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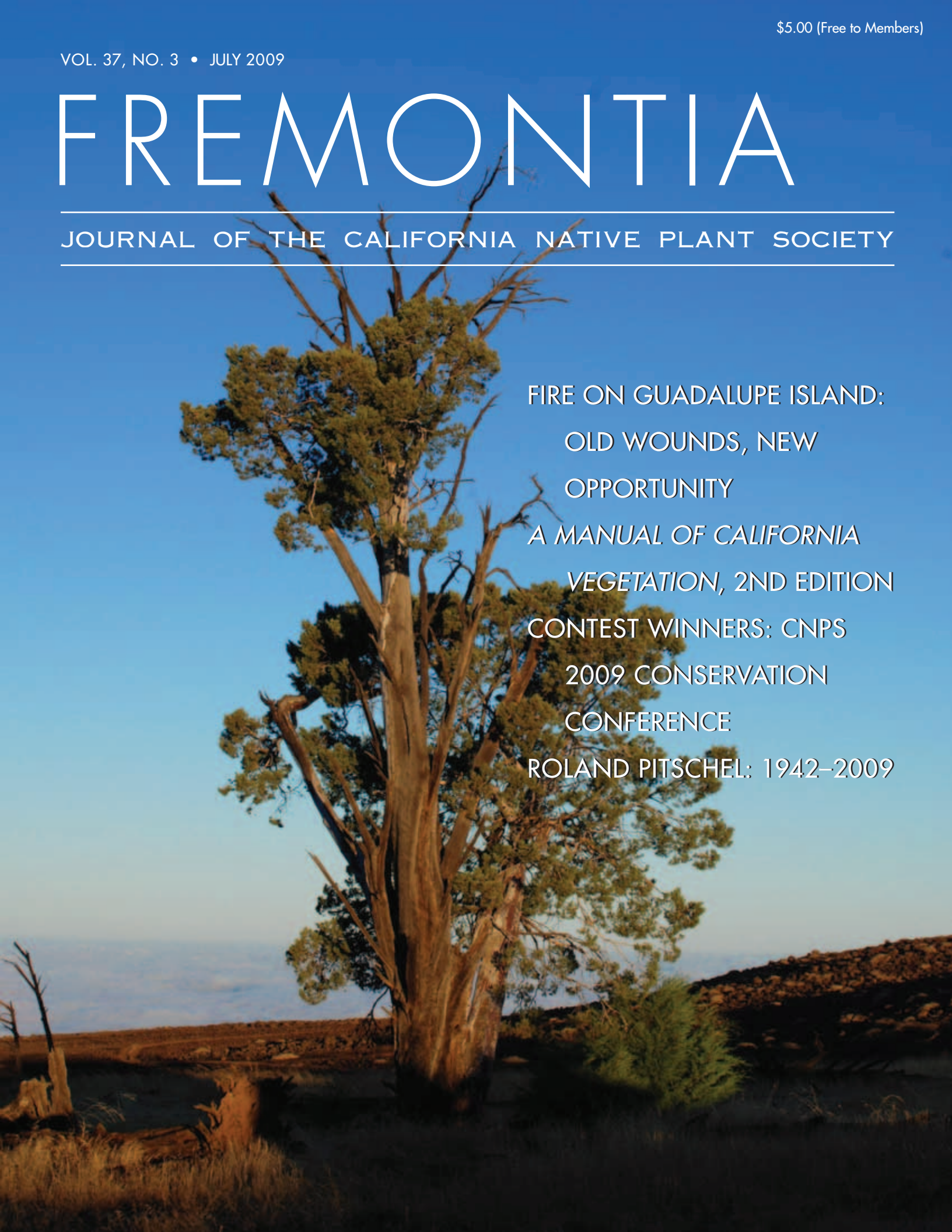

FIRE ON GUADALUPE ISLAND: OLD WOUNDS, NEW OPPORTUNITY

A MANUAL OF CALIFORNIA VEGETATION, 2ND EDITION

CONTEST WINNERS: CNPS 2009 CONSERVATION CONFERENCE

ROLAND PITSCHEL: 1942–2009

FREMONTIA

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CALIFORNIA NATIVE PLANT SOCIETY

Dedicated to the Preservation of the California Native Flora

The California Native Plant Society (CNPS) is a statewide nonprofit organization dedicated to increasing the understanding and appreciation of California's native plants, and to preserving them and their natural habitats for future generations.

CNPS carries out its mission through science, conservation advocacy, education, and horticulture at the local, state, and federal levels. It monitors rare and endangered plants and habitats; acts to save endangered areas through publicity, persuasion, and on occasion, legal action; provides expert testimony to government bodies; supports the establishment of native plant preserves; sponsors workdays to remove invasive plants; and offers a range of educational activities including speaker programs, field trips, native plant sales, horticultural workshops, and demonstration gardens.

