*Dedicated to the Preservation of California Native Flora*

# The California Native Plant Society

Bristlecone Chapter Newsletter

**Volume 45, No. 3**
**May–June 2024**

## New Chapter Website

The local Bristlecone Chapter of the California Native Plant Society (CNPS) recently launched their new website. The chapter took advantage of the state CNPS offer of financing and maintenance of a new website using WordPress templates. One big advantage of the WordPress website is its ease of updating. The new site shares many similarities with the main CNPS website, other chapter websites, and is mobile- and tablet-friendly.

The CNPS Bristlecone Chapter is one of 36 chapters across California. The chapter was founded by Independence botanist Mary DeDecker and other Owens Valley residents in 1982. Named for the oldest and most magnificent of the world's trees, the Bristlecone Chapter covers the region from Indian Wells Valley in northeastern Kern County and all of Inyo County northward to the northern boundary of Mono County.


The home page of the new website, https://chapters.cnps.org/bristlecone/, features links to upcoming events such as field trips, native plant sales, and pollinator garden tours (coming on June 1). Our current bi-monthly newsletter and the previous six newsletters are all available one click away from the home page. There are also links to photos and information about our local plants of interest, local conservation issues, and the Mary DeDecker Botanical Grant Program.

*—Stephen Ingram*

## General Meeting

**Wednesday, May 22nd, 7:00 p.m.**
**White Mountain Research Center**
**3000 E. Line St, Bishop**

**Speaker: Mahima Dixit, Bristlecone Chapter DeDecker Grant recipient**
**Title: *Phylogeny and Taxonomy of the* Eriogonum deflexum *Complex (Polygonaceae)***

Mahima is a PhD student studying Botany at Claremont Graduate University and California Botanic Garden. Growing up in a household with immigrant parents, she was exposed to plants through home remedies. While attending Point Loma Nazarene University, her love for plants developed through her study of ethnobotany and stress response of plants in the coastal sage scrub habitat. After she graduated with a B.S. degree in Biology and a Music minor in 2022, she began attending Claremont Graduate University/California Botanic Garden to study the phylogeny and taxonomy of a group of *Eriogonum* species (see her progress report in this issue). Her recent transition from a master's to a PhD program was prompted by a desire for a more interdisciplinary project including ethnobotany and phytochemistry within *Eriogonum*. Outside of schoolwork, Mahima enjoys music and sings in a local community choir. She also enjoys going on hikes and walks on local trails, as well as spending time with her sisters and friends, especially if it involves food and boba.

## Conservation Updates: The Future of Solar Development on BLM Lands

Whether we like it or not, utility-scale solar development is likely to increase on public lands. According to the Department of Energy, roughly

700,000 acres of public lands may be needed to help meet national goals for reducing carbon emissions. The Bureau of Land Management (BLM) is in the process of a planning effort in 11 western states, including California, to decide where exactly these projects will be allowed to go and establishes certain criteria on how they should be built.

In our chapter area, the BLM lands being considered occur approximately from Coville to Cartago. BLM lands further south are covered by the Desert Renewable Energy Conservation Plan (DRECP) and are excluded from the current planning effort.

BLM is considering five scenarios ("Action Alternatives") that utilize a variety of criteria to direct where solar projects can be developed including slope, proximity to transmission lines, and existing disturbance. Alternative 1 (maximum 55 million acres) is the most permissive and Alternative 5 (maximum 8 million acres) would limit solar applications to previously disturbed lands that are within 10 miles of existing and/or planned transmission lines and would also exclude lands with greater than 10% slope. In all cases, an additional set of 21 criteria would exclude additional areas such as designated critical habitat for federally endangered species or documented Tribal interest areas. Some of these exclusions are difficult to map due to information sensitivity or incomplete data, and it is likely that the acreage estimates for each of the Action Alternatives will be reduced because of this.

The comment period for this stage of the planning effort closed on April 18th. BLM will consider these comments before publishing a final document later this year which will also be open for public comment. You can find more information regarding the solar planning effort, including a link to an interactive map, here: https://eplanning.blm.gov/eplanning-ui/project/2022371/510. (See an additional map on pg. 7.)

While this high-level planning effort will greatly impact where utility-scale solar projects are sited in the years to come, each individual proposed project will still require environmental analysis at the local level which will likely include additional opportunities for public comment.

*—Maria Jesus*

## 2023 DeDecker Grantee, Progress Report

**Mahima Dixit, PhD Student in Botany, California Botanic Garden/Claremont Graduate University**

***Phylogeny and Taxonomy of the* Eriogonum deflexum *Complex***

Through support from organizations such as the CNPS Bristlecone chapter, I have been able to make progress in my phylogenetics research this year! I am studying a group of species whose flowers are oriented upside-down, referred to as the *Eriogonum deflexum* complex (subgenus *Ganysma*). Species with this trait include the annuals *E. brachypodum*, *E. cernuum*, *E. concinnum*, *E. deflexum* (with 3 varieties), *E. eremicola*, *E. hookeri*, *E. nutans* (with 2 varieties), *E. rixfordii*, and *E. watsonii*, and at least one described perennial, *E. austrinum* (in Baja California). An additional, yet-to-be-described perennial species is known from the Bristol Mountains area in California, and there is question to whether it is the same as *E. austrinum*. These taxa are distributed in arid environments across the western United States, with some species such as *E. eremicola* being a narrow endemic in Death Valley, to others like *E. cernuum* having a wide range across several states. Additionally, there is a lot of morphological diversity within this group, from peduncle length, involucre and tepal shape, to the presence of glands (Figure 1).

My main goal in this study is to shed some light on the relationships among these taxa. The questions I hope to answer are: (1) How many times did deflexed involucres and flowers evolve in this complex? (2) How are the annuals related to the undescribed perennial species?

This field season, my advisor, field assistants, and I traveled across the western United States to collect from populations of the *E. deflexum* complex and other members of the subgenus Ganysma. During the fall, I extracted DNA, prepared and sequenced a library, and generated a preliminary phylogenetic tree along with ancestral state reconstructions for deflexed versus not deflexed involucres and the presence/absence of glands. The ddRADseq approach was robust enough to infer strong phylogenetic relationships with the preliminary dataset. A total of 68 samples with 22 provisionally-identified taxa were included. Several samples from this sequencing

run had to be removed due to poor sequencing reads, and a few previously-sequenced samples (collected by J. Travis Columbus and Peter Pearman) were added. The data suggests that this complex is not monophyletic; there are taxa without deflexed involucres resolving between and within clades of taxa with deflexed involucres (Figure 2). For example, clade III is made up of the two varieties of *E. hoffmannii* which do not have deflexed involucres, and it is sister to clades I and II as well as clade IV, which have taxa with deflexed involucres. Furthermore, within clade IV, there are taxa without deflexed involucres (*E. salicornioides* and *E. rotundifolium*). The ancestral state reconstruction suggests that deflexed involucres are a derived trait that evolved at least once with multiple reversal events (Figure 3). The star indicates the first shift to deflexed involucres, and the arrows point to the hypothesized reversal events. Additionally, based on the ancestral state reconstruction for the presence/absence of glands, glands are inferred to have evolved multiple times (Figure 4). Overall, there is great taxonomic diversity within this complex and leads to further questions regarding the evolutionary history of deflexed involucres.

*Eriogonum cernuum*

*Eriogonum hookeri*

*Eriogonum eremicola*

*Eriogonum 'sarmentosum'*
Photo: Tada Ryvola-Marez

*Eriogonum rixfordii*

*Eriogonum nutans* var. *nutans*
Photo: J.T Columbus

*Eriogonum deflexum* var. *deflexum*
Photo: J.T. Columbus

*Eriogonum deflexum* var. *nevadense*

*Eriogonum brachypodum*

*Eriogonum watsonii*
Photo: J.T. Columbus

**Figure 1.** Images of *E. deflexum* complex taxa included in this phylogeny.

The 2023 DeDecker grant made it possible for me to travel to populations of crucial members of the *E. deflexum* complex in the Inyo County region including *E. rixfordii* and *E. eremicola*. I have yet to

