

# BOTANICAL LEAFLETS

ISSUE 24 FALL 2019



## PRESIDENT'S MESSAGE

It is fall and hopefully everyone has finished their summer field work. Many of us are experiencing the power outages which could be a new norm for California. And I am sure we all know people who are affected by wildfires in every part of California. Many are still dealing with the loss from wildfires from the last couple of years. It would be wonderful if we got some rain soon! In June, I was able to spend some time on the

Bruce Peninsula which is about 3 hours north of Toronto in Ontario Canada at the Native Orchid Conference. It was quite an experience to drive along the road on the Bruce Peninsula and see yellow lady slipper orchids growing along the road on both sides for miles. We certainly can't see that in California! I saw ten different native orchid species in flower which was wonderful! We are busy planning our 2020 Symposium

which will be January 13 and 14, 2020 at California State University, Chico. See details within the newsletter about the symposium. We plan to have workshops on January 15, 2020 as well. It is really going to be a great event!

Have a great fall with your many vast botanical adventures. And hope to see you in January at the Symposium.

Linnea Hanson, President

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## NORTHERN CALIFORNIA BOTANISTS SYMPOSIUM! 13-14 JANUARY 2020—REGISTRATION IS OPEN!

The Northern California Botanists will host their 9th symposium at California State University, Chico, January 13-14, 2020 with optional workshops on the 15th. The 2020 Symposium is titled *The Diversity of Northern California Botany: Challenges and Opportunities*.

See Page 2 for more information

## MYSTERY PLANT

This prostrate perennial is a little seen monotypic genus in the carrot family known from moist portions of stabilized dunes and sandy beaches of our Northern California coast as well as along the coastline of Oregon and Washington to Alaska. Its eastern Asia counterpart is much better known for

its use as a bronchial treatment in traditional Chinese medicine. The fleshy leaves are divided pinnately and divided again to 3 leaflets with coarse teeth and matted hairs beneath. The inflorescences are tight clusters of small white flowers on hairy stalks.



Photo by Robert Fischer

(Answer on Page 2)

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## 2020 NCB SYMPOSIUM (CONTINUED)

The 2020 Symposium, titled *The Diversity of Northern California Botany: Challenges and Opportunities*, will provide updates and perspectives on topics such as Species Boundaries, Fire in Managed Landscapes, Restoration, Pollinators, Plant Biotic Interactions, New Discoveries, and Now The Good News.

We will again have a Lightning Talks Session with 5-minute per talk. The

Poster Session will be held on Tuesday morning.

Two optional workshops will follow on Wednesday and will include:

- NEPA for Botanists
- Field trip to the Butte Creek Canyon Ecological Preserve—Tour of Fall 2019 Prescribed Fire Areas.

The California Botanical Society will again host a Mixer on Sunday evening January 12, 2020 from 5:00-8:00 p.m. at Woodstock's Pizza in downtown Chico. Come to town early to join in on this fun social and networking event.

Visit our webpage at <http://www.norcalbotanists.org> for more information.

## 2020 SYMPOSIUM KEYNOTE ADDRESS—ERIC KNAPP

The 2020 Symposium Keynote Speaker will be **Eric Knapp**. His talk is titled **"Fire trends, causes, and consequences for the native plants we love."** Eric is a research ecologist with the U.S. Forest Service, Pacific Southwest Research Station and studies long-term changes to forests in the absence of fire and how organisms, including plants, respond to disturbances such as fire. His path to being a botanist (in a very broad sense) has been anything but

straight, but the common theme has been a focus on plants. As an undergraduate at U.C. Santa Barbara, the experiences that probably had the biggest impact on shaping his thinking and eventual career choice were plant identification and ecology courses taught by the late Bob Haller. His legendary field trips exposed Eric to different ecosystems and why plants grow where they do and taught him the value of knowing the species or

not shying away from keying them out if you don't. His graduate studies at U.C. Davis were in plant breeding, but as genetics became more and more a laboratory endeavor, this increasingly conflicted with a desire to spend as much time as possible outdoors. He switched to plant ecology and his current position provides a good balance office and field work. As someone who learns best through careful observation (poking, digging, measuring) whatever it takes  
(Continued on Page 9)

## LIGHTNING TALKS

This year we are again offering a 5-minutes per talk session. Consider giving a talk if you: are working on a project and want to give an update, are aware of an issue of concern or growing need in the botanical community, want

to promote something exciting, need to hire people for an upcoming botanical project, have discovered something novel and interesting, know of new laws or regulations that the community should know about, or want

to update about what your organization is doing. If you are interested in giving a lightning talk, contact [kkaczynski@csuchico.edu](mailto:kkaczynski@csuchico.edu) by November 15th. Please see our website for more information.