Since its founding in 1965, the traditional strength of CNPS has been its dedicated volunteers. CNPS activities are organized at the local chapter level where members' varied interests influence what is done. Volunteers from the 33 CNPS chapters annually contribute in excess of 97,000 hours (equivalent to 46.5 full-time employees).

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Guadalupe Island continues to exhibit a remarkable recovery of native vegetation following the removal of feral goats. A recent fire in the remnant groves of endangered Guadalupe cypress caused unexpectedly high mortality of adult trees. What enabled that relatively low intensity fire to kill the large trees was that the trees had been scarred by goat browsing and that damage to the trunk allowed the fire to kill the tree. Fortunately, the fire also triggered a tremendous dispersal of cypress seeds and the likely rejuvenation of the forest.

Since the first edition of *A Manual of California Vegetation* was published 15 years ago, significant changes have occurred. Thousands of new field samples have been collected and analyzed, and the classification of vegetation types has been refined and expanded. The second edition includes detailed information on life history and ecology of the State's vegetation, and is expected to contribute significantly to better management of California's natural landscapes.

In discussing the science connected to conservation issues, it is easy to lose sight of why we are so engaged in these discussions. This is precisely why planners of the CNPS 2009 Conservation Conference decided to sponsor two contests, one for photography and the other for botanical art. The images that follow eloquently express an appreciation for California's native flora.

THE COVER: The critically endangered Guadalupe cypress (*Hesperocyparis guadalupensis*) was restricted to three groves on Guadalupe Island before the removal of feral goats in 2006. Since then the cypress have been regenerating and over 10,000 seedlings and young trees are now in evidence. Photograph by Thomas Oberbauer.

EDITORIAL: WHAT IS *NATIVE*?

Much ink has been spilled, and numerous discussions—not to mention arguments—have happened over the definition of what constitutes a native plant. Why does the question even matter? The word is used a lot, and it even occurs in policy or legal documents, so we need at least a working definition.

About 20 years ago I was explaining to a landscape architect practicing in San Francisco, where we both live, that a certain plant was not native, that it was native down the California coast south of San Francisco. His looks and his words added up to "My, aren't we precious?" I replied, "What if Mexico still owned Monterey, would its plants still be called native in San Francisco?" He got the point—California is a political designation, not a biological one.

For example, Joshua trees (*Yucca brevifolia*) grow in the harsh and demanding Mojave Desert, along with the critically important yucca moth (*Tegeticula maculata*). Would these organisms be considered native in Fresno, Tahoe, Eureka, or San Diego? If you live in Barstow and wanted a native tree, would you plant a coast redwood? In thinking about natives, we need to look at the biological relationships, the plant and animal associates, the weather, the soil. The Yerba Buena Chapter has always had a policy to offer at its annual plant sale only plants propagated from material originally obtained from our restricted chapter area. The primary reason for this was that we were urging people to plant natives in their gardens, but those natives were unavailable.

The term *native plant* means native to the site; it has no other meaning. Native plants of a given site interact with each other and with local wildlife—the birds, the bees, butterflies and other insects, the soil microfauna and flora—even the local pathogens. These organisms are all intricately woven into the living fabric we call an ecosystem. Ecosystems have sorted out these relationships over the eons, and they are finely tuned.

Absent these relationships and the plant you just planted may be merely another exotic plant; it may have come from another part of California but it may just as well have come from the other side of the ocean, since it left components of its ecosystem behind. Further, because it lacks these interactions, some of the introductions may even spread out of control and displace other plants and animals that have been there for thousands of years.

What might be some of the consequences of introducing a plant from another part of California that has local congeners here? Three examples immediately come to mind:

1) As landscaping along Highway 1, Caltrans planted a coastal buckwheat (*Eriogonum parvifolium*) which occurs naturally from Monterey County to San Diego County. In its new home, it self-sowed readily and invaded Pacifica State Beach at Linda Mar, displacing the native coast buckwheat (*Eriogonum latifolium*). (Fortunately, local volunteers have been eradicating the invader at this site and replanting the native.)

2) A long time ago, someone introduced to San Francisco's coastal strand a subspecies of beach evening primrose (*Camissonia cheiranthifolia*) from Southern California, and it rapidly displaced the local subspecies, which no longer exists here. The mere fact that this plant and the buckwheat displaced their native relatives is an indication that they are not supporting or fully interacting with the local wildlife and other organisms.

3) As part of the San Bruno Mountain Habitat Conservation Plan, a red-flowered form of bush monkey flower (*Mimulus aurantiacus*) from Southern California was introduced on the mountain, genetically contaminating the local stock. It hybridized with the local apricot-colored indigenous plants, producing muddy-orange intermediate-colored flowers in its offspring.

What are the consequences of these ill-advised introductions? Without detailed study most consequences are unknown. The mere fact that they bear the same name does not mean they are equivalent. Plants have chemical compounds that help them defend themselves and adapt to their local circumstances. Changing their genetic constitution may impair this ability in unseen ways—for example, the changed flower color may not be readily seen by the pollinating organisms that it has previously relied on. Or the chemical compounds that had deterred a Southern California caterpillar from chewing the leaves of the monkey flower—a caterpillar that doesn't exist here—won't deter another caterpillar that is here. However, it may deter the federally listed endangered Bay checkerspot butterfly, which uses the native monkey flower, from ovipositing.

All this argues for a conservative policy, one that our CNPS chapter observes. — Jake Sigg

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USEFUL WEBSITES AND CONTACT INFORMATION

California Native Plant Society (CNPS):

www.cnps.org with links to conservation issues, chapters, publications, policies, etc.

For updates on conservation issues:

Audubon Society
www.audubon.org

Center for Biological Diversity
www.sw-center.org

Native Plant Conservation Campaign
www.plantsocieties.org

Natural Resources Defense Council
www.nrdc.org

Sierra Club
www.sierraclub.org

Wilderness Society
www.wilderness.org

Dead cypress with seedling offspring. All photogtaphs by Thomas Oberbauer unless otherwise noted.

FIRE ON GUADALUPE ISLAND REVEALS SOME OLD WOUNDS, AND NEW OPPORTUNITY

by Thomas A. Oberbauer, Luciana Luna Mendoza, Nadia Citlali Olivares, Lucía Barbosa Deveze, Isabel Granillo Duarte, and Scott A. Morrison

Guadalupe Island's recovery from more than 175 years of destruction by feral goats has been phenomenal (e.g., Luna et al. 2007). Following the eradication of goats, completed in 2006, shrubs thought to be extirpated for more than a century have reappeared. Guadalupe pines (*Pinus radiata binata*) have regenerated in considerable numbers in the vicinity of the few remaining parent trees—and with little apparent mortality despite recent dry years. Portions of the island that not long ago resembled the surface of Mars are now beginning to provide a glimpse into what the island may have looked like in the past.

The critically endangered Guadalupe cypress (*Hesperocyparis guadalupensis*) has also shown promising regeneration. Its distribution before the goat eradication was restricted to three groves, consisting of approximately 4,000 trees, covering roughly 100 hectares (Rodriguez Malagón et al. 2006). Following the removal of goats, seedlings were at long last able to establish, and today, only a few years later, tens of thousands of seedlings and young trees up to four meters in height are found in numerous locations around the groves. Older individual trees periodically continue to fall from the lack of soils due to erosion or other goat-caused damage, but it is not uncommon to see those wooden skeletons surrounded by a flush of young trees.

On September 15, 2008 a fire began that spread over a three-day period into the two large groves and one smaller cluster of trees. Attempts to quickly extinguish the fire were frustrated by strong winds, low humidity, and insufficient fire-

fighting equipment and personnel on the island. Water is limited due to reliance upon one perennial spring located elsewhere on the island. The initial suppression team consisted of a few on-island staff of the island conservation organization Conservación de Islas, personnel of the Mexican Navy (Secretaría de Marina-Armada de México), visiting researchers, and local fishermen, armed with three small trucks, rakes, and shovels. The National Forest Commission (CONAFOR) and the National Commission of Protected Natural Areas (CONANP) augmented that effort, and ultimately, a force of nearly 80 individuals participated in extinguishing the fire.

Approximately 60% of the cypress forest was affected and around 600 hectares (1,500 acres) of grassland burned. Some on the island during the fire described hearing cypress trees crashing down as the fire burned (D. Rogers [UC Davis] *pers. comm.*). The fire reportedly changed direction frequently, but generally spread southward and northward aided by the winds. Because of the winds, the little vegetation that existed on the island, mostly introduced grasses, was able to carry the flames between and far beyond the groves.

POST-FIRE ASSESSMENT

On October 5, 6, and 7, 2008 we conducted an initial reconnaissance of the burn (a more thorough assessment continued during the following weeks under the coordination of Conservación de Islas, and the collaboration of the Mexican Navy and CONANP). Although the fire burned through a significant area of the cypress groves, many of the trees remained standing. (A number of them have since fallen, however, due to strong Santa Ana winds.) Although about a quarter of the large northern grove burned in a crown fire that consumed entire trees, the majority of the southern grove was not burned. For the most part, it appears that the fire kept close to the ground. In some places outside the groves, among the low growing forbs, a narrow jeep trail served as a fire break. In other places, the fire was able to cross the trail and spread. The prevailing winds would have pushed the fire to the south and they did so through the two major cypress groves. However, we observed that the fire also burned far to the north through low and sparse herbaceous vegetation.

In many locations we found soil that was bright pink, outlining ghost trees where once a trunk lay. The heat of the burning log removed all organic matter, leaving clean, iron-

ABOVE: **Moonscape-like surface of the island in 1988, the result of vegetative destruction by vast herds of feral goats.** • RIGHT: **Bare slopes with a lone pine tree, 1988.**

rich volcanic soil. In unburned locations of the forest, the surface of the soil appeared as a pulverized mix of cypress leaf scales and bits of wood chips, created by the pounding and mixing effects of decades of goat hooves. Within the burn areas, fire entered into that soil, consuming the organic material. The result was a fluffy texture of soil-ash powder that in some places was 20-30 centimeters deep, and resembled moon dust or dry quick sand.

Guadalupe cypress is a tree with serotinous cones that remain closed and sealed with sap until exposed to fire or heat. And therein lies some good news: the plates on the round fire-blackened cypress cones did indeed open, revealing and releasing thousands of orange cypress seeds.

A goat-scarred tree trunk. Over 175 years, goats consumed almost everything within their reach on the island, including tree bark (especially during periods of drought). This often resulted in leaving heartwood exposed, making the trees more vulnerable to fire, rot, and disease.

In the burned area, the ground was peppered with millions of seeds. On island and coastal locations where fire is probably irregular, serotinous cones may also open readily without fire (McMaster and Zedler 1981; Barbour 2007). We did indeed observe cones on branches that were no longer living that had split and released seeds, even though the cones were not burned or affected by the heat of the fire.

The fire improved the conditions for seed germination by removing organic material on the soil surface. Young seedlings need exposure to mineral soil to ensure that roots contact stable substrate; that contact with mineral soil can also help protect seedlings from desiccation. Interestingly, fog swept through the groves the night before we arrived on the island. Even leafless burned trees condensed enough moisture so that the ground beneath the branches was wet. Seeds that fall on such locations will surely benefit from moisture generated by this process.

SURPRISES

There were some disturbing observations, however. Although the fire appeared to have burned at very low intensity through much of the forest—perhaps only a few decimeters high—many adult trees were nevertheless killed. Many of those trees had a common characteristic: they burned from the base, where fire entered into and hollowed out the trunk. Some trees were consumed while standing. Others apparently collapsed once the fire hollowed out a section of the trunk. A number of really large trees—some a meter and a half in diameter—collapsed, breaking approximately half of a meter above the ground so that the fallen canopy radiated out from the stump. In a number of those cases the fire consumed the rest of the tree once it lay on the ground, and as its crown burned it ignited an adjacent tree, exacerbating the fire's spread and intensity much like falling dominos.

Why were trees exposed to relatively low levels of fire collapsing from the base? While cypress are known to have relatively thin bark, these trees burned out and collapsed from fires that should not have killed healthy individuals. When we examined the trees that were burned and those that were unburned, the cause became evident. All of the trees—burned or unburned—exhibited severe scarring near their base. The majority of them had been partially girdled and damaged to the point that dead heart wood was exposed at the surface.

The cause of this damage was fairly obvious. In 2000, researchers

on the San Diego Natural History Museum-sponsored expedition to the island noted tooth marks on the cypress bark, caused by goats gnawing the trees mostly during periods of drought. This scarring and exposed heartwood was prevalent throughout the forest, all at levels within reach of the goats. Over 175 years, tens of thousands of goats consuming everything within their reach has clearly left a lasting effect on the forest. Not only did the goats cause major erosion issues within the forests, but the surviving trees were heavily scarred. And those wounds enabled an otherwise low intensity fire to kill the trees.

Even a low intensity fire would easily ignite the exposed wood and burn out the base of the tree from the inside. If a piece of this cypress wood is subjected to the flame of a butane lighter, within moments the wood ignites and burns on its own. If the bark were intact with a live cambium layer, the flame would likely not have been able to ignite the bark or wood. Every tree—including those not affected by the fire—displayed the scars. Even trees that have healed over so that no wood is exposed exhibit scars that create a ribbed surface near the base. The grooves between the fluted ribs contain oozing sap, and provide another avenue for heat and flame to enter the heartwood of the tree.

Interestingly, even in the absence of fire, many of the very old large trees have been hollowed by rotting where heartwood was exposed. As we observed in the unburned forest, it is only a matter of time before they collapse. We found numerous specimens of older unburned trees that collapsed along the scars where they too were weakened, which is basically the height of a goat's head. Cones on these broken trees were also observed to open and release seeds, although not to the extent that burned ones did.

In contrast to the situation on Guadalupe Island, low fires within groves of Tecate cypress (*Cupressus forbesii*) in San Diego County, a close relative of the Guadalupe cypress, have been observed in some cases to be relatively hot and burn the organic duff and understory, without causing tree mortality (P. Scully [CAL FIRE] and A. Shreve [U.S. Forest Service], *pers. comm.*).

PERSPECTIVE

While at first blush this fire could appear to be tragic, we suggest it is not, and that it will have a number of interesting benefits. Overall the fire has caused what can be—with proper management—a renewal and expansion of the cypress forest. New healthy seedlings will replace the old scarred and damaged trees, many of which would continue to die even though the goats have been removed. Even prior to the fire, within openings of the forest, a number of unique species of plants had already appeared with the reduction in numbers of goats, among them the annual monkey flower (*Mimulus latifolius*), island nightshade (*Solanum wallacei*), and native tobacco (*Nicotiana attenuata*).

Elsewhere, vegetation recovery appears to be accelerating. The spread of some of the plants seems almost miraculous considering their reappearance on the island just a few short years ago. While they have not quite yet formed a mature vegetation community, in the last few years the Guadalupe white sage (*Senecio palmeri*) and Guadalupe perityle (*Perityle incana*) have spread from a very few isolated cliffs to be quite common over the upper parts of the island. Island endemics like the beautiful prostrate Guadalupe tarplant (*Deinandra frutescens*), Guadalupe phacelia (*Phacelia phyllomanica*), and native Island hazardia (*Hazardia cana*) are spreading in flats near the cypress forest limits. The unusual silver-stemmed Guadalupe stephanomeria (*Stephanomeria guadalupensis*) that was previously known from the southern islets and nearly extinct on the main island can now be found growing on the slope of Mount Augusta, the highest point on the island.

The reappearance of felt-leaf ceanothus (*Ceanothus arboreus*, also known from the California Channel Islands, e.g., Junak 1995 and Junak et al. 2007) and one which appears to be related to cupleaf ceanothus (*C. greggii* var. *perplexans*, known commonly from the mainland chaparral to the north) is especially noteworthy, especially considering that adult ceanothus shrubs normally live less than 60 years

BELOW, TOP: **The heat from the fire resulted in the release of millions of cypress seeds, many of which germinated and began a cycle of passive revegetation.** • BOTTOM: **Cypress seeds and cone.**

Severe scarring of tree trunks caused by the large number of goats on the island made the cypress extremely vulnerable to fire. This tree with its hollowed trunk is typical of the damage that resulted.

(Keeley and Davis 2007) and that mature individuals had not been observed on the island for over 100 years. Historic references indicate that ceanothus was once quite common within the cypress forest (Franceschi 1893).

Young ceanothus are again appearing in a number of locations. Prior to the removal of goats, any individual plants that germinated would have been consumed. With the goats removed, these plants survive—the product of delayed germination of a very old, diminishing, and fortunately not yet exhausted seed bank. With this staggered germination strategy, it is likely that new ceanothus plants will continue to germinate for some time. It will be of great interest to observe the germination of plants such as ceanothus that may have been stimulated by the fire.

THE IMPERATIVE OF MANAGEMENT

When this fire occurred, a State Fire Management Collaboration Group planning effort was underway for Guadalupe Island. This fire event highlights the urgency of completing that effort. If the rejuvenating benefits of this fire are to endure, it will be essential there be no subsequent fire in the area in the several decades ahead. Tecate cypress has been found to reproduce best if fire intervals are longer than 30-50 years (Zedler 1981; Barbour 2007). If a fire occurs more frequently than that, the trees will be unable to produce enough seed for their replacement and numbers are likely to diminish, thereby reducing the size of the grove or forest. Therefore, even though these trees are adapted to periodic fire on the island, due to their precarious condition, no fire can be allowed to return until the new trees are at least 30 years old.

This fire also reminds us of how precarious these and other island resources are. The Guadalupe junco (*Junco hyemalis insularis*) tends to be associated with forest cover, so it will be important to evaluate its response to the fire. There are other species in great peril of extinction on the island including California juniper (*Juniperus californica*), which at one time grew in an open forest, Island oak (*Quercus tomentella*), Island redberry (*Rhamnus pirifolia*), toyon (*Heteromeles arbutifolia* var. *macrocarpa*), and even California sagebrush (*Artemisia californica*), to name a few. Managers need to identify ways of augmenting those populations, so as to reduce the risk of a catastrophic impact that could come with a single fire event.

Some management may be needed within the burn area, although it does not appear at this time that active reforestation of cypress is required, given the massive release of seeds and the impact that mechanical revegetation may have on the seedlings that have already established. In effect, the fire has caused a rejuvenation of the forest because this new crop of trees may replace the adult trees killed by the fire. But seed collection would nonetheless be prudent in the event of widespread seedling mortality (e.g., due to drought), or more immediately, for broadcast dispersal into burned areas outside the footprint of the current groves. Seed collection was already underway while we were on the island.

There is also a great amount

HOW OLD ARE THE CYPRESS GROVES?

Cypress growth rings are sometimes difficult to see, but after the wood has been weathered they are more easily counted. We estimated the age of trees by counting growth rings of a few cut sections of cypress that fell a number of years ago. Small- to medium-sized cypress trees roughly 50 centimeters in diameter seemed to be roughly 150 to 160 years of age. The large trees with trunks more than 1.2-1.4 meters on the outlying edge of the forest and on the southwestern portion of the southern grove are likely to be 350-500 years old.

These large trees appear to be remnants of a more widespread forest where younger trees have died out. Based on old accounts and cut trees, dead tree trunks appear to decay at a rate of approximately 30 to 50 years. Dead tree trunks exist in the open land between the two major groves, indicating that relatively recently the two groves were united into one large grove. Furthermore, within the last century, cypress trees grew near the major island spring far from existing groves, which indicates the much greater extent of this forest type.

In just a couple of years following the fire, the endemic Guadalupe white sage (*Senecio palmeri*) has spread and become quite common in certain parts of the island. Photograph by J.A. Soriano/Conservación de Islas.

LEFT AND BELOW LEFT: **Guadalupe cypress (*Cupressus guadalupensis* ssp. *guadalupensis*) seedlings in 2010, over two years after the Guadalupe Island fire, which burned approximately 60% of the existing cypress forest covering more than 150 hectares. Photographs by J.A. Soriano/Conservación de Islas. • BELOW: Map of Guadalupe Island showing the three cypress areas (upper left) impacted by the 2008 fire.**

of downed wood (or soon to be downed, i.e., standing trees that were killed but not consumed by the fire). Eventually the old logs will decay. But in the meantime, it must be decided if they pose an additional fire hazard. Since the goats removed the stabilizing vegetation many years ago, and the fire burned off additional soil vegetation and organic matter, erosion is a problem that has been exacerbated in the burn areas. Perhaps the newly lying dead logs may be able to serve as soil-stabilizing devices in some areas.

Monitoring will be important and should prove very interesting over the coming years. Plant species may emerge within the burn area that will surprise all. However, it will also be important to monitor for invasive weeds that may interfere with the establishment of native species and provide flashy fuels for future fires. Again, it will be important to redouble efforts to reduce the risk of fire igniting and spreading on the island, perhaps with strategic fire breaks and removal of dry grasses around the forest and other sensitive resources. Some of the new roads cut to suppress this recent fire may need rehabilitation.

The recovery of the vegetation on Guadalupe Island remains on a positive trajectory. More than anything, this fire reminds us of how fragile—but also how resilient—these island ecosystems can be, and that there is still much to be done to undo the damage of the era of feral animals on the island. Above all, the island remains an inspiring story of restoration and the conservation success that can be achieved through vision, dedication, and collaboration. Clearly, with severely damaged ecosystems like this one, the removal of a destructive introduced species is not enough to ensure resilience. Attentive and ongoing conservation management is imperative.

HOW LONG HAVE THE GOATS BEEN PRESENT ON THE ISLAND?

Feral goats were likely to have been introduced in the early 1800s at the time of the first seal and otter hunters. Conservación de Islas and its partners, including the Mexican government, worked for seven years to remove the goats (Luna et al. 2007). The goat removal was completed in 2006. However, a few collared goats, referred to as Judas goats, have remained on the island from 2007-2010. They act as decoys to attract any other goats that could have hidden in the deep canyons or caves, and serve as a means to confirm the eradication. The Judas goats will be removed at some point during 2010.

While they existed on the island, the goats consumed all vegetation within reach and though they did not feed on the trees directly, they caused erosion of the soil that supports trees, causing many to die. The groves that remain are mere remnants of what were once much larger stands of trees. Much of the island resembled a moonscape while the goats persisted. The vegetation is now gradually making a comeback.

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The reappearance of ceanothus on Guadalupe Island prior to the 2008 fire is likely due to the final removal of all the feral goats in 2006, and not to the fire event itself. The goats had been on the island for 175 years, which is the most likely theory as to why ceanothus had not been observed there for over 100 years.

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A mosaic of vegetation occurs in California based on geomorphology, fire history, hydrology, and elevation, such as pictured at Big Sur in Monterey County. Photograph by J. Evens.

A DYNAMIC TOOL FOR SOUND LANDSCAPE MANAGEMENT: INTRODUCING THE SECOND EDITION, *A MANUAL OF CALIFORNIA VEGETATION*

by Todd Keeler-Wolf and Julie M. Evens

The past 15 years have been very productive for vegetation science in California. CNPS and affiliated organizations have been advancing standard approaches to categorize and define vegetation using thousands of recently collected and analyzed field samples. Simultaneously, we have been increasing public awareness and knowledge through classification and mapping work. Detailed descriptions and maps of vegetation have recently been created for millions of acres. This information leads to better protection and management of large portions of the biological landscape in California.

Our current state of knowledge is summarized in the second edition of *A Manual of California Vegetation* (Sawyer, Keeler-Wolf, and Evens) published in October 2009. While the first edition of the book was published as an introduction to a new way of defining and describing vegetation, the second edition presents a refined tool that distinguishes all of the currently known vegetation types in California. Just as importantly, it also uses the descriptions as a means to describe dynamic processes such as fire, flood, and climate change that shape the state's biotic landscape.

In many ways the new book is part of the story of how vegetation description is contributing to conservation and sound management of California's natural landscape. In this article we want to show the reader what information lies within the book, and also what related activities are underway to provide integrated information on California vegetation.

STRUCTURE OF THE BOOK

The main body of the book includes 482 individualized descriptions of vegetation types. These are arranged simply in three main categories—by trees, by shrubs, and by

herbaceous vegetation. Leading off these three sections are keys to assist the unfamiliar reader in identifying a particular "stand" of vegetation or related type. Within each of the three sections are several different types of descriptions.

The majority of them (about 320) are descriptions of **alliances**. We describe alliances if we have sufficient quantitative data to substantiate them as distinctive floristic and ecological units. Many alliances are well known throughout the California botanical community, and have been understood as plant communities for many years. Some examples are Coast Redwood (*Sequoia sempervirens*), Chamise (*Adenostoma fasciculatum*), and Purple Needlegrass (*Nassella pulchra*) Alliances. In other cases, some alliances have been described only recently through vegetation sampling and quantitative analysis. Examples include Island Scrub Oak (*Quercus pacifica*), Sierra Juniper (*Juniperus grandis*), Wright's Buckwheat (*Eriogonum wrightii*), and Vernal Pool Goldfields (*Lasthenia glaberrima*) Alliances.

Each alliance description has a prescribed format, starting off with a diagnostic list of plant species that characterize or may commonly be found within stands of them. Completely new in this edition are tables and descriptions for both life history and fire ecology or other natural processes influencing the vegetation. An expanded section on geographic distribution makes use of a range map and a discussion of each vegetation type's distribution within the State's ecoregions.

A new section on management implications interprets the particular vegetation alliance in light of significant human management issues. This is followed by a list of all the specific plant **associations** that have been defined for each alliance. The plant association is the finest unit of classifying vegetation, and at least one association is defined for each alliance. Similar to the concept of biologically related species placed within a genus, a set of floristically and ecologically related plant associations can be aggregated into an alliance. Following the associations is an expanded set of references. These new sections provide ecologists, botanists, and many others with better information to identify and protect, as well as maintain and restore, our state's biodiversity.

TOP: **Stands of bigberry manzanita (*Arctostaphylos glauca*) occur intermixed with other chaparral and woodland vegetation from Central to Southern California, often on upper slopes and ridges. The manzanita is particularly notable on serpentine substrates where fires are less frequent. •** BOTTOM: **Water primrose (*Ludwigia peploides*) is represented by both native and non-native populations in California. Monotypic stands are very common in the lower Sacramento and San Joaquin river drainages. Since this vegetation has not been extensively sampled and ecological relationships to other closely related vegetation have not been worked out, it is considered as a Provisional Alliance. Photographs by T. Keeler-Wolf.**

Besides the standard alliance descriptions are three other categories, also newly defined in this second edition. One is **semi-natural stands**. Semi-natural stands are very strongly dominated and defined by non-native species, almost to the exclusion of native species. For example, although many grassland stands in California have yellow star-thistle (*Centaurea solstitialis*) or Maltese star-thistle (*Centaurea melitensis*) as a component, only those stands that are entirely dominated by yellow or Maltese star-thistle with an extremely low proportion of native species can be considered members of the yellow star-thistle semi-natural stands. This level of detail enables us to target and manage areas with strongly dominant non-native vegetation and to restore and reestablish characteristic native species. A couple of other widespread semi-natural stands are perennial pepperweed (*Lepidium*

LEFT: **Popcornflower (*Plagiobothrys nothofulvus*) is a native annual herb that brightens thousands of acres of "annual grasslands" in the foothills surrounding the Central Valley. It is characteristic of a different soil texture (loamy, well-drained, often riddled with animal burrows) than other similar herbaceous vegetation. Photograph by T. Keeler-Wolf. • BELOW: The Yellow Bush Lupine (*Lupinus arboreus*) Alliance of the California coast is characterized by short-term dominance of this species, followed by die-back and alternating temporary dominance by grasses and native herbs. It is represented by native and non-native stands in Central California, but all stands north of Sonoma County are non-native. Photograph by T. Keeler-Wolf. • OPPOSITE, TOP AND BOTTOM: The Herbaceous White-Tipped Clover (*Trifolium varigatum*) Alliance is one of several new native annual herb alliances that have recently been described in loamy to clayey soils that are mesic to wet in lower elevations of the California floristic province. Photographs by J. Evens.**

ABOVE AND OPPOSITE: **These two desert stands—the left on a steep rocky slope, and the right on a sandy alluvial fan—both have tall spiny ocotillo (*Fouquieria splendens*) and several members of the cactus family highly conspicuous. However, through analysis of hundreds of vegetation samples in the California desert, we have learned that the most diagnostic species for distinguishing different environments are not necessarily the most conspicuous. On the left, the low-growing, grayish-green brittlebush (*Encelia farinosa*) is most significant and most abundant, making that stand a member of the Brittlebush Alliance, while the many low gray shrubs of burrobush (*Ambrosia dumosa*) and the scattered dark green shrubs of creosote bush (*Larrea tridentata*) make that stand a member of the Creosote Bush-Burrobush Alliance. Photograph above by J. Evens. Photograph opposite by T. Keeler-Wolf.**

latifolium) and ryegrass (*Lolium perenne*).

Another category is what we call **special stands**. Theoretically these are different than alliances, because they do not occur as regularly across a landscape. Instead they are rare and local, often dominated by geographically restricted endemic species such as a rare species of manzanita (*Arctostaphylos*) or California lilac (*Ceanothus*), or a restricted endemic tree such as Torrey pine (*Pinus torreyana*) or island oak (*Quercus tomentella*). Their stands may be related to more widespread alliances, but are so strongly dominated or characterized by an endemic local species that they tend to be found only in a handful of locales.

The final category of plant descriptions is for **provisional alliances**. These are not given full alliance status in the book because they are not well sampled and described. However, we expect their status to be resolved when sufficient sampling and assessment of them is done, and we expect that most of them will reach full alliance status. These three additional categories are described in less detail in the book than the others, lack a detailed map of distribution, and contain less information on fire regime and life history.

NATURAL PROCESSES AND LIFE HISTORY INFORMATION

We include many new details in the book to enrich readers' abilities to gauge the *ecological status* (i.e., the natural condition and transitions) of vegetation, and to better protect and manage California's varied landscapes. Because fire influences the majority of vegetation in the state, and because it is often of primary concern to land stewards and managers, fire ecology is featured prominently in the book. With the help of professional fire ecologists, we present individualized text descrip-

tions and tables denoting fire characteristics such as return intervals (i.e., the number of years between two successive major fires), intensity, severity, and other effects of fire on all major vegetation types. Along with this information, we present more general descriptions of the life history strategies of the characteristic plant species that form each alliance.

Combined life history and fire information can assist the reader in interpreting what is the normal range of variability for a given vegetation type. For example, if we see a dense and healthy stand of Big Berry Manzanita (*Arctostaphylos glauca*) Alliance in the California Central Coast Ranges, we now recognize that it likely has had a medium duration fire return interval (20-100+ years). It usually burns in late summer to fall in medium to large-size fires that may spread into other adjacent vegetation. In addition, the fires can be characterized as crown fires of high intensity, high severity, or moderate to low complexity.

A main reason that we can surmise this is because big berry manzanita is an evergreen, nonresprouting shrub producing long-lived, animal-dispersed seeds that build up in a soil seed bank. These seeds require chemical treatment and heat to germinate, and adult plants can produce viable seeds from plants ranging from 10 to over 100 years. Descriptions of these terms may be found in appendices in the book and further explanation may be found in the book *Fire in California Ecosystems* (Sugihara et al. 2006).

It is possible to understand the natural state and dynamics of California vegetation more completely because we now have descriptions for a greater array of vegetation, even those that persist for short periods. For example, the Bush Poppy (*Dendromecon rigida*), Black-Stem or Mojave Rabbitbrush (*Ericameria paniculata*), Deer-Weed (*Lotus scoparius*), Silver Bush Lupine (*Lupinus albