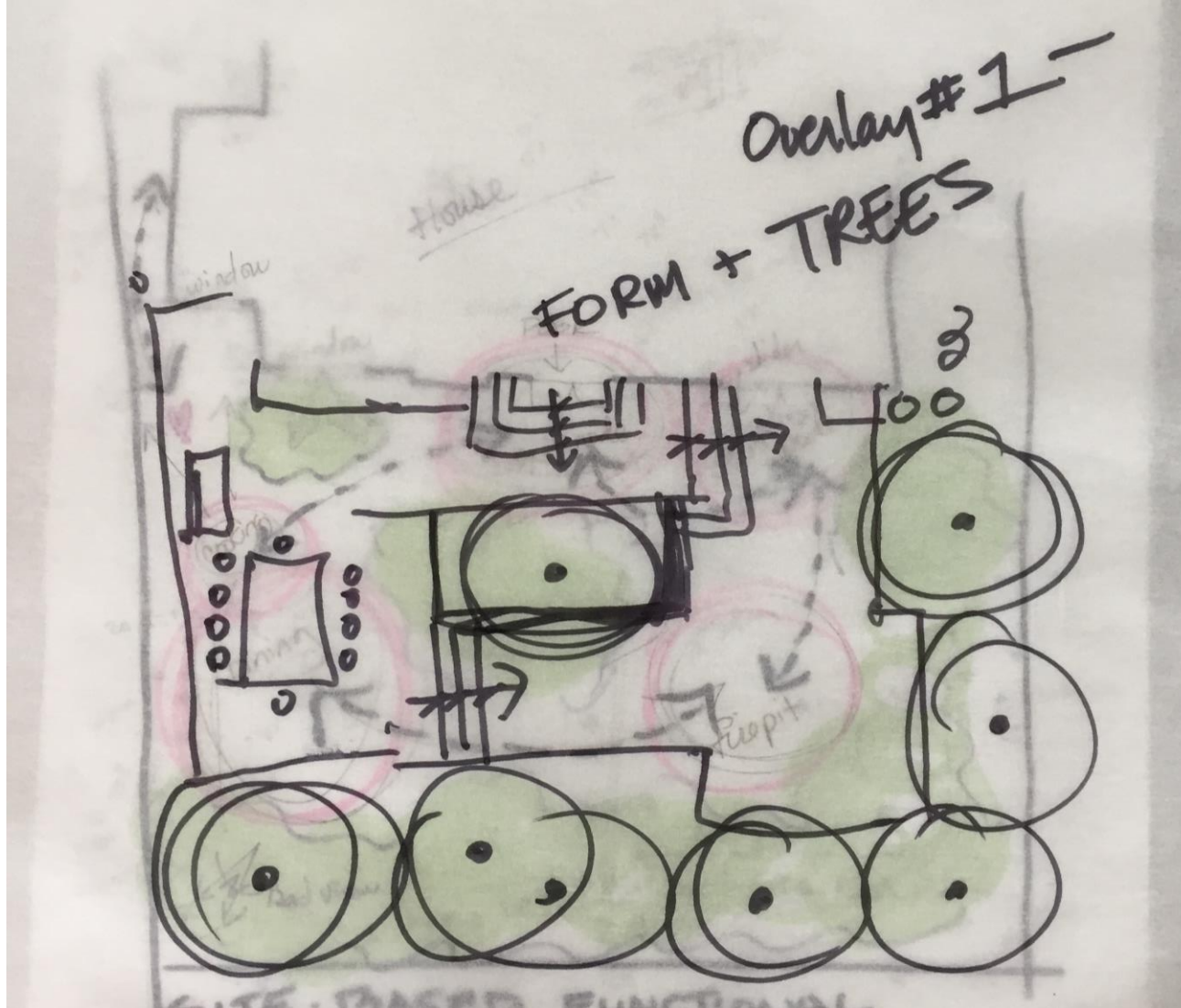
Conceptual designs

Very generally converts the bubble diagrams to areas that have more shape and character.



Overlay site measurements or aerial view with tracing paper.

Very generally show functional areas for activities, movement between areas, and then planting areas.



Form Follows Function

Leave initial tracing paper in place and add another layer on top.

Create shaped areas (form).

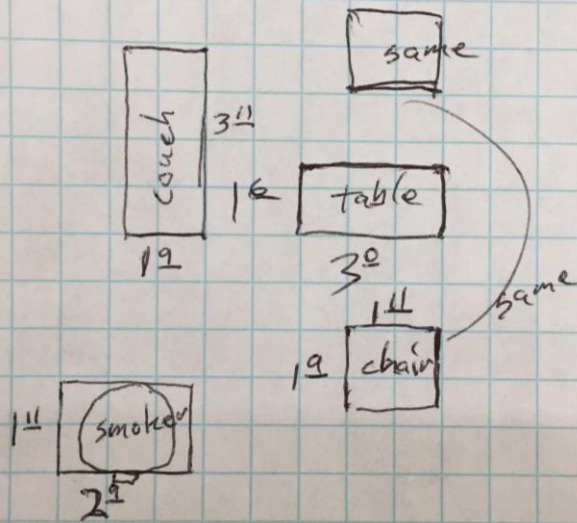
Generally show trees in planting areas.

Add another layer of trace paper on top.

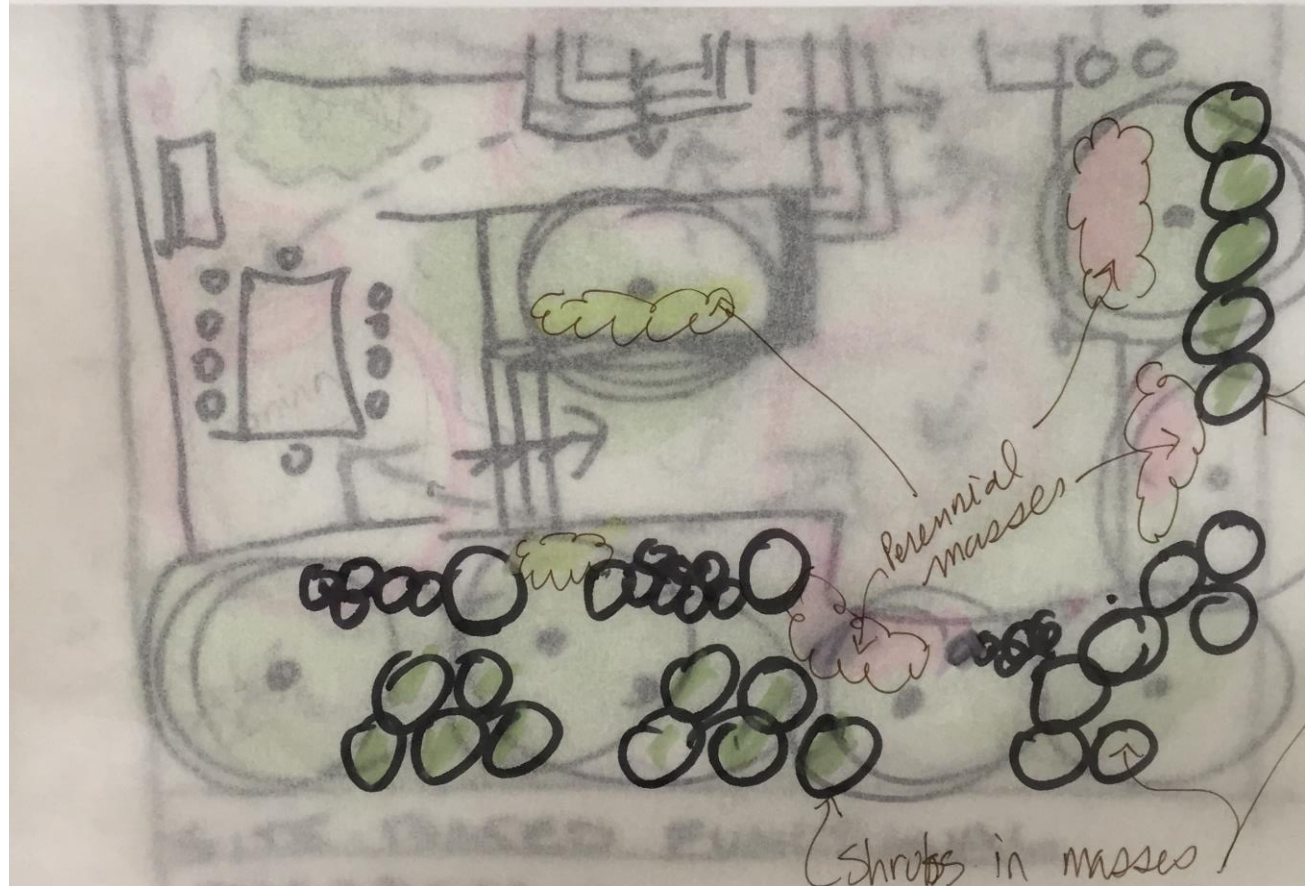
Start to show shrub and perennial masses

Continue to refine areas using additional measurements of furniture, pathways, etc.