## CALL FOR POSTERS

The NCB symposium planning committee invites you to bring a poster to share your work and knowledge of the biology, ecology, conservation and/or management of our Northern California plant life with other at the 2020 Symposium. This will be a great opportunity for continuing education and networking.

The first session on Tuesday morning, January 15 will be a dedicated poster session. Poster authors are requested to be present with posters during a portion of the session.

The deadline for submitting poster abstracts is December 14, 2019. Space is limited to 40 posters, so get

yours in early.

See Page 9 for information on the Student Poster Contest. Additional information can be found on the website at: [www.norcalbotanists.org](http://www.norcalbotanists.org)

Contact Barb Castro for more information at [barbcastro@hotmail.com](mailto:barbcastro@hotmail.com)

## NORTHERN CALIFORNIA BOTANISTS IN ACTION

A continuing series that highlights well-known to possibly less-well-known botanists, with photographs from the present to several decades back. Please share unpublished pictures of northern California botanists: send jpegs and information to [jane.vansusteren@gmail.com](mailto:jane.vansusteren@gmail.com)



**Renee Pasquinelli** is a retired Senior Environmental Scientist for the Mendocino District of California State Parks. Currently she is the conservation chair for the Dorothy King Young Chapter of CNPS where she reviews coastal development and building permits where rare plants and

rare vegetation are threatened. She staunchly stands up for native plants in their native habitats attending meetings even though she prefers to be out in the field. She also does quite a bit of field work volunteering for CNPS and CDFW doing vegetation surveys on the coastal terraces of Mendocino County which have not yet been mapped. She was a part of the large group that just finished mapping the Mendocino Cypress Woodlands which now can be seen on Bios (the report is published on the veg camp site of CDFW).



**Kjirsten Wayman** is shown here photographing *Trillium albidum* in Plumas County. Kjirsten is a professor of chemistry at Humboldt State

University, where she teaches organic chemistry. Her research interests focus on the use of secondary compounds to study chemotaxonomy and hybridization among related plant species. In particular, this includes analyzing the floral scent composition of western North American *Trillium* species and the application of this information to understanding species boundaries within the genus. In the spring she can be found seeking out new populations of *Trillium* in California, Oregon, and Washington. Exploring the mountain flora is Kjirsten's passion and she has spent a great deal of time hiking and botanizing in the Dolomites of Italy and the Klamath Mountains of California.



**Kristen Kaczynski** is an Associate Professor of Environmental Science at California State University, Chico. She earned her doctorate in Ecology at Colorado State University, where she focused her research on the causes and consequences of montane willow dieback in the

Rocky Mountains. The photo shows her assessing the impact of elk browsing on willows. Currently, Kristen works on diverse set of vegetation research projects related to wet meadow restoration, post-fire recovery, and impacts of climate change on sagebrush communities. She really enjoys taking undergraduate and graduate students out in the field to teach them about the diverse plant communities in northern California.



**Martin Lenz** is the District Botanist with the Shasta-Trinity National Forest Recreation Area. His interest in botany started as a youngster while camping around northwestern California, he would key plants using his parents' 1925 Jepson Flora. His education in the field was done at Humboldt State with Dr. J.P. Smith and others. In 2012, he started working for the U.S.

Forest Service at Shasta Lake as a part-time botanist and started looking into bryophytes when they started showing up on rare plant lists. He took classes at Southern Oregon University and got hooked. It became a specialty of his and with the help and interest of Dan Norris, he was driven to delve deeper into his knowledge and collecting of bryophytes. Some of his projects include a Siskiyou County flora and a fen bryophyte inventory on the Bighorn National Forest in Wyoming. He has since collected pretty widely in northern California and some in southern Oregon.