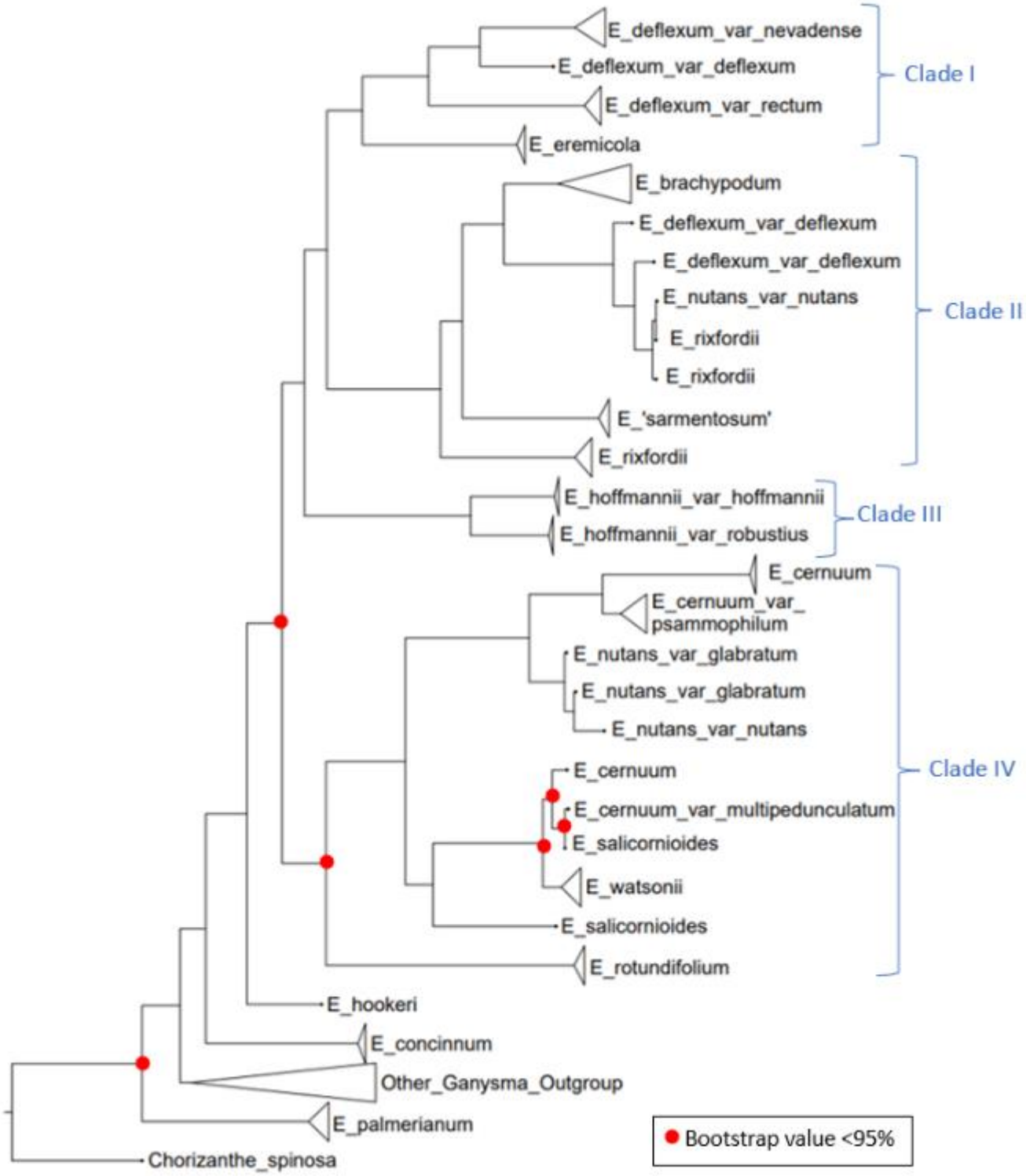


**Figure 2**. Maximum likelihood tree constructed in IQ-Tree. The tree is rooted to *Chorizanthe spinosa* and support for clades are measured with bootstrap

present my research, however, I plan to during the upcoming year of 2024! Currently, I am planning fieldwork for next spring and summer. One of the goals I have is to travel to Baja California to visit populations of *E. austrinum* in order to compare it with the undescribed perennial in the Bristol Mountains. Additionally, because there are areas of low resolution and bootstrap support in this preliminary tree, I plan to sample from more populations, conduct more sequencing, and generate a more well-supported phylogenetic tree of this complex.

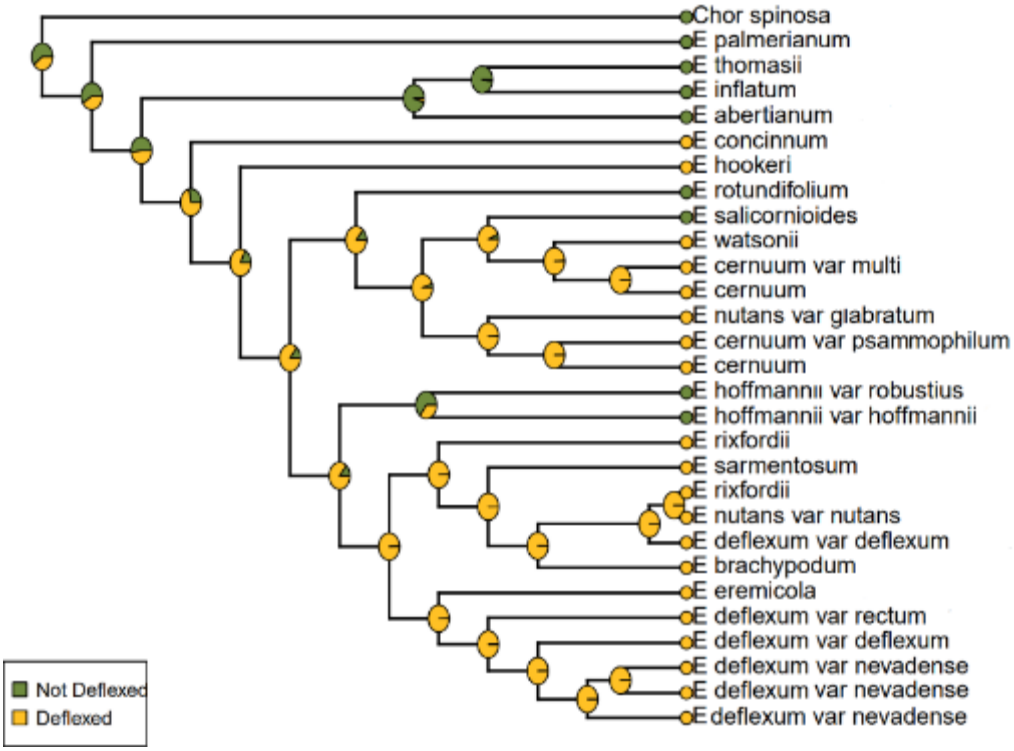


**Figure 3**. Ancestral state reconstruction for the evolution of deflexed versus not deflexed involucres. The likelihood of a state at each node is indicated by the pie charts where dark green = not deflexed and yellow = deflexed. The star indicates the first shift to deflexed involucres, and the arrows point to the hypothesized reversal events to not deflexed involucres.

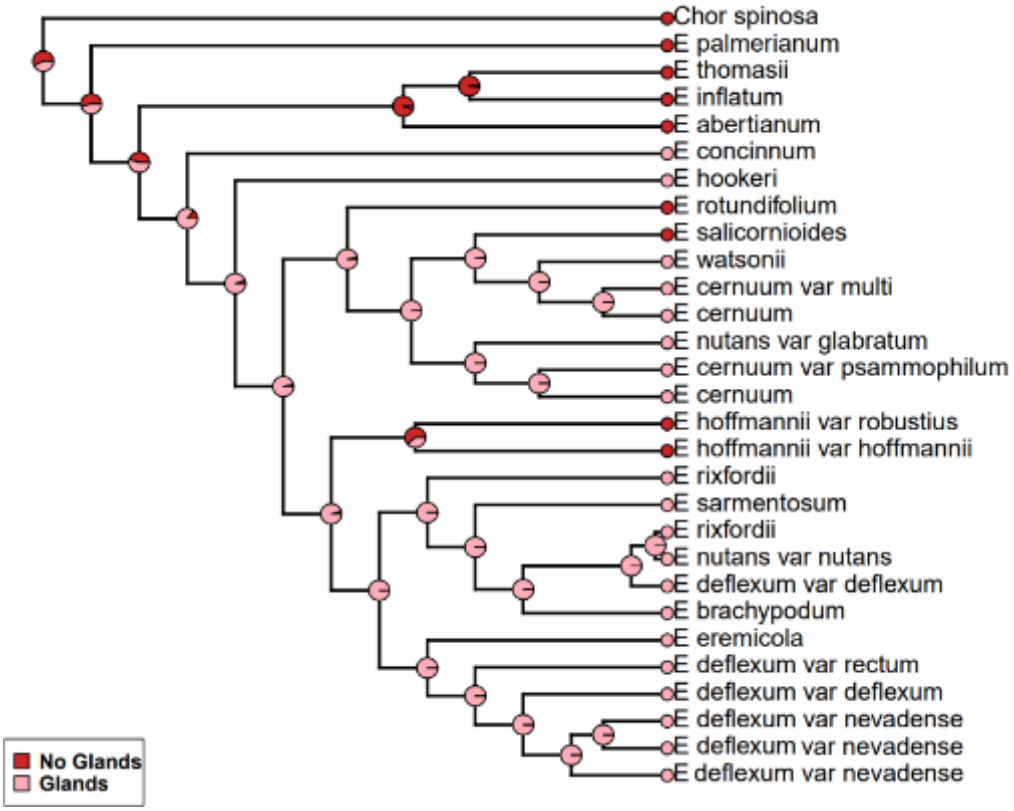


**Figure 4**. Ancestral state reconstruction for the evolution of glands versus no glands. The likelihood of a state at each node is indicated by the pie charts where red = no glands and pink = glands.

## Greenhouse Update

April has been a busy month for the greenhouse and me. I gave the general meeting presentation of *Considerations when putting in a Native Plant Garden* and quickly followed that with a potting party. Six wonderful volunteers used six garbage cans full of soil to fill pots and plant all the seeds I had stratified for the fall sale. Now the greenhouse is full of pots with seeds starting to sprout into little seedlings. The following weekend was the Pollinator Garden Workshop organized by the Eastern Sierra Land Trust. We had planned to hold it in the Bishop Community Garden but we had to change plans to an indoor presentation due to the weather forecast predicting high winds, and boy, are we glad we did. There were four presenters and 40 participants. Everyone said they liked it better inside. If you missed the workshop and would like to see it, the Land Trust recorded a similar workshop during Covid times and that is available on their website; go to "About," scroll down to "Pollinator Gardens," and then to "Pollinator Garden Workshops".

*—Katie Quinlan*

## Up-Coming Events

### Chapter Events

**Wednesday, May 22, 7:00 pm**
**Chapter General Meeting**

Please see details on page 1.

**Saturday. August 17th, 9:00 am – 11:00 am**
**Chapter Annual Plant Sale (IN-PERSON)**
White Mountain Research Center
3000 E. Line St., Bishop

This is the largest native plant sale of the year. A wonderful array of native plants is offered every year. A variety of flowers, shrubs, and trees adapted to our area will be for sale. This year the sale is going back to an in-person only sale.

**Please send submissions to us by June 15th, 2024 for the next issue.**

## Up-Coming Events

### Other Events

**Saturday, June 1st, 8:30 am – 1:00 pm**
**Pollinator Garden Tours**
Eastern Sierra Land Trust Office
250 N. Fowler St., Bishop

Locals across the Eastern Sierra have been hard at work creating beautiful native plant and pollinator gardens. Take the tour to learn more about and see examples of pollinator-friendly gardening. The tour begins at the ESLT office and then moves on to a lovely selection of local gardens in bloom. RSVP at: eslt.org/event/pollinator-garden-inspiration-tour/

**Sunday, June 9, 6:00 am – 1:00 pm**
**Swall Meadows BioBlitz!**
**Eastern Sierra Land Trust**

Join ESLT staff and local conservation easement landowners to BioBlitz Swall Meadows. A BioBlitz is a communal citizen-science effort to record as many species within a designated location and time period as possible. We will record what we find in iNaturalist and be joined by local experts on our area's natural history. More details and to RSVP at: eslt.org/event/swall-meadows-bioblitz/

### Bristlecone Chapter Directory

President: **OPEN**
Vice President: **OPEN**
Secretary: Kathleen Nelson secretary@bristleconecnps.org
Treasurer: Sue Weis treasurer@bristleconecnps.org
Chapter Council Delegate: Stephen Ingram
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Conservation/Partnerships: **OPEN**
Education: **OPEN**
Programs: **OPEN**
DeDecker Grants: Kathleen Nelson
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Field Trips: **OPEN**
Bishop Plant Sales: Katie Quinlan
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Publicity: Gaylene Kinzy gkinzyreische@gmail.com
Newsletter: **OPEN**
Membership: Sue Carter
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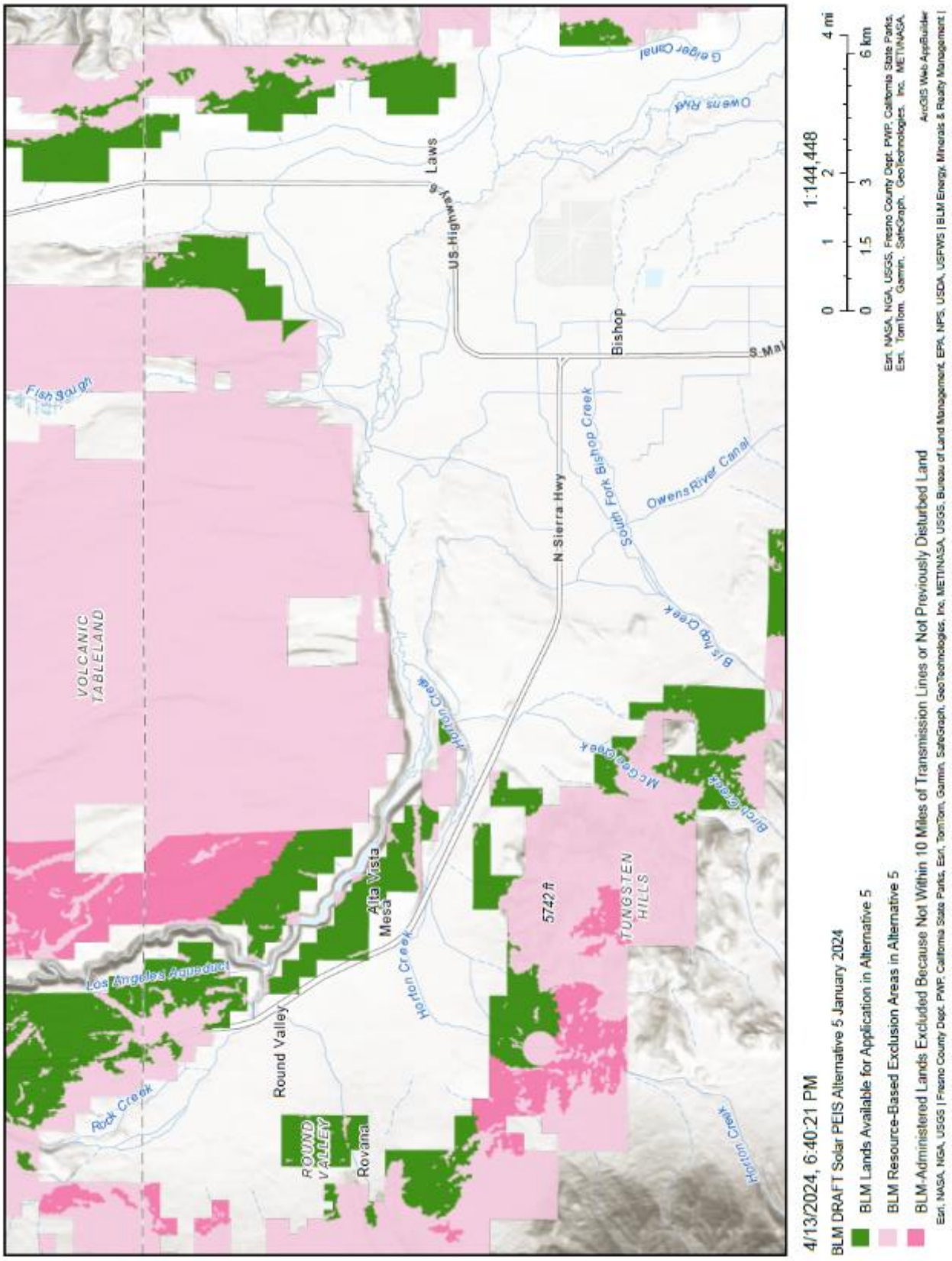
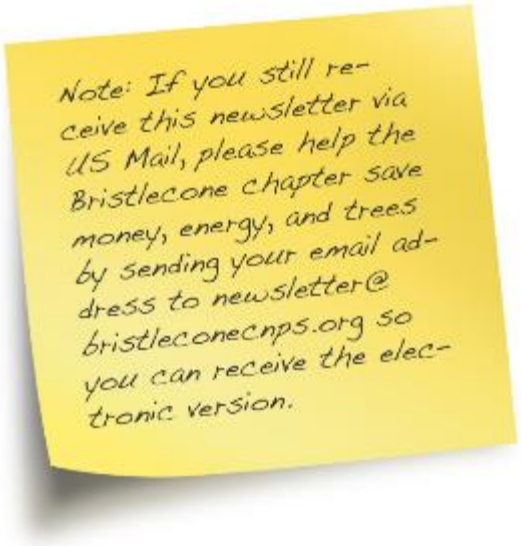
Website: **OPEN**
T-shirt Sales: Katie Quinlan
plant_sale@bristleconecnps.org
DeDecker Gardener: Kelly Bahr kbahr@cnps.org




Green areas indicate lands that may be open for solar development in northern Inyo County under Alternative 5, the most restrictive alternative in the BLM's draft planning document.

**The California Native Plant Society**
Bristlecone Chapter
P.O. Box 364
Bishop, CA 93515-0364
RETURN SERVICE REQUESTED




# Membership

*The California Native Plant Society is an organization of laypersons and professionals united by an interest in the plants of California. It is open to all. The society, working through its local chapters, seeks to increase the understanding of California's native flora and to preserve this rich resource for future generations.*
**To join or renew online**: Go to www.cnps.org and click JOIN/RENEW (at the top-right or select it after clicking the menu button of the webpage) or mail the form below:

**Name:** _____
**Address:** _____
**City:** _____ **State:** _____
**Zip Code:** _____ **Phone:** _____
**Email:** _____
I wish to be affiliated with the Bristlecone Chapter: _____
Other: _____

**Membership Category**

| | |
|---|---|
| _ Student / Limited Income | $25 |
| __ Individual | $50 |
| __ Plant Lover | $120 |
| __ Supporter | $500 |
| __ Patron | $1,000 |
| __ Benefactor | $2,500 |
| __ Steward | $5,000 |
| __ Guardian | $10,000 |
| __ Additional Contribution | _____ |

**Membership Type:** ___ New Member
___ Renewal

**Mail To / Make Payable To:**
CNPS Membership Coordinator
2707 K Street, Suite 1
Sacramento, CA 95816

**Gift Contribution:** _____ Wherever needed ☐
Specific Area: _____

**Go Perennial!** To become a monthly sustaining (perennial) member, join or renew online at **www.cnps.org/perennial**