Coffee table at NW corner
w 2 chairs + a loveseat



Overlay # 2
Shrubs & perennials



Refined Concept

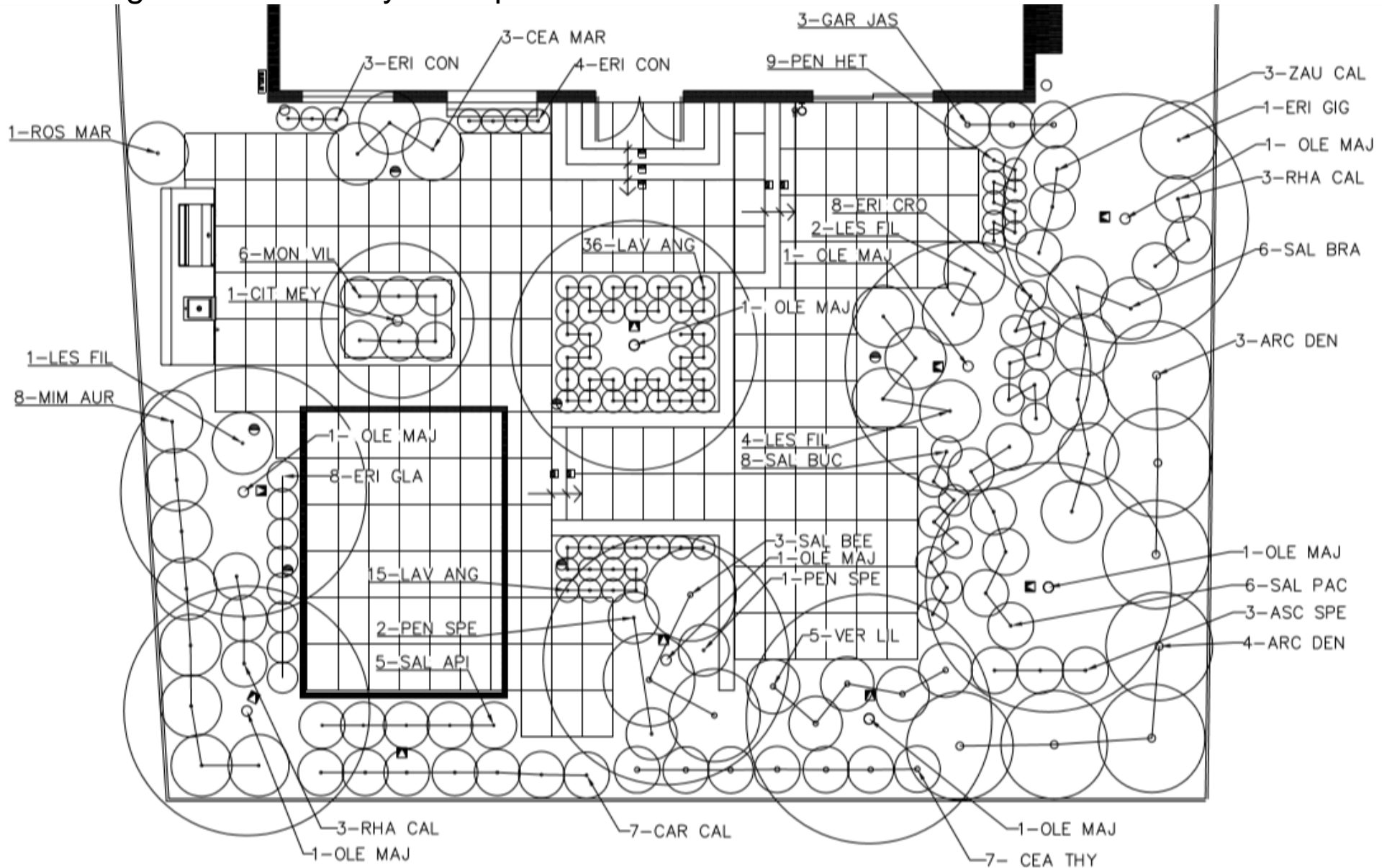
Specific shapes--what sort geometry will a space have?
Curvilinear, rectilinear, etc.

Example below shows hardscape and planting areas conceptually.



PLANTING PLAN

1. Lay out plants from your plant palette. **Draw as circles at mature diameter, edges just touch.**
2. Lay out plants in masses. Large plants and trees towards the back, smaller, lower plants at the edges near walkways and patios.



Basics of Habitat Design: Why California Native Plants?

“California hosts approximately 6,500 species, subspecies, and varieties of native plants, many of which are found nowhere else in the world, and many animal species depend on these native plants for food and shelter.

It is estimated that approximately 66 percent of California’s endemic plant species will experience decreases of up to 80 percent in the size of their ranges within the next 100 years.”¹

1. Loarie SR, B.E. Carter, K. Hayhoe, S. McMahon, R. Moe, C.A. Knight, and D.D. Ackerly. 2008. Climate Change and the Future of California’s Endemic Flora. PLoS ONE. 3(6): 1-24.

<https://www.wildlife.ca.gov/Conservation/Plants/Climate>



Why California Native Plants?

California native plants evolved to thrive in different California climates. There are many native California plant species well-adapted to hot, dry summers and wet winters. These plants will be drought-tolerant ***after being established***. This means to water about once a week for 1-3 years, and then water can be reduced (but not eliminated completely—after all, these are living beings).

Rules of Thumb

1. Use local, native California plants to create your plant palette.
 - Native plants and pollinators evolved together and these plants provide nutrients and compounds required for reproduction. Native insects won't survive on non-native plants, which become “dead-ends” for transferring the sun's energy into the ecosystem, with a resulting cascade effect on other species.
 - Native plants are largely preferred over nonnative plants by pollinators.
 - Nonnative plants can escape cultivation and infest natural areas, and/or bring in disease and exotic insects.
2. Use at least 3 species of plants that bloom during ***each*** of the early, mid and late seasons (i.e., 9 different species minimum).
 - Pollinators emerge at different times, and providing overlapping bloom times will keep them foraging in the garden.
 - Providing a diversity of blooms and plant resources will attract a diversity of pollinators.
 - A garden with at least 20 different types of blooming plants is ideal for attracting a diversity of pollinators.

3. Consider plants as a buffet...or a salad bar, with nectar and pollen for bees, but also consider if that plant provides other vegetative resources (larval food).
Helpful hint: Check out the plant finder tool (beta version) at www.nwf.org.
4. Plant trees, shrubs, perennials, annuals and bulbs. Think of these as layers that build in complexity.
5. Start small, unless starting from scratch (less disruption). Add more plants over time as appropriate.

Island Drive before



Island Drive after



What is Locally Appropriate?

Which native plants were here in the past?

1. Research if the plant was present in the past:
Plant search by county, date (i.e., before 1900), etc.
<http://ucjeps.berkeley.edu/consortium/>

2. By or order from local, reputable sources.



UC/JEPS: Consortium Se X + v

ucjeps.berkeley.edu/cgi-bin/get_consor.pl

Consortium of California Herbaria
Participants News Search About Help Donate

Search Results – 2000 specimen records retrieved (1219 records with coordinates)
(That's the default maximum. Contact Jason Alexander for larger data requests.)
Results for search: County=SANTA CLARA; Year=1894;

Mapping Options:
[BerkeleyMapper with county and bioregion layers](#)
[BerkeleyMapper without layers.](#)
[KML export](#)
 (Note: only records with coordinates are mappable)

Download Options:
[Select all records](#) · [Select records with coordinates](#)
 [Retrieve selected records as tab-separated list](#)
 Include annotations and voucher information

PLEASE NOTE: Due to changes in newer versions of Excel, directly copying text from the above selected results does not produce a usable table. Follow these steps:
 1. The contents of the selected results window must be copied into a text editor like TextEdit for Mac or WordPad for Windows.
 2. The selected results must be saved as a new text document.
 3. This new text document can now be copied into Excel or imported as a tab delimited text file.

(For large data requests, please contact Jason Alexander, jason_alexander@berkeley.edu.)

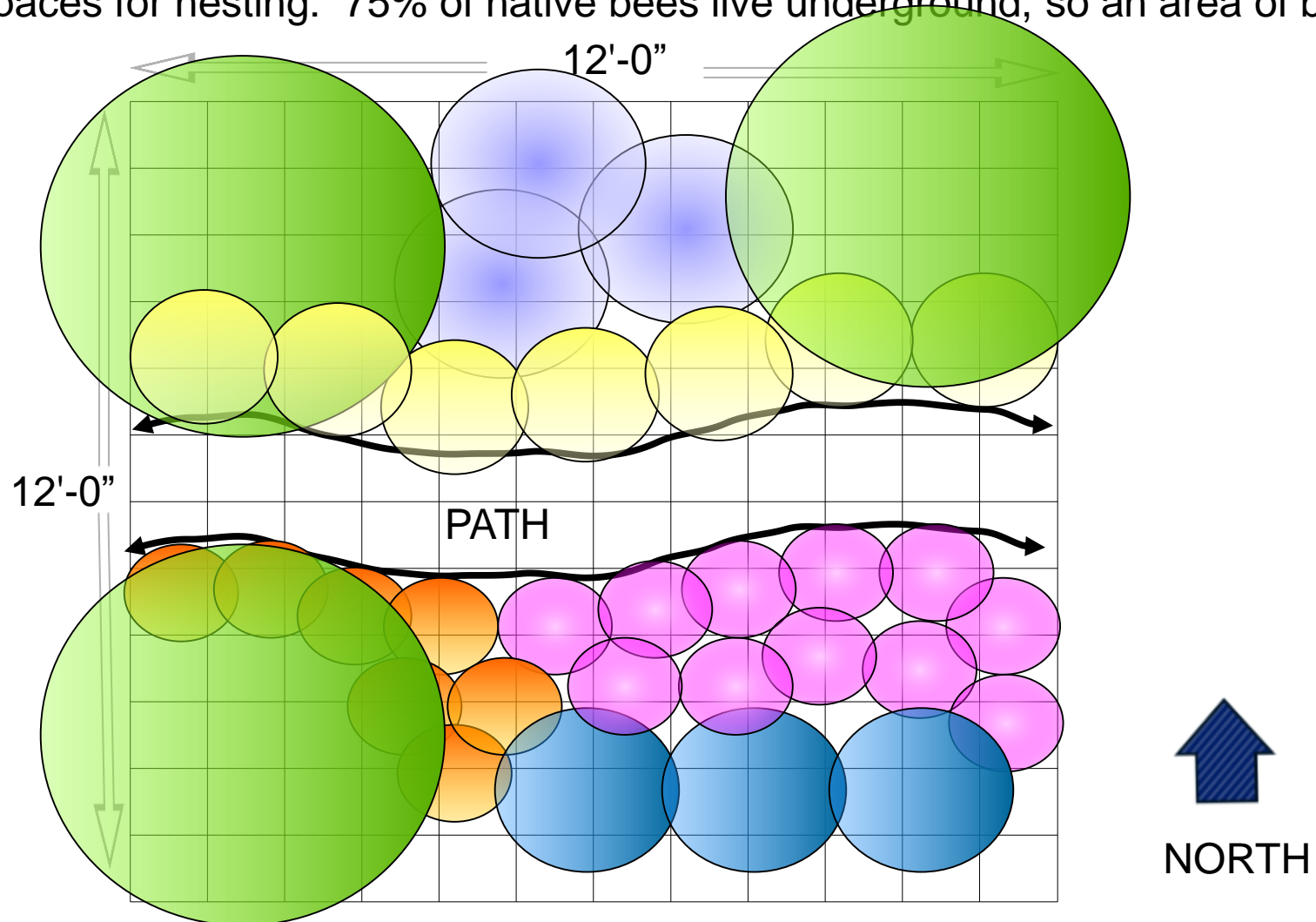
Please cite data retrieved from this page: Data provided by the participants of the Consortium of California Herbaria (ucjeps.berkeley.edu/consortium/).
Records are made available under the [CCH Data Use Terms](#).

Click on column header to sort data (* sorts by family); click in leftmost checkbox to select record. [CCH Help Page](#).
Turn on yellow flags to show possible range discrepancies. [Read more ...](#)

| ? | Specimen ID | Determination * | Collector | Collection Date | Collection Number | County | Locality | Elevation in meters | Feedback |
|--------------------------|------------------|--------------------------|----------------|-----------------|-------------------|-------------|---|---------------------|--|
| <input type="checkbox"/> | CAS-BOT-BC203221 | Abutilon | W. R. Dudley | 1895-5-31 | 4134 | Santa Clara | Coyote Creek | | Comment |
| <input type="checkbox"/> | CAS-BOT-BC219663 | Acanthomintha lanceolata | W. R. Dudley | 1895-5-31 | 4151 | Santa Clara | Soda Springs Canon [Canyon], Pine Ridge | | Comment |
| <input type="checkbox"/> | CAS-BOT-BC219666 | Acanthomintha lanceolata | W. R. Dudley | 1895-5-31 | 4151 | Santa Clara | Soda Springs Canon [Canyon], Pine Ridge | | Comment |
| <input type="checkbox"/> | UC204612 | Acanthomintha lanceolata | W. R. Dudley | 1895-5-31 | 4151 | Santa Clara | Pine Ridge, Soda Springs Canyon Pine Ridge; Mount Hamilton Range, Soda Springs Canyon | | Comment |
| <input type="checkbox"/> | UC25192 | Acanthomintha lanceolata | Edw. L. Greene | July 1891 | | Santa Clara | Mount Hamilton | | Comment Read comments Jan 17 2007 |
| <input type="checkbox"/> | CAS-BOT-BC333244 | Acer macrophyllum | C. F. Leitholt | 1894-8-13 | s.n. | Santa Clara | Santa Cruz Mountain Peninsula. Black Mtn. | | Comment |
| <input type="checkbox"/> | CAS-BOT-BC333245 | Acer macrophyllum | C. F. Leitholt | 1894-8-13 | s.n. | Santa Clara | Santa Cruz Mountain Peninsula. Black Mtn. | | Comment |

Basics of Plant Layout

1. Add paths for structure and maintenance purposes.
2. Add plants (from your plant palette) as circles at their mature diameter. Most circles should just touch or overlap slightly for spacing.
3. Plant in odd numbers for massing.
4. Plants the same species in **masses of at least 3' in diameter to enhance foraging efficiency** (less time flying between plants) and attractiveness to bees.
5. Place large trees and shrubs first, then layer in perennials, annuals and bulbs.
6. Leave spaces for nesting: 75% of native bees live underground, so an area of bare dirt is fine.



What Plants to Use and Why

California Native Trees

- Many species are drought-tolerant, once established.
- Trees form major “hubs” from which wildlife moves around an area.
- Trees can provide large nectar sources as well as other habitat resources and food for butterfly and moth larvae.
- Trees are “keystone species” supporting dozens of other species.

A few of the many native trees of California that are drought tolerant:

- *Quercus agrifolia*—Coast Live Oak. Evergreen. Leaves provide a rich mulch. The roots stabilize soil on hillsides. Provides food and habitat for many species. Other native Oak species as well, some deciduous and some evergreen.
- *Prunus ilicifolia*—Catalina Cherry. Evergreen, white flowers in the spring. 15'-40' tall. Relatively fast-growing.
- *Fraxinus velutina*—Velvet Ash. Deciduous, fast-growing 30'-50'. Good residential street tree but not especially showy.
- *Cercis occidentalis*—Western Redbud. Deciduous, early-blooming.
- *Cercocarpus betuloides*—Mountain Mahogany. Semi-deciduous to 20'. Very adaptable.
- *Aesculus californica*—California Buckeye. White to pink blooms, deciduous. 15' and up.
- *Lyonothamnus floribundus* ssp. *asplenifolius*—Santa Cruz Island Ironwood. Evergreen, 20'-50' tall, fast-growing.

Choose wisely: Select a tree that will fit your site in terms of size and local appropriateness (check to see if it grows in the area with the Calflora database: www.calflora.org).



A landscape without vegetation.



Quercus agrifolia. Long-lived, adding shade and a sense of place.



TREES HELP SAVE WATER

- Trees absorb water and release it into the air, cooling and cleaning it.
- Trees form *half of the rain cycle*, teaming up with the oceans, they help circulate water across land.
- Without trees, deserts can form.
- Trees improve water quality by filtering rain water and slow down the impacts of heavy rain.
- Trees reduce flooding and stabilize soil.



California Sister butterfly.
Caterpillars feed on Oaks, especially Quercus chrysolepis.



California Native Shrubs

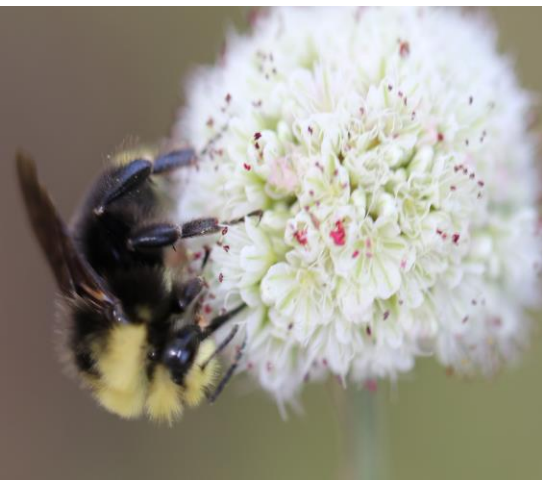
- Provide a variety of floral/vegetative resources as well as habitat.
- Persist and provide the structure to a garden.
- Provide a “nurse” role for establishing other plants.



Arctostaphylos spp. (sub for Raphiolepis, Boxwood)
 *Ceanothus spp. (sub for Oleander)
 *Eriogonum spp. (sub for Rosemary)
 Frangula californica--(good sub for Pittosporum)
 Baccharis pilularis (sub for Juniper)
 Salvia spp. (sub for Teucrium)
 Artemisia spp.
 *Monardella villosa
 Ribes spp.
 Vaccinium ovatum
 Amelanchier alnifolia
 Adenostoma fasciculatum
 Fremontodendron californica
 Symphoricarpos spp.
 Amorpha californica
 Berberis spp. (sub for Nandina)
 Carpenteria californica (sub for Camellia)

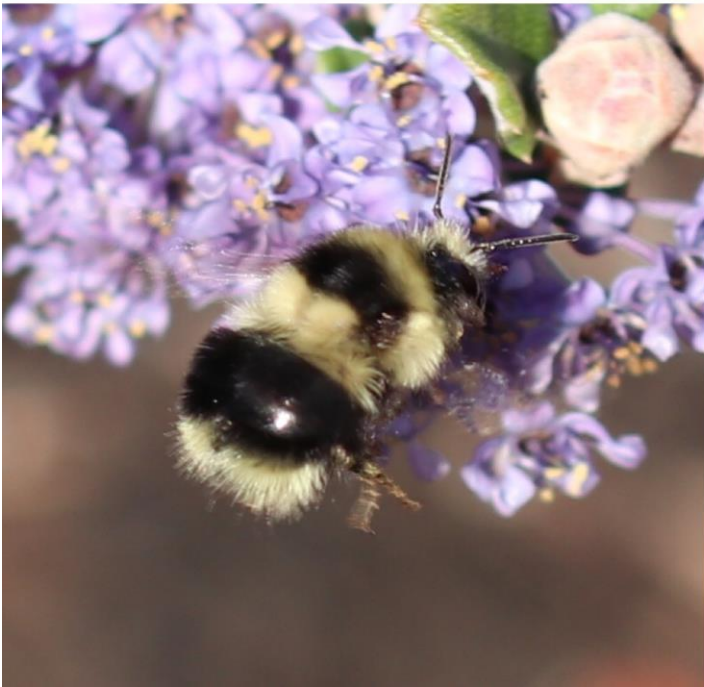
Heteromeles arbutifolia (sub for Holly)
 Garrya elliptica
 Holodiscus discolor
 Lavatera spp.
 Malacothamnus spp.
 Morella (Myrica) californica (sub for Ligustrum)
 Rhus ovata (sub for. Ligustrum, Myoporum, Oleander, Photinia, Pittosporum, Raphiolepis, Xylosma
 *Lupinus spp. !!!!

*casual observations in our gardens show multiple species/visits



Early Blooming Plants for Bumblebees

Bombus melanopygus, the Black Tailed Bumble Bee on *Ceanothus* 'Valley Violet' in January. Early-blooming *Arctostaphylos* is a favorite as well.





California Native Perennials

Provide a variety of floral resources as well as habitat.

- *Phacelia spp.
- *Cirsium spp.
- Mimulus spp.
- Penstemon spp.
- *Aster spp.
- *Scrophularia californica
- *Grindelia spp.
- *Heterotheca spp.
- Helianthus spp.
- Achillea millefolium
- Ranunculus
- Epilobium spp.
- Frageria spp.
- *Hoita orbicularis
- Plantain spp.
- Wyethia angustifolia
- Silene spp.
- *Lepechinia spp.
- Aquilegia spp.
- Scutellaria spp.
- Sidalcea spp.
- Armeria maritima
- *Erigeron glaucus
- Eriophyllum spp.
- Viola spp.
- *Acmispon spp.
- *Perideridia spp.
- Asclepias spp.
- Camissonia spp.
- *Erysimum spp.
- Heuchera spp.
- Iris spp.
- Keckiella spp.
- Lessingia filaginifolia
- Lomatium spp.
- *Sisyrinchium spp.
- Solanum spp.
- Sphaeralcea spp.
- Stachys spp.
- *Solidago spp.
- Etc.

*casual observations in our gardens
show multiple species/visits





Aster chilensis



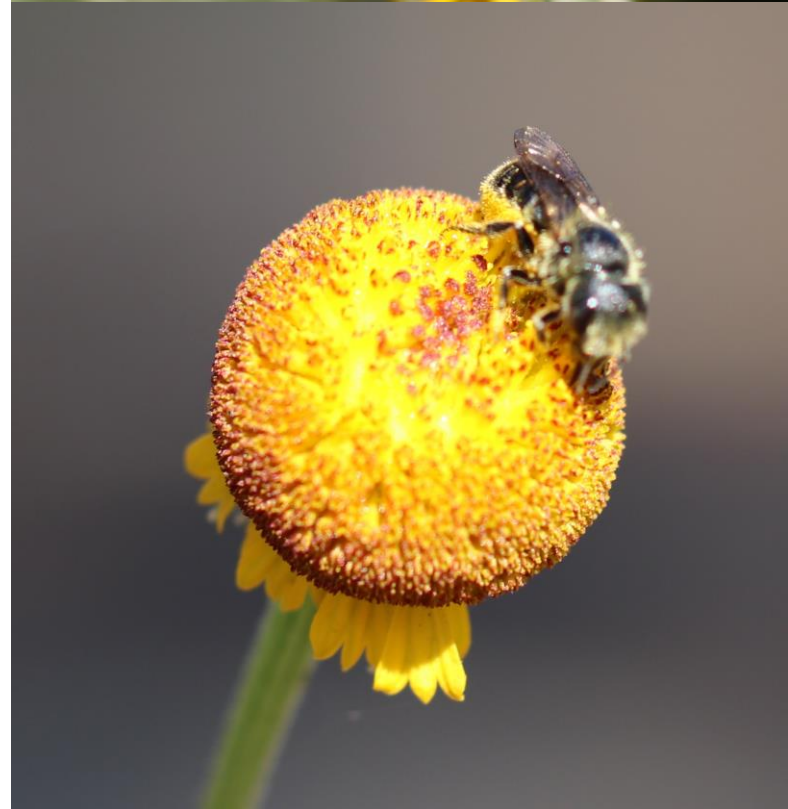
Eriophyllum
confertifolium



Grindelia
camporum



Helenium
puberulum



Clarkia amoena mix. Very easy from seed, reseeds, long bloom season.
Note the nectar guides on the petals.



Phacelia tanacetifolia.

Super easy to direct sow, reseeds, high quality nectar attracts masses of bumble bees.



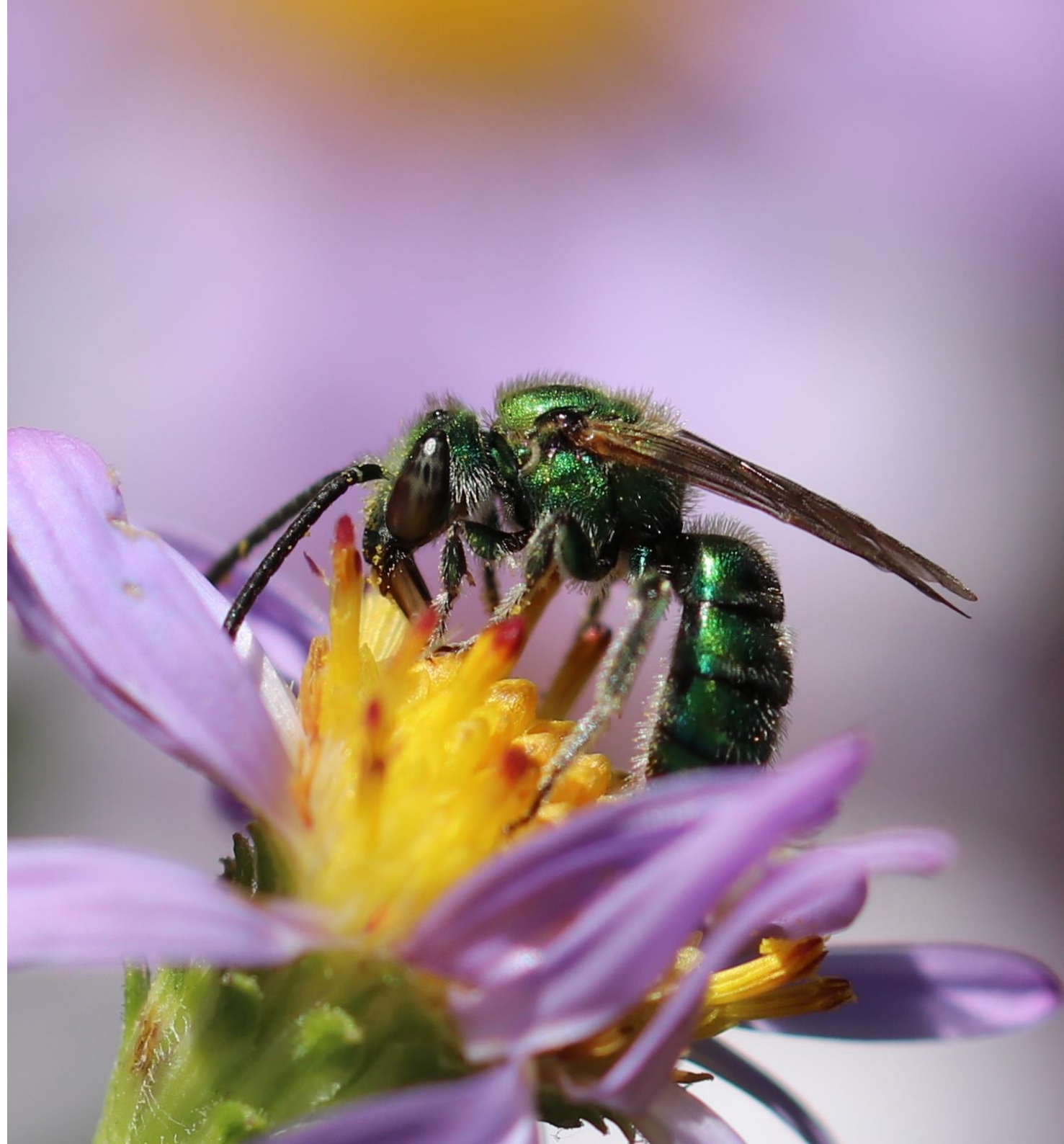
Observation is Key

Most bees don't see red, but can see ultraviolet. Blue, purple, white, and yellow flowers (which may have ultraviolet patterns we can't see) will be attractive to bees.

Flowers with petals or a globe shape and orientation patterns help a bee to land and find it's way to the nectar reward.

Eriogonum, Ceanothus and Asteraceae are examples.

Metallic sweat bee
on *Aster chilensis*



Resist the temptation to over-plant





Maintenance

- Keep weeds at bay.
- Irrigate the first 1-3 years to establish and then adjust to a drier regimen as the plants need.
- Wait to prune and clean up the garden
- Don't fertilize, amend sparingly.
- Mulch to control weeds and establish, then mulch with leaves (use a bit of wood bark on top to hold in place).
- Leave areas of bare dirt for nests.
- Don't use leaf blowers.
- Don't use pesticides, herbicides, or fungicides.
- Let annuals dry out, then trim them back and collect seed.

Gilia capitata

LEAVES AS MULCH

Helps prevent weeds, holds in soil moisture, insulate the soil, keeps soil cool. Provides a place for some insect species to over-winter, as the *birds quickly discover*.

Encourage fungal decomposition (unless finely shredded) and quickly break down.

Shred large, dry leaves with a mower or let them break down in a compost bin before adding them to the garden. You can also bag them up and use as needed.

Rake smaller leaves to areas around trees and shrubs, being careful not to place them directly against trunks and stems. You can weigh them down and make the garden look more tidy with with a thin layer of bark chips on top.

The leaf layer should be 3" or less deep.

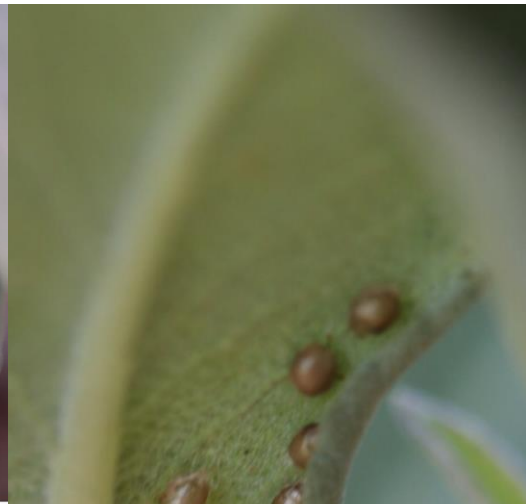


PRUNING DECISIONS

Insects occupy different places on plants, depending on what they are doing. For those over-wintering, they might have pulled a leaf blanket in close.

Other insects may be in the form of eggs, larva, pupae, or parasitized mummies.

Thus, look closely before pruning...or simply wait to prune.



Maintenance decisions and plant additions should be influenced by observation and research.

How many insect species on one plant?

Are the leaves being eaten?

Nesting behavior?

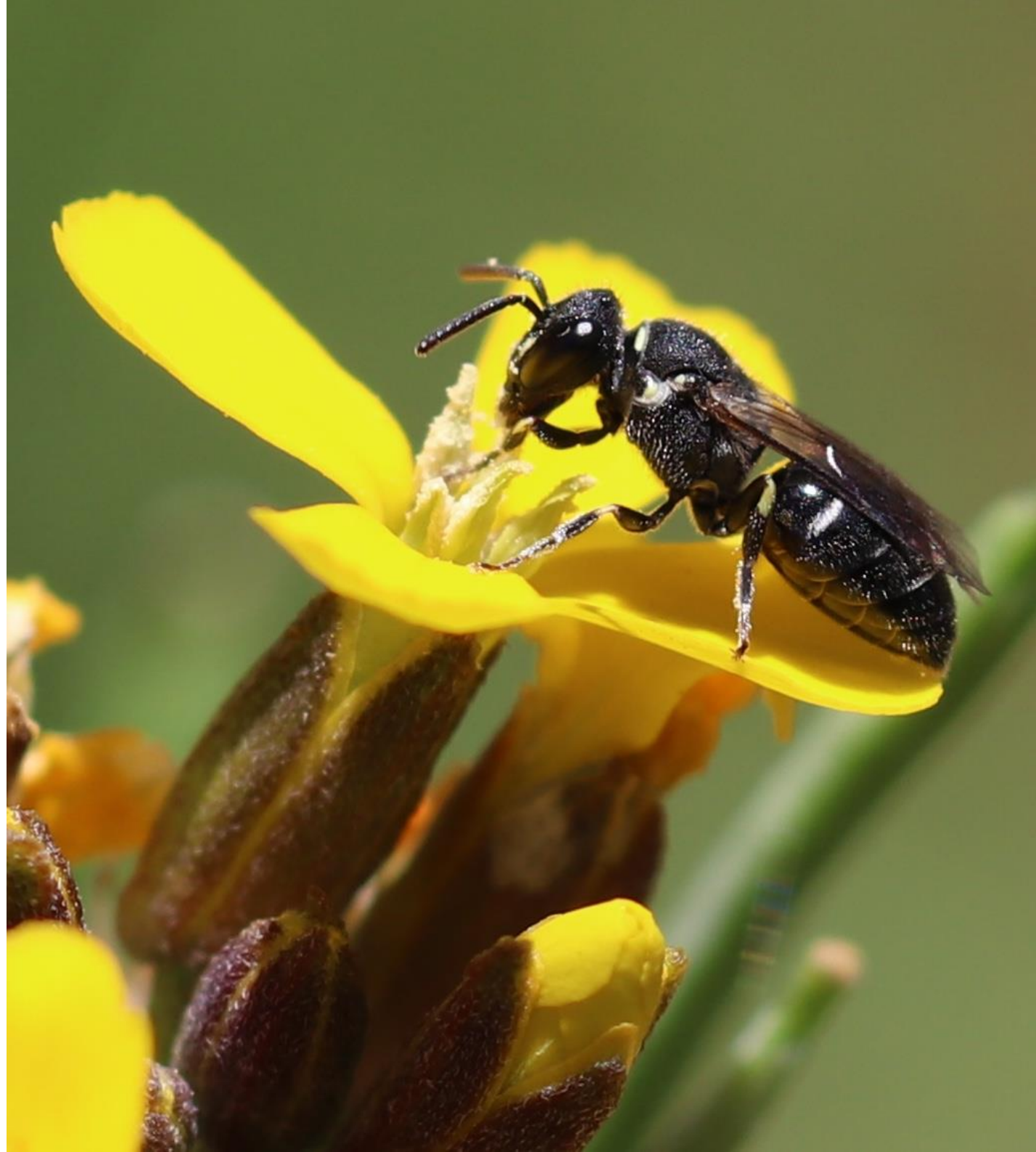
Times of day when active?

How hard is it to grow?

How will this plant enhance pollinator resources in the garden?

Is this a rare species I must have?

Erysimum sp.



Look closely before acting.

The world of bees and insects is at different scales than ours.



Silene scouleri

Enjoy the garden. Habitat = Home