## 2019-2020 STUDENT RESEARCH SCHOLARSHIP AWARDS

Northern California Botanists is pleased to announce the recipients of this year's research scholarship awards. As in the past, we received many worthy applications. This year we awarded 11 scholarships of \$1,000 each. The Sacramento Valley and Shasta chapters of the California Native Plant Society have teamed up with NCB and are each funding one of the scholarships.

**Alex Rinkert** is an M. S. student at San Jose State University.

The title of his research is **"Bird nests as botanical time capsules for lost habitat"**.



Transitional habitat between the tidal marsh and adjacent uplands of the San Francisco Bay estuary is important to many threatened species. This habitat is above the normal high tide line and is only rarely inundated by saltwater during extreme tidal events. Unfortunately, by the early 20<sup>th</sup> century, nearly all transitional habitat in the estuary was lost or severely modified by drastic changes in land use. Few herbarium specimens were collected in this habitat before degradation and only one habitat description exists from the early 1900s, limiting the effectiveness of estuary-wide restoration efforts. Fortunately, early naturalists collected bird nests from transitional habitat before much of the drastic land use changes. These historical nests may serve as botanical time capsules that could be used to reconstruct transitional habitat prior to its loss. Song Sparrows (*Melospiza melodia*) and Savannah Sparrows (*Passerculus sandwichensis*) use plant material from transitional habitat to build their nest, providing an inventory of some plant species present. Traditional analysis of nest material using morphology and anatomy does not provide the species-level identifications needed to reconstruct transitional habitat, and historical nest specimens cannot be disassembled. Instead, we will use a molecular approach by extracting DNA, then amplifying and sequencing the nrITS region. A phylogenetic analysis and comparison to sequences in Genbank will allow us to identify the plant material to species. Previously, we used this molecular approach to identify plant from nests collected in 2003 and 2018. Now we will apply the same molecular approach to identify species from two nests collected from the estuary in 1904 to shed light on plant species that were once part of transitional habitat before it was lost.

**Jackie Shay** is a Ph.D. student at the University of California, Merced.



The title of her research is **"Endophyte community shifts in response to drought in monkeyflowers (*Erythranthe laciniata*) grown in native soil."**

All plants have a community of asymptomatic microbes inhabiting their tissue known as endophytes. Increasing evidence suggests that microbes are an extension of plant host phenotype and can ultimately help them adapt in response to stress, including drought (Compant *et al.* 2010). Additionally, stressful conditions may select for distinct endophyte taxa with specific functions (Lemanceau *et al.* 2017). Further understanding of how the structure of endophytes shift in response to drought is a potentially important avenue for identifying significant biotic interactions that may play a role in stress response to climate change and perhaps predicting species distribution shifts. The aim of this project is to examine changes in endophyte communities in plants suffering from drought. We ask, does drought alter microbiome composition, and if so, what part of the plant is changing and are there specific taxa that come into play? We sampled both roots and shoots of *E. laciniata* plants grown in native soil in laboratory 1) controlled and 2) drought conditions. Plant tissues were sampled at two time points in the plant life cycle to account for any shifts over time. All tissue was analyzed for bacterial and fungal taxa. Preliminary results indicate strong differences in endophyte between plant compartments (e.g. roots and shoots), suggesting that root communities are more impacted by the effects of drought than shoot communities. Diversity of endophytes was also greater in the root communities than in the shoot, suggesting transmission of endophytes from their native soil.



## 2019-2020 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONTINUED)

**Dena Paolilli** is an M.S. student at Cal Poly, San Luis Obispo.



The title of her research is **“Assessing alpine vegetation community shifts in the Sierra Nevada of California”**.

As temperatures continue to rise (Solomon 2007), species in high alpine environments are thought to be increasingly at risk (Parmesan 2006). However, recent studies have found mixed results. For example, some studies detected a decrease in species diversity (Walker 2006) whereas others, a significant increase (Steinbauer 2018). Evidence of alpine community shifts in functional traits has also been mixed (Alexander 2018) and may depend on the interaction of temperature and moisture changes. I am currently resurveying 150 vegetation plots established 30 years ago in alpine wilderness areas in Sequoia and Kings Canyon National Park in the southern Sierra Nevada, California. I will assess change in alpine vegetation species' richness, abundance and functional trait diversity to improve predictions of future change and inform wilderness management decisions.

