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CALIFORNIA NATIVE PLANT SOCIETY

BULLETIN

Vegetation Map Supports Desert Project Planning

Future renewable energy projects can be steered away from critical habitats

By Todd Keeler-Wolf and Janet Reyes

Although solar and wind power projects started in the Mojave Desert in the early 1980s, development activity increased enormously when Former Governor Arnold Schwarzenegger signed Executive Order S-14-08 on November 17, 2008, requiring that "... all retail sellers of electricity shall serve 33% of their load with renewable energy by 2020."

Since that time, permitting agencies have approved a number of projects without adequately assessing their environmental impacts. A contributing factor to this unfortunate situation was the lack of a reliable vegetation base map, which hindered the ability of planners to steer development away from critical desert habitats. Existing vegetation map data was often too general, too outdated, or too spotty in coverage.

As reported in earlier editions of the *CNPS Bulletin* (Suba Oct–Dec 2010; Hansen and Suba Jul–Sep 2011), a priority of the Desert Renewable Energy Conservation Plan (DRECP) has been the creation of an up-to-date, high-resolution vegetation map of the desert to identify these critical habitats. Thanks to an intensive two-year collaborative effort among CNPS, the California Department of Fish and Wildlife (CDFW), and Aerial Information Systems Inc., about six million acres of vegetation in the Western and Central Mojave and Northeastern Colorado Deserts of California have now been mapped. With this data, federal and state partner agencies can evaluate different planning scenarios for renewable energy development with a clearer understanding of potential impacts on our biologically rich desert landscapes.

This map, based upon the vegetation classification system in the CNPS *Manual of California Vegetation*, 2nd edition, sets a new standard for detail and accuracy in desert vegetation mapping. The map was produced using both geographic information system (GIS) technology and field surveys to assess vegetation patterns in some of the most highly valuable and diverse regions of California's desert landscape located outside of the national parks and wilderness areas.

As you might guess, mapping some of the low-lying, scrubby desert vegetation is similar to searching for sparrows in a big field of dry grass. You know they are there, but you have to know where they hide, and sometimes you can't see them until you are literally on top of them.

To help demystify the enigmatic desert vegetation, field crews drove and hiked across the desert landscape, ranging from the poppy fields of the western Antelope Valley to the alluvial fans supporting communities of ironwood *(Olneya tesota)* and blue palo verde *(Parkinsonia florida)* near the Colorado River.

The crews assessed thousands of individual stands of vegetation from the ground. Photo interpreters applied this information to the patterns they observed on high-resolution aerial imagery, produc-

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Edward Reyes

In the western portions of the Mojave Desert, saltbush scrub dominates over thousands of acres near Rogers and Searles Dry Lakes. Much of this landscape is high priority for solar energy development, and is also the last stronghold for endemic sensitive species such as the desert cymopterus and Mojave ground squirrel. In this photo, a sparse cover of the blue-green spinescale saltbush offers a sharp contrast to the dense carpet of California goldfields underneath.



From the Executive Director

Plans, Plants, and People

Big planning is a big fad these days, with California seeing a proliferation of large-scale planning efforts with awkward acronyms: the BDCP (Bay Delta Conservation Plan), DRECP (Desert Renewable Energy Conservation Plan), VTPEIR (Vegetation Treatment Program EIR), and HCPs (Habitat Conservation Plans) and NCCPs (Natural Community Conservation Plans) covering countless regions across California.

Some of these plans are conservation victories. For example, the Santa Clara County HCP benefited from early involvement of CNPS and others, and benefits important rare plants. Some plans are lost opportunities, such as the DRECP. While it will cover 26 million acres and last 30 years, it has been rushed, is hampered by bad science and incomplete data, and will likely be approved over the protests of its own science committee.

Other plans are a mixed bag. For instance, the BDCP claims to restore or protect 100,000 acres of the Sacramento-San Joaquin River Delta, but the terribly complex details are buried in many thousands of pages of text. More importantly, it sends huge volumes of water to "faux farmers" in the southern San Joaquin Valley who are more interested in growing cities than cultivating crops.

In all of these planning efforts, CNPS is advocating on behalf of plants and plant communities. Too often we are the only organization advocating for plants, and in many cases the agencies' planning staff actively solicit our input. The demand for CNPS input is great, and would almost be flattering if it weren't so worrisome.

This proliferation of mega plans (the VTPEIR covers 35% of California) is happening at a bad time. For decades, state and federal agencies have been eliminating botany positions and have diminished their capacity to adequately consider plants. Consequently, plans are worse than they would be if agencies had adequate botany staffing, and so agencies are increasingly reliant on the botanical expertise provided by CNPS. Our capacity to provide feedback is stretched.

We are responding in several ways. First, we thank the hundreds of dedicated CNPS volunteers who give their nights and weekends to analyze and comment on these plans! Second, we are organizing subcommittees focused on specific issue areas (such as forestry reform or desert planning), recruiting new dedicated participants, and exploring new ways to better support our conservation volunteers.

Finally, we are beginning a conversation that we hope you will join, expanding upon this message: botany is fundamental, and cuts to botany capacity have fundamentally weakened the system. Renewed investment in botany will help agencies to avoid train wreck controversies, and ensure protection of the marvelous flora that we have inherited.

Students Prepare Rare Plant Conservation Plans

Rancho Santa Ana Botanic Garden (RSABG) offers a graduate course where students learn to prepare conservation plans for rare plants. Each student selects a plant from the *CNPS Inventory* with a California Rare Plant Rank of 1B, and that is currently not state or federally listed. They then conduct a literature search, visit all known populations, assess threats, and establish partnerships with stakeholders. Ultimately, they construct a detailed conservation management plan and publish their research through RSABG.

Agencies and land managers today have few resources for conducting research on rare 1B species *before* the species need to be listed. The management plans developed by students are valuable because they summarize existing and new population information and make recommendations for maintaining populations in the face of clearly identified threats. Ideally, this can lead to action that prevents the plants from having to be listed at all.

This year, with thanks to a generous donor, CNPS is supporting student research costs and the publication of conservation plans, and also promoting the development of this type of program at several universities. Please get in touch if you are interested in this program or other CNPS rare plant work.

Josie Crawford
CNPS Education Program Director

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San Clemente Island: A Rare Plant Success Story

Effective land management responsible for recovery of 15 CRPR 1.B plants

By Aaron E. Sims and Danny Slakey



Aaron E. Sims

The following rare plants are only found on San Clemente Island, and have been proposed for downranking due to the success of recent restoration efforts. Clockwise from top left: San Clemente Island lotus *(Acmispon dendroideus* var. *traskiae)*, San Clemente Island brodiaea *(Brodiaea kinkiensis)*, San Clemente Island Indian paintbrush *(Castilleja grisea)*, Blair's wirelettuce *(Munzothamnus blairii)*, San Clemente Island buckwheat *(Eriogonum giganteum* var. *formosum)*, and bright green dudleya *(Dudleya virens* subsp. *virens)*.

It is not often that we get to celebrate stories of success regarding the recovery of rare California plants. When asked to provide such stories in the past, we often drew a blank and could only think of the few successful rediscoveries of plants that had been presumed extinct in the past decades.

Although tremendously exciting and significant in and of themselves, these are not the stories of recovery of rare plant populations through effective land management and rehabilitation that people were asking about. Today, however, we are happy to report on one such story. It is the successful recovery of most of the native plants of San Clemente Island.

San Clemente Island is one of the eight Channel Islands located off the coast of Southern California. Together they encompass an exceptional flora with many rare and endemic plant species. Of all the Channel Islands, San Clemente Island has a particularly unique flora, hosting 15 plants that are known from nowhere else in the world, and an additional 48 plants that are only known from the Channel Islands.

This is due, in large part, to its long history of isolation, being one of the Channel Islands that was not completely submerged during sea level rise in the late Pleistocene Era. This isolation, however, also came with great costs in terms of pressures imposed on the island's flora throughout its recent history.

Feral goats were introduced onto the island at least by the early 19th century, and by 1840 it was said that the goat population was prolific. Feral pigs were also introduced at an unknown date, and by 1877, sheep and cattle were raised on the island for commercial production. The devastation to the flora caused by these herbivores was immense. A number of plants were extirpated from the island, and it is possible that some plants never known to science became extinct before botanists were able to explore it.

Due in part or entirely from this damage, there are currently 61 plants on the island that are included in the CNPS *Inventory of Rare, Threatened, and Endangered Plants of California*. Over half of them are California Rare Plant Rank (CRPR) 1B taxa, meaning they are rare in California and throughout their entire known range.

In 1934 the US Navy took acquisition of the island, and by 1972 began removing the feral herbivores in response to the threats they posed. By 1991 the feral goats and pigs had been completely eradicated, with a total of over 29,000 goats removed. Several studies were initiated after the removal of feral animals to determine the status of the island's vegetation. Today the US Navy actively manages San Clemente Island to promote successful recovery of its native vegetation through continued rare plant surveys, revegetation of natives, weed eradication, and erosion control.

A total of 15 CRPR 1B plants from San Clemente Island have been proposed for down-ranking to CRPR 4 (watch list) due to their recovery. Six of these 1B plants are endemic to the island itself (all six are pictured above), and two of them—the San Clemente Island lotus (*Acmispon dendroideus* var. *traskiae*) and San Clemente Island paintbrush (*Castilleja grisea*)—are additionally being proposed for downlisting from Federally Endangered to Threatened. These downlistings are particularly significant as they were among the very first plants

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CHAPTER NEWS

SANTA CLARA VALLEY CHAPTER:
Reaching beyond CNPS members via YouTube

One of the best things about CNPS is being able to learn about native plants, both in a natural setting as well as in our gardens. Our chapter hosts lots of talks about native plants, and this learning experience has always been a wonderful benefit of being a member.

Last year I began thinking about how we could share these talks, and I decided to learn how to videotape the lectures so they could be shared with a wider audience. We now have a large selection of videos covering much of the process of designing and taking care of a native plant garden, as well as videos on a great many topics. To give you a sense of the breadth of our programs, a few recent ones we have taped include "The Evolutionary Ecology of Two Serpentine Endemics," "Songbird Gardening" (cohosted with the Audubon Society), and "Why Plants Have Colors."



A composite of images from a PowerPoint presentation titled, "Why Plants Have Colors," given by Jim Bishop on August 17, 2012. A video of his talk is now on YouTube and can be found on the Santa Clara Valley Chapter's website, but others who search the Internet will also be able to find it.

All these videos are available from our chapter website, cnps-scv.org, under Education/Presentations, but the videos themselves are hosted by YouTube. We used YouTube because it helps to have a specially configured website to host video, and that way we didn't have to pay for all the bandwidth that might be required if many folks wanted to watch the video at the same time.

YouTube also allows us to track who has viewed the videos, which is how we know that we have had about 7,0000 "views" to date. Most are from California, but there are also some from every other state in the US, as well as several hundred views from all across the globe. A one-page set of notes to get you started on producing videos is available here: cnps-scv.org/fileUploads/videoinstruction.pdf. If you are interested in learning more or have questions, feel free to contact me at sailinsteve@sbcglobal.net.

The state CNPS organization is now setting up a YouTube channel that will allow us to host content from chapters across the state and provide a single place for people to find videos about California's native plants.

Stephen Rosenthal, President
Santa Clara Valley Chapter

Success Story *(from page 3)*

to gain protection under the Environmental Species Act back in the late 1970s.

Following the retrieval of past and present data on the rare plants of San Clemente Island, the California Department of Fish and Wildlife's Natural Diversity Database (CNDDB) promptly updated and added over 750 occurrence records for the CRPR 1B plants on the island. After the updates, the CNPS Rare Plant Program and CNDDB initiated the status review process for these plants last year, starting with San Clemente Island paintbrush. (For an explanation of the review process, see the *CNPS Bulletin*, Vol. 42, No. 1, Jan.-Mar. 2012.) While the paintbrush did not qualify for downranking to CRPR 4, its threat rank was changed from 0.2 (moderately threatened) to 0.3 (not very threatened) in order to reflect its recovery and effective management by the US Navy.

Although many of the other proposed plants might not qualify for downranking, mostly due to their restricted distributions, they have recovered remarkably in terms of increased numbers of plants and distribution, as well as successfully reestablishing themselves throughout the island.

The CNPS Rare Plant Program and the CNDDB program applaud the US Navy for their commitment to environmental stewardship and conservation.

Aaron E. Sims is CNPS's rare plant botanist. **Danny Slakey** is CNPS Rare Plant Program assistant and statewide Rare Plant Treasure Hunt coordinator.

Book to Benefit CNPS

Living Wild—Gardening, Cooking, and Healing with Native Plants of California by Alicia Funk and Karin Kaufman. 2013. 2nd edition. Flicker Press. 175 pages. $29.95. Available online from the CNPS bookstore.



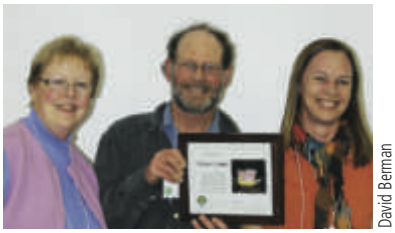
Alicia Funk of The Living Wild Project is donating 100% of book profits from the sale of her book to support CNPS because, she says, "We must work together to grow and conserve native plants so future generations of wildlife and humans can enjoy the habitat we call home."

An invitation to celebrate California's heritage and culture weaves through *Living Wild*, an essential guide to the uses of native plants. The expanded 2nd edition offers a deep awareness of the landscape, with advice on cultivating more than 100 native plant species and enjoying this natural abundance for sustainable wild food cuisine and herbal medicine recipes.

Volunteer Recognition Awards

CNPS regularly recognizes members for outstanding contributions to the preservation and appreciation of California's native flora through its Volunteer Recognition Award. CNPS is grateful for all these volunteers have done.

Laura Camp is the latest recipient of this award. Laura's many activities on behalf of CNPS have greatly enhanced interest in and the effectiveness of the Orange County Chapter. She has served as chapter president, as delegate and secretary to the CNPS Chapter Council, and continues to serve on her chapter's board of directors.


David Berman

Laura Camp (right) receives the CNPS Volunteer Recognition Award from Mary Frances Kelly-Poh, representing the Volunteer Recognition Committee, and Brett Hall, president of the CNPS Board of Directors.

Laura is currently secretary of the CNPS Board of Directors and a member of the Executive Committee. She serves on the state membership committee and also on the horticulture committee, which she chairs. Laura spearheaded the CNPS Chapter Challenge in support of the successful 2012 Conservation Campaign.

Laura is a font of ideas, applies thoughtful insight to achieving goals, and has proven her willingness to lead activities by working with chapters, staff, and CNPS leadership. Congratulations!

Charles Blair, Chair
Volunteer Recognition Committee

In Appreciation: Chuck Heimstadt and Loretta Brooks

Promoting the importance of native plants

Chuck Heimstadt and Loretta Brooks have only been CNPS members for about five years, but they have taken to the cause of locally native plants with an enthusiastic zeal.

It all started a few years ago with guided weekend wildflower walks in Edgewood County Park near Redwood City, and in no time Chuck and Loretta started participating in the volunteer weeding program there.

When a proposed housing development project threatened part of Sign Hill, a detached portion of San Bruno Mountain, Chuck and Loretta found their way to San Bruno Mountain Watch. Quickly they were placed on San Bruno Mountain Watch's conservation committee and approached by Executive Director Ken McIntire to head up a new weeding program for the south side of the mountain. Through a program with the City of South San Francisco, Chuck and Loretta have adopted the Ridge Trail in Sign Hill Park, and have put in a native plant demonstration garden with the support of the city's Parks and Recreation Department. Now both retired, the majority of their free time is spent restoring habitat in some form or another.

When asked, "Why CNPS?" Loretta explained that they appreciate the efforts of so many who have selflessly given their time, expertise, and effort to promoting the importance of native plants to all creatures great and small. She quotes Desmond Tutu, "Do your little bit of good where you are. It is those little bits of good put together that overwhelm the world." Chuck and Loretta have done a lot more than a "little bit of good" in their part of the world—they are shining examples in their community of the difference two people can make.

Stacey Flowerdew, Membership and Development Coordinator



Loretta Brooks and Chuck Heimstadt

Desert Project

(from page 1)

ing a map containing information about the floristic composition, structure, and disturbance level of each mapped patch of vegetation.

The mappers faced some challenges unique to the desert environment. One of the biggest was distinguishing among the seven species of saltbush (*Atriplex)* found in the region, including extensive stands of allscale *(A. polycarpa)*, spinescale *(A. spinifera)*, and shadscale *(A. confertifolia)* just to mention a few. Not only is it difficult to tell the species apart on aerial imagery, but in many cases there is an overlap in the environmental settings favored by each species.



John Fulton

Fields of California poppies near the Antelope Valley California Poppy Reserve in the western Antelope Valley. These are the best and most reliable poppy fields left in California and occur in a hotspot for genetic and biological diversity, which had been overlooked until an updated vegetation map was produced. Stands here mix with red bromes and other non-native annual grasses.

Another challenge was the diverse response of desert flora to disturbance, which includes fire, grazing, and human activities. Disturbance throws off the predictability of where plants are expected to occur. Many of the very small shrubs found in the mid- to higher elevations are also followers of disturbance. Among these are plants of the genus *Ericameria* (including rabbitbrush), white bursage *(Ambrosia dumosa)*, buckwheat *(Eriogonum fasciculatum)*, and spiny hop sage *(Grayia spinosa)*.

To make sure these challenges did not compromise map quality, before the map was finalized field teams checked a random selection of 3,000 of the more than 46,000 individual patches of mapped vegetation. This helped ensure that the accuracy of the final map met accepted standards. And it did: its accuracy, averaging about 84% over all the types, is unsurpassed for a fine-scale map in a land of low vegetation cover and high diversity (137 separate types mapped). As such, it provides a baseline for assessing the location of rare, undisturbed, highly diverse, and/or sensitive plant communities.

Much of the map's value lies in the level of detail and the many ways the information it contains can be customized for particular purposes. The map is technically a "geodatabase:" it combines the visual impact of a map with the power and flexibility of a database. For each polygon (an individually mapped patch or stand), there is information on the vegetation type, cover of the overstory, understory, level of human development, road density, and the proportion of native to non-native vegetation.

One especially useful aspect of the geodatabase design is the assessment of the presence of the protected species Joshua tree *(Yucca brevifolia)* in each polygon. This means that even though the map may characterize an area as a creosote bush *(Larrea tridentata)* community, the presence of even a few Joshua trees among the creosote is noted in the data. Joshua trees—including isolated ones—provide places for raptors and other birds to perch and nest. Such areas can be flagged as having additional habitat value.

The different attributes present in the geodatabase can be displayed and analyzed in any combination. For example, one could assess which areas of native grasslands have a low level of human disturbance and which ones already have been impacted by human activity. Information from other studies can also be incorporated. For instance, users can add in data on field observations of the Mojave ground squirrel, and then compare it to various attributes of desert vegetation to see if meaningful correlations might help identify likely habitats for this vulnerable species.

The rarity of natural communities within the DRECP area is another important type of information that can be gleaned from the new vegetation map. A code for state and local rarity was applied to each of the vegetation types mapped. Once identified, rare communities such as desert olive *(Forestiera pubescens)* can be assessed for acreage, current levels of disturbance, and proximity to proposed developments.

Other uses of the data include identifying alternatives for preserving corridors that connect sensitive habitats, and establishing buffer zones around irreplaceable communities. The map also will serve as a baseline against which future habitat changes can be assessed.

The above examples only scratch the surface of how the new desert vegetation map can enhance the ability of planners to make quantitative, defensible decisions in the trade-offs between the development of much-needed energy alternatives and the protection of important plant habitats.

To find out more about the map, please visit the CDFW Vegetation Program website: http://www.dfg.ca.gov/biogeodata/vegcamp/veg_classification_reports_maps.asp.

Todd Keeler-Wolf is the senior vegetation ecologist at the California Department of Fish and Wildlife, and co-leads the agency's Vegetation Classification and Mapping Program. **Janet Reyes** is a geographer at Aerial Information Systems in Redlands, CA.

Integrating Vegetables Into the Native Plant Garden

By Susan Krzywicki

Native gardens and vegetable gardening do not have to be mutually exclusive. There are two distinct approaches that work. One is to zone an area for vegetable production, including separate irrigation for high-water users, and then use natives in the surrounding spaces. The other is to integrate vegetables with native edibles and ornamentals.

These two approaches both reflect the ideas of a permaculture: a complex system focused on high density food production with minimal inputs. We don't normally think of permaculture or urban farming as having a place for native plants. But natives play many roles in enhancing food production, including attracting beneficial insects, crowding out weeds, and maintaining soil health.

Creating zones is straightforward: you design your garden with raised beds for production. Fill them with the loamy soil that vegetables love, run drip irrigation, and set the timer to match your particular microclimate. Then surround this with natives that don't mind a bit of extra irrigation, such as Cleveland sage (*Salvia clevelandii*), penstemon (*Penstemon* 'Margarita BOP'), and yarrow (*Achillea millefolium* spp).

However, many native plant gardeners may prefer an alternative "mosaic" approach that integrates vegetables and natives into the same space. This necessitates using the native riparian species and cultivars that naturally prefer more moisture.

But this is not just about water. Contrast the soil preferences: chaparral or coastal sage scrub species are found in fungus dominated soils with low nitrogen levels. Vegetables prefer bacterially dominated soils with higher available nitrogen. The miracle of our California Floristic Province is that our less-often used riparian species do, indeed, prefer bacterially dominated soils.

If you locate the vegetable area of your garden where you can edge the soil profile towards a fluffy, loamy soil with nice bacterial counts, you will have a perfect solution. You can then combine edible and ornamental natives along with exotic edibles in the same way that Rosalind Creasy and Ivette Soler write about in their books on edible landscaping and front yard gardens.

How pretty can a riparian-vegetable mosaic garden be? Think of the softer, greener look of trees like buttonwillow (*Cephalanthus occidentalis*) and colorful bulbs like the leopard lily (*Lilium pardalinum*) or Douglas iris (*Iris douglasiana*). The native riparian species break up the vegetable monoculture and interrupt pest vectors. Native plants act as alternatives for insects, drawing them away from the vegetable species and attracting beneficial insects.

Grow Mexican elderberry (*Sambucus mexicana*) and make wine. Add a native cherry tree to your garden. Select one of the tree-shaped forms, like Catalina cherry (*Prunus ilicifolia* subsp. *lyonii*), or the hedge-shaped continental variety, hollyleaf cherry (*Prunus ilicifolia*).

The native California wild rose (*Rosa californica*) can be grown for its hips. Golden currant (*Ribes aureum*), wood strawberry (*Fragaria vesca*), the native Pacific blackberry (*Rubus ursinus*), and huckleberry (*Vaccinium ovatum*) will all provide you with berries, and appreciate the extra water that adjacent vegetable plants will receive. Native edible annuals can also be included in your mosaic garden design, such as chia (*Salvia columbariae*), miner's lettuce (*Claytonia perfoliata*), and several species of lupines.

Use our popular deer grass (*Muhlenbergia rigens*) or canyon prince wild rye (*Leymus condensatus* 'Canyon Prince') in attractive clumps. Add ornamental shrubs and perennials such as yerba mansa (*Anemopsis californica*) or cinquefoil (*Potentilla gracilis*). Near the coast, Menzies' goldenbush (*Isocoma menziesii*) is great at attracting butterflies, and marsh fleabane (*Pluchea odorata*) is a bee attractant. And, of course, California fuchsia (*Epilobium canum* 'Catalina') is always a good choice.



Susan Krzywicki

A combination of natives and edible plants, such as cinquefoil, strawberries, tomatoes, and basil, typifies the mosaic garden design.

As you decide on plants for your garden, remember to consider dormancy or "down periods." Vegetables, annuals, and even shrubs may have varying periods of die-back, leaf drop, and crop harvesting aftermath. Miner's lettuce (*Claytonia parviflora*) disappears and reappears; California gooseberry (*Ribes californicum*) is deciduous.

Balancing harvest, dormant, and bloom periods means that some creative forethought, as well as trial-and-error, will keep your gardening project a dynamic one. With these techniques, you can develop a permaculture that is beautiful, includes our California heritage, and also provides us with healthful food for humans as well as the birds and butterflies we all love to see.

Susan Krzywicki is a California native plant landscape designer in San Diego. She chairs the San Diego Chapter Gardening Committee, sits on the chapter board, and is chair of the San Diego Surfrider Foundation Ocean Friendly Gardens Committee.


Greg Suba

CNPS Conservation Program Receives Grant for Desert Conservation

The CNPS Conservation Program was recently awarded a grant from the Giles W. and Elise G. Mead Foundation to help fund the Program's Desert Renewable Energy Initiative.

The goal of this ongoing work is to conserve native plant species and communities across California's desert region by directing solar, wind, and geothermal energy development onto already disturbed lands and away from ecologically functional, intact landscapes like those of the Silurian Valley in San Bernardino County, California, pictured here.

The grant will fund the coordination of a volunteer committee of topic and region-specific experts in native desert flora. The committee's information and recommendations will improve CNPS's continued involvement in desert conservation planning.

Next Chapter Council Meeting

(Details available at: http://cnps.org/cnps/admin/cc/)

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