



## Southern California Horticultural Society – November 2020 Webinar Questions

This month, the Southern California Horticultural Society invited Dennis Mudd, founder of [Calscape](#) and co-director of [Smart Food Foundation](#), to present a webinar on how to restore nature in your garden.

These are Dennis' answers to questions we were unable to answer live, plus one from the SCHS Gmail and an email conversation between Dennis and Carol Bornstein.

To watch the full replay of Dennis' presentation, visit <https://youtu.be/eilqQPUR3a4>.

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1. How is Calscape maintained and updated?

Dennis Mudd (DM): I managed the site for around 12 years, but stepped aside about 2 years ago to work on another startup. Now CNPS manages the site directly.

2. Do you recall the source of the research on how large shrubs and trees pull water up and "share" it with other plants growing around them?

DM: Caldwell, Richards and Dawson were responsible for much of the research on hydraulic uplift. Here are a couple of good resources with references to the original research:

- o [https://www.researchgate.net/publication/225007998\\_Hydraulic\\_Lift\\_Consequences\\_of\\_Water\\_Efflux\\_from\\_the\\_Roots\\_of\\_Plants](https://www.researchgate.net/publication/225007998_Hydraulic_Lift_Consequences_of_Water_Efflux_from_the_Roots_of_Plants)
- o <https://www.ehleringer.net/uploads/3/1/8/3/31835701/208.pdf>

3. Your irrigation strategy is brilliant! As far as the bubblers in the rocky catchment, what is your watering schedule?

DM: Thank you! It really depends on how much it rained in the rain season. The last couple of years have been quite wet, so I didn't irrigate at all until September. Then, around once every 2-3 weeks after that until the rains started. I just turn on the bubblers manually on a cooler night during the period. I've found as the plants get more mature, the roots get deeper and wider, and the mychorral fungi more established, I need to add water to the system less frequently.

4. Do you remove any leaf litter due to fire danger?

DM: When the fire season starts, I remove leaf litter from the semi-riparian area nearest to my house, but not from the area farther away.



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5. Do you grow native plants from seed, and is it difficult? I'm especially concerned about the cost of native plants.

DM: I have a low overall success rate with most seeds I'm afraid. Acorns are easy, but for most plants, it's just way easier to buy 1 gallon plants. I don't think they cost much more than non-native plants. Better to grow from 1-gal plants anyway [in my opinion]. They are less likely to be rootbound and usually catch up to a 5-gal start in 1-2 years.

6. How do Engleman Oak differ from Coast Live and Valley Oaks when considering planting in oak woodland canyons?

DM: The biggest differences between Englemann and Coast Live Oaks are that Englemanns grow more slowly, and need a bit more water than Coast Live Oaks. In nature, Englemanns are more likely to grow on well watered mesas, with shallow water tables. But they also grow on shallow slopes near drainages or in lower slopes with more ground moisture.

Coast Live Oaks are a bit more drought tolerant, but in southern California also prefer to be near a creek or other water source, or just on a lower slope with more than normal soil moisture.

Both are spectacular plants and often grow right next to each other in nature. I don't have any firsthand experience with Valley Oaks since they don't naturally grow in San Diego county.

7. Any special planting technique that you have found works particularly well?

DM: Here's the [planting guide](#) I wrote for Calscape.

8. How long have you spent transforming your garden?

DM: Almost 15 years now!

9. Do you have Duckweed or Water Fern in your pond?

DM: Duckweed. My main pond plants are Seep Monkeyflower, Spiny Rush, California Bullrush, Southern Cattail and Marsh Pennywort. Scarlett Monkeyflower, Maidenhair Ferns, and a Shiny Willow grow in the marginal areas.

10. I live 3 miles from a major freeway (#10 in West Covina). [It's] very flat, very "lawny," very "track" home neighbor. [I] would like ways to create natural irrigation in this environment.



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DM: If you can, it really pays off to terraform a flat lawny garden, and build up berms and mounds, and dig down to create a catch basin / simulated creek. I paid a guy with a Bobcat to do that for my front yards, which was also quite flat before I started reworking it. I'd also bring in some fill dirt, too, to make the mounds even taller. Most California plants can handle a wide variety of soil, but they have a problem with flat poorly drained areas.

For my son's garden, we skipped the digging and just put a lot of fill dirt over the lawn to create the mounds and berms we wanted. [It] had the secondary benefit of killing all the grass as well.

11. Has your son's smaller garden managed to attract any raptors as your garden did?

DM: Yes, though he also lives adjacent to a canyon like I do. But he says he hears the Great Horned Owls pretty much every night, and sees hawks nearly every day. He also has numerous hummingbirds and butterflies.

12. Question from Jason H. via SCHS gmail: Is there a recommended planting plan for wildfire resistant design? For example, including succulents, native, etc. Which plants are okay closer to home and how [do I] to maintain the existing landscape?

DM: I think it really depends on your level of fire risk, and in particular on whether or not your garden is adjacent to a wild area. In my backyard, I have a big patio that is a good fire break, and only a handful of moisture loving plants near the house. In the front yard, I have more moisture tolerant plants close to the house in the front yard, like Toyon, and I make sure they get enough water to stay lush through the year. I did an experiment with a blow torch on green Toyon leaves and it was almost impossible to get them to ignite - same with green Oak leaves. Overall, unless a native garden is very dried out, it's less flammable than a regular garden - and way less flammable than a garden with eucalyptus or palm trees. Las Pilitas has some great resources:

- o <https://www.laspilitas.com/fire.htm>
- o [https://www.laspilitas.com/classes/fire\\_burn\\_times.html](https://www.laspilitas.com/classes/fire_burn_times.html)

Very useful info except the times measured for burn time on oak leaves likely were for dried out oaks. Oaks with plenty of water are very difficult to burn.



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*An email conversation between Dennis Mudd and Carol Bornstein:*

Carol Bornstein (CB): I had posed a question that was actually more about the water uptake phenomenon that [you] discussed. How are researchers determining that the water that trees and deep-rooted shrubs pull up is the same water being used by surrounding vegetation? I'm sure he has a reference for that.

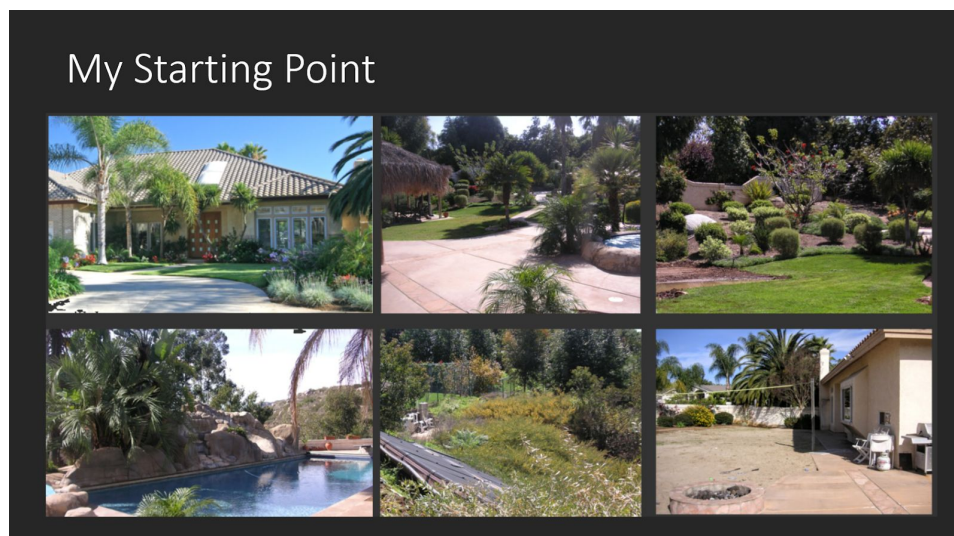
DM: This is probably the best summary reference:

[https://www.researchgate.net/publication/225007998\\_Hydraulic\\_Lift\\_Consequences\\_of\\_Water\\_Efflux\\_from\\_the\\_Roots\\_of\\_Plants](https://www.researchgate.net/publication/225007998_Hydraulic_Lift_Consequences_of_Water_Efflux_from_the_Roots_of_Plants)

Original research is well footnoted in the doc as well.

CB: It seemed like the soil on [your] property was fairly intact and undisturbed, which suggests that there was already a healthy population of mycorrhizal fungi present. Is that correct or did you inoculate during planting?

DM: Actually it was quite the contrary. My soil was mostly covered by grass, with a fair number of well watered palm trees and tropical plants on the banks (see image pasted below). The back bank was mostly just a big weed patch. So, I'd guess there was little to no mycorrhizal fungi present when I started. I purchased most of my plants from [Moosa Creek](#), and they inoculate all their plants with endomycorrhizal fungi. Ectomycorrhizal fungi are apparently broad spore spreaders, so I'm guessing my garden has been gradually inoculated by native ecto species in nearby canyons. I also added small amounts of pristine native soil and mulch to my garden to hopefully increase the diversity of the mycorrhizal fungi species in my garden, but hard to know if they took.





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CB: I'm curious about your son's garden. Is he blessed with well-drained soils as well? I had mostly sandy loam to work with at the Nature Gardens, thank goodness, but there is plenty of clay-dominated soils in the LA region and definitely so up in Santa Barbara. I learned about creating berms when I lived up there out of necessity.

DM: My son Jake's front yard is clay over hardpan, but we added some fill dirt on top of the clay to make a few mounds to improve drainage. See image pasted below. By the way, my front yard was originally sticky and poor draining clay - originally very flat, too. I brought in a bobcat tractor to terraform berms, mounds and valleys so the water drains away from the plants reasonably well, even though the structure of the soil itself is still poorly draining. It seems like the soil is easier to work now as the mycorrhizal fungi pull increasing amounts of carbon into the soil. It is definitely darker than it used to be. My back slope was really terrible fill dirt, but the mycorrhizal fungi also seems to have improved that soil dramatically over the past 10 years. In my own experience anyway, it's not too hard to grow natives in even poor and slow draining soils, as long as you engineer in some drainage pathways.



CB: Very interesting to hear about wood rats going after the cultivars. I'd like to hear more about that sometime. Did you keep records of what you've planted over the years and their respective fates? Since so many of our native cultivars are direct selections from the wild, it doesn't seem like they would be weaker or immune-deficient. I imagine that provenance is a significant factor.





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DM: I've really only bought cultivar Ceanothus and Manzanita species. Those were my favorites especially early on.

Ceanothus cultivars I planted were Frosty Blue, Wheeler Canyon, Julia Phelps, Dark Star, Luis Edmonds, Concha, Ray Hartman, Snow Flurry, Snowball, Blue Jeans. Nearly all would do great for 2-3 years and then die, most after gradual branch dieback. I'd guess I lost over 100 cultivar Ceanothus over the last 15 years! All spectacular plants so I kept trying until I gave up on cultivars about 5 years ago. Concha, Snow Flurry and Dark Star usually got a black mildew before dying. My Julia Phelps tended to die very quickly. Snow Flurry and Ray Hartmans did the best, but were almost always torn up by wood rats. I think they have closest parentage for my region, though *Thyrsoflorus* grows in the much rainier mountains above San Diego, but not the foothills where I live, and *Arboreus* in the channel islands which is much cooler than where I live. I still have 1 Snow Flurry and 3 Ray Hartmans left. Only last the Snow Flurry looks fairly healthy, but still gets a black mold every summer. It's about 5 years old. The Ray Hartmans are doing their best, but they lose most of their shoots and foliage every year thanks to wood rats. They are also about 5 years old.

On the other hand, I've lost only a couple of the straight natives that are native to Poway - *C. tomentosus*, *leucodermis*, *verrucosus*, *crassifolius* and *cyaneus*. And two I lost were planted too close to irrigated areas. I'd guess I have around 50 spread out across my garden.

Manzanita cultivars I planted were Dr. Hurd, Sunset, *Refugioensis*, Sentinel and John Dourley. All died after gradual branch dieback, except one Sentinel, which actually looks OK but is still tiny after 10 years. On the other hand, I've never lost an established *A. glauca*, *A. glandulosa* ssp. *glandulosa*, or *A. glandulosa* ssp. *crassifolia*. Or a *Xylococcus bicolor* either (all are native to Poway). Most were started from 1g containers and are quite large already. I figure I've got ~30 spread out across my garden.

QB. There is a renewed interest in native plant gardening and I am heartened by that. Because water is still so cheap relative to other natural resources, conserving it still isn't a huge savings budget-wise. We've never had the equivalent in the gardening world to the oil embargo from the 1970s or whenever that was. I'd love to see a large scale shift like the auto industry's response. Even though there are once again many gas guzzlers on the road, people's collective consciousness about gas mileage and air pollution stuck to a significant degree. What do you think it will take to get folks other than your biking buddies to make the switch?

DM: Yes, I definitely agree. For me, saving water is a tertiary benefit of native gardens. My preference for straight species is driven first and foremost by a desire to have a



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garden that feels (and is) truly natural, and secondarily by a desire to avoid trips to the dump :-)

The last part of your question is a tough one. Personally, I think love of nature is the best message for convincing people to plant natives. People love nature, nature is being destroyed at breakneck speed by development, especially in Southern California, and the only way to save it is to integrate it into the developed part of the state. If there's one thing I hope my garden does it's show that it's not that hard to recreate a beautiful and exceptionally biodiverse bit of nature even when starting from a grass and tropical plant starting point. (it's already worked for some of my mountain biking buddies!) I'm really encouraged that CNPS horticulture has taken up "Restore Nature One Garden at a Time" as their tagline, and also by the success CalScape has had. Also encouraging that so many water districts are now pushing the CalScape site too.

Definitely going a lot more slowly than I would like, but I am hopeful!