**Carly Miranda** is an M.S. student at San Francisco State University.



The title of her research is **Population genetics and conservation of endangered Suisun thistle, *Cirsium hydrophilum* var. *hydrophilum* and its close relatives**.

The diversity of plant communities in the California Floristic Province ranges from montane meadows to coastal sand dunes, dry deserts and metal rich serpentine outcrops, to estuary marshes and inland to coastal forests. Each habitat presents unique population limiting factors and environmental stressors on extant taxa. The endangered native California thistle *Cirsium hydrophilum* occurs endemically in serpentine and salt marsh soils, surviving in low nutrient and exceedingly saline and metal conditions that prove toxic to most plants. Varieties of *C. hydrophilum* are acclimated to a few stressful environments across Northern California. Extant populations are restricted to the brackish salt marsh of Rush Ranch in Solano County and the highly metallic soils of Mt. Tamalpais in Marin. *Cirsium hydrophilum* is recognized as endangered at the federal and state levels due to its low recorded occurrence. We aim to construct a phylogeny of California endemic *Cirsium* as the phylogenetic relationships between *C. hydrophilum* and its subspecies have yet to be formally investigated. After collecting fresh tissue samples from extant populations, we extract the DNA and apply next generation sequencing in order to conduct genetic analyses. This data will ultimately guide us in developing regional outplanting recommendations to maintain the genetic diversity of *Cirsium* within California.

**Justin Luong** is a Ph.D. student at the University of California, Santa Cruz.



The title of his research is **“What happens to restored coastal prairies years after implementation?”**

I aim to determine: (1) the outcomes of coastal prairie restoration efforts in California in relation to original project goals and compared to similar projects, (2) the management practices that are correlated with improved outcomes and are cost effective, and (3) the primary obstacles that restoration practitioners face in improving grassland restoration success. I will do this using ecological and management surveys at 32 restored coastal prairies distributed from Santa Barbara to Humboldt counties. At each site I surveyed plant communities using a standard transect protocol standardized by site size. I also took soil samples from each of the transects to help determine whether soil factors play a major role in success. I will follow up in the coming year using interviews with practitioners to determine perceptions of success and original project goals. In the field I will further assess restoration sites for ecosystem functions such as carbon storage.

## 2019-2020 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONTINUED)

**Keir Morse** is a Ph.D. student at Claremont Graduate University.

\*Shasta Chapter CNPS awardee



The title of his research is **“Taxonomy and conservation of the genus *Malacothamnus* (Malvaceae)”**.

*Malacothamnus* (the bush mallows) are fire-following shrubs in the mallow family (Malvaceae) which are native to the California Floristic Province in California and northern Baja California as well as a disjunct area in central Arizona. They are noted for being extremely variable and difficult to tell apart. A review of research needs for conserving California’s rare plants listed *Malacothamnus* as being the genus with the highest level of taxonomic problems for taxa on the CNPS rare plant list with 12 of the 16 listed taxa being considered taxonomically problematic. Thirty-six taxa have been described with 11 and 17 taxa being recognized in the two most recent treatments and 28 taxa recognized by the treatment most CNPS listed taxa are included in. My goal is to resolve the taxonomy of the entire genus and create quality resources to alleviate the confusion between taxa. To do this, I am using a combination of morphometric analyses, restriction site associated high-throughput DNA sequencing (RAD-Seq), comparative phenology, and extensive field observations. Preliminary data show great promise and possibly some undescribed taxa.

Observations from the public have been very useful. Any observations made through iNaturalist, Calflora, or emailed ([kmorse@rsabg.org](mailto:kmorse@rsabg.org)) would be most welcome, especially from the northern counties where there are few specimens and little data.

**Joseph Saler** is a M.S. student at Humboldt State University.

The title of his research is **“Investigating the Initial Effects of Woody Shrub Removal within a Northern California Fen”**.



Woody vegetation encroachment and transition from herbaceous species dominated wetland towards drier vegetation communities is occurring in many wetland types in the absence of disturbance, however nowhere is this phenomenon more prevalent than in fens. Big Lagoon Bog is a 1.3 ha peatland fen along the north coast of California in Humboldt County and represents uncommon habitat that supports numerous special status plant species. A marked and progressive decline in open, early successional habitat within Big Lagoon Bog has been documented due to encroachment by woody species resulting in a loss of over 60 percent of open, early successional habitat. It is likely that without treatment the remainder of Big Lagoon Bog would become entirely dominated by woody vegetation threatening the persistence of many special status plant populations at this site which depend on open, early successional fen habitat. Many similar fens along the coast have been completely eliminated in the last 10 – 20 years indicating the region wide and pressing nature of accelerated woody vegetation encroachment within coastal peatland fens.

In response to the observed loss of open, early successional habitat within Big Lagoon Bog active treatment was proposed consisting of woody vegetation removal. All woody vegetation with a diameter at breast height (DBH) under 30 cm were removed resulting in the complete removal of woody vegetation from within Big Lagoon Bog.

My study aims to quantify the impacts of woody vegetation encroachment on herbaceous species cover and diversity using pre-treatment data, as well as document the effect of woody vegetation removal on herbaceous species cover and diversity within Big Lagoon Bog. The study includes extensive pre and post treatment sampling, including percent cover, species richness, and spatial arrangement of herbaceous and woody species as well as woody vegetation height within the fen. The study will allow for a comprehensive look at the effectiveness of woody vegetation removal on restoring early successional habitat within coastal fens.



## 2019-2020 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONTINUED)

**Sean Stewart** is an Undergraduate student at Humboldt State University.



The title of his research is **“How does the invasion and removal of *Lupinus arboreus* from Northern California coastal sand dunes impact seed banks?”**

Understanding the soil seed bank in an ecosystem can help with assessing future plant composition of a site. It can also help determine how well a restoration project has been in removing invasive species. At Lanphere Dunes, a coastal sand dune ecosystem in Humboldt County, CA, a long-term restoration project is being conducted to remove yellow-bush lupine (*Lupinus arboreus*). *L. arboreus* is a non-native, nitrogen-fixing shrub which also increases the abundance of other non-native species due to the increase in sand fertility. Removing *L. arboreus* allows the coastal sand ecosystem to remain at low nutrient levels that native plants have adapted to, including the federally endangered Menzies' wallflower (*Erysimum menziesii*) and beach layia (*Layia carnosa*). This study will characterize the seedbank of three sites of varying *L. arboreus* impacts: an invaded site, a never-invaded site, and a restored site.

We gathered 20 soil samples from each of the three sites. Soil samples were randomly chosen along transects. All transect points had at least one cluster of plants within 25cm to ensure proximity to a potentially reproductive plant. Each sample was left to dry, and then sieved to remove large organic matter. A thin layer of each sample was spread above sterilized sand inside black plastic pots. The pots were placed in trays and now sit in a Humboldt State University greenhouse where germination will occur. Pots will be inspected daily for new growth and watered as needed to keep the sand moist. Once seedlings can be identified they will be removed from the pot. Seed bank composition will be analyzed and compared among the three sites. This study will provide more data on *L. arboreus* and its impacts to coastal sand dunes and will also provide another tool to gauge restoration success.

**Cory O’Gorman** is an M.S. student at Sonoma State University.



The title of his research is **“Survey of *Quercus kelloggii* at Pepperwood Preserve: identifying specimen oaks to reimplement traditional ecological knowledge and promote ecosystem resilience”.**

California black oak, *Quercus kelloggii*, plays an important role in the lifeways of many indigenous tribes throughout California. Native peoples tend black oaks using Traditional Ecological Knowledge and encourage the development and proliferation of specimen oaks. These mature, large, full crowned trees provide a disproportionate amount of ecosystem services, including acorns and habitat, when compared to smaller black oaks. Altered approaches to land management and the cessation of frequent low intensity cultural burns places these specimen oaks at risk from encroachment, forest densification, sudden oak death, and catastrophic fire. We found and collected data from 55 specimen black oaks to determine the effects of encroachment on live crown ratio and the ratio of canopy area to DBH. Ground and litter fuels were both recorded to determine the effects of encroachment and sudden oak death on fuel load accumulation since the Tubbs Fire in October 2017. This project is a collaboration between Sonoma State University and the Native Advisory Council of Pepperwood and the research is being conducted on Pepperwood Preserve in Sonoma County. This work will allow for the reimplement of TEK to nurture specific specimen black oaks at Pepperwood Preserve at the discretion of the Native Advisory Council, provide the opportunity for outreach education related to the importance of cultural revitalization and linkages to the preservation of California biodiversity and inform future interactions between native peoples and land management organizations.

## 2019-2020 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONTINUED)

**Devon Picklum** is a Ph.D. student at the University of Nevada,



The title of her research is **“Understanding the ecological consequences of multi-trait floral similarity in two Sierra Nevada alpine wildflowers”**.

Pollinators provide reproductive services to flowering plants by carrying pollen between individuals while collecting nutritional resources in the form of nectar or pollen. Pollinators learn about flower color, shape, and scent when foraging for resources, and use these floral cues when making foraging decisions. In diverse flowering communities, a bee's ability to distinguish between different species has direct consequences for plant fitness, as hetero-specific pollen transfer represents cost in both lost male fitness and may prevent subsequent pollination. *Dodecatheon alpinum* (alt. *Primula tetrandra*, Alpine shooting star) and *Pedicularis groenlandica* (Elephant head lousewort) are ideally suited to study the ecology of floral cues because they share similar color, pollen reward, specific behavioral requirements (buzz pollination), habitat preference, and are both predominately visited by *Bombus* species. In order to understand if an overlap in several floral traits provides a benefit or cost to individual plants, I investigate if *D. alpinum* and *P. groenlandica* facilitate or compete for pollinators where they co-occur. To do this I measure community level floral density and abundance and quantify both con- and heterospecific pollen deposition and resulting seed set for individuals of both species in a variety of populations where plants are interspersed and where they occur in discrete patches. I further measure floral color and chemistry (scent) to understand fine scale population-level variation in floral traits. Together these data will characterize indirect interactions between these species are will allow for a fine scale look how these interactions are mediated by floral traits.

**Lacey Benson** is an M.S. student at San Jose State University.



The title of her research is **“Desiccation tolerance of western sword fern (*Polystichum munitum*) gametophytes across the coast redwood forest ecological gradient.”**

Ferns are an integral component of biodiversity and productivity in the coast redwood understory and canopy. Although ferns are the oldest living lineage of plants with complex vascular systems there is still much to learn especially considering how rapidly natural disturbances are expected to change within the coast redwood ecosystem. Given that summer fog is expected to decrease and winter precipitation patterns are predicted to change it is vital to understand the role of microclimates and adaptation strategies utilized by ferns in the coast redwood ecosystem in order to gauge how the distribution, community dynamics, and reproductive success of ferns will be affected in the coming decades. While fern sporophyte water relations are well understood research is still needed to understand how microclimates influence sporophyte production as well as the ecological impact of water retention abilities of gametophytes. Little is known about the abilities of terrestrial fern gametophytes to tolerate and recover from desiccation; however, evidence suggests the degree of tolerance correlates to environmental moisture niches within the sporophyte generation and plays a role in water holding capacity. The specific aims of this study are (1) to compare desiccation tolerance (DT), recovery rates, and morphology of western sword fern (*Polystichum munitum*) gametophytes from different biogeographic regions and (2) to examine microclimatic differences for the biogeography of *P. munitum* within the coast redwood forest. We will rear gametophytes from spore and subject them to a series of drying intensities using variation of photochemical efficiency ( $F_v/F_m$ ) to compare DT and recovery ability with their associated biogeographic origin. This novel project will illustrate how closely related terrestrial gametophyte physiology is to population dynamics and biogeography.



## 2020 SYMPOSIUM KEYNOTE ADDRESS (CONTINUED)

to figure out how organisms persist, flourish, or perish in response to stressors, he works in the field to observe the outcome of management actions or fire with his own eyes for perhaps four to six weeks a year. To really understand fire behavior and fire effects, there is no better way than watching it burn and prescribed fire provides great access. On a good day, fire managers conducting the burn will hand him a drip torch. In reality, four to six weeks of field time still means

he spends the vast majority of his work hours in front of a computer, analyzing data, writing papers, and working on outreach through presentations. Among the research outcomes he is most proud of are developing a better understanding of outcomes and associated mechanisms of fire in different seasons on plants and the effect of management actions on the understory plant community. Most recently, he has been marveling what can be learned about the functioning of healthy forests by attempting to restore

degraded ones. It has been eye opening to see native perennial grasses establish and forbs again flower after forest thinning and prescribed fire. These and other observations provide insight about the disturbance pathways that once shaped these ecosystems and potential paths forward in an uncertain future.

The Keynote Address will follow the banquet on Monday evening, January 13, 2020 from 7:30 – 8:30 p.m.

## STUDENT POSTER CONTEST

### ATTENTION STUDENTS!

Northern California Botanists will be holding a contest for the best student poster presentations. Participating student posters will be evaluated by a

panel of judges during the Poster Session on the second day of the Symposium.

Three cash awards will be given to the top ranked posters. Winners will be announced at the Symposium and featured

in an issue of the Northern California Botanists Newsletter.

Students, come present a poster to highlight your research and compete for this award!

## 2020 SYMPOSIUM SPONSORSHIP

Please help make the 2020 Symposium a success!

NCB invites sponsorship for our 10th symposium. Your help is important and allows us to keep our registration rates low, support student attendance, and keep our programs moving forward.

All sponsors of \$100 or more will receive recognition in the symposium program, on our website, and in our newsletter. Sponsorships of \$200 or more receive additional benefits including an Exhibitor Booth space.

If you or your company would like to partner with us in this event or if you

have questions about sponsorship, you may contact us at [ncbotanists@gmail.com](mailto:ncbotanists@gmail.com) or visit our website at [www.norcalbotanists.org](http://www.norcalbotanists.org).

Thank you to all who have sponsored in the past and those that have already pledged support for the 2020 Symposium.

## STIPENDS (\$200) FOR COLLEGE STUDENTS ATTENDING THE 2020 SYMPOSIUM

Northern California Botanists will provide a number of \$200 stipends to help cover expenses of travel, lodging, meals, and registration for current college students who wish to attend the NCB symposium in January 2020. Butte College and CSU Chico students are also encouraged to apply; NCB will provide registration refunds to a number of local area students.

More information and the application

form can be found on our webpage. Once verified, awards are given on a first-come basis. Get your applications in early!

For questions, please contact Daria Snider at [dsnider@madroneeco.com](mailto:dsnider@madroneeco.com). Applications must be received by December 1, 2019 and should be emailed to Daria Snider. Applicants awarded stipends will be notified by email in late December.

The check for \$200 can be picked up at

the registration desk at the conference in January.

### Requirements:

- 1) Must be a current college student;
- 2) Must provide evidence on application form of interest or involvement in plant sciences, and
- 3) Must register for the NCB symposium by 20 December 2019.



NORTHERN CALIFORNIA  
BOTANISTS

P. O. Box 8042  
Chico, CA 95927-8042

*Registration is Open!*

*NCB 2020 Symposium  
January 13-14, 2020  
Chico, California*

Please send address changes to:

ncbotanists@gmail.com

## MEMBERSHIP APPLICATION/RENEWAL

Name: \_\_\_\_\_

Affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Email: \_\_\_\_\_

### MEMBERSHIP DUES:

\_\_\_\_\_ Individual \$25.00 \_\_\_\_\_ Student/Limited Income \$15.00

\_\_\_\_\_ Family or Small Business/Non-Profit (two memberships) \$40.00

In addition, I would like to donate \$\_\_\_\_\_ to Northern California Botanists to help fund NCB programs and student research scholarships.

Make checks payable to "Northern California Botanists" and mail to:

Northern California Botanists  
P. O. Box 8042  
Chico, CA 95927-8042

NCB is a federally recognized 501 (c) (3) non-profit organization. Membership dues and donations are tax deductible.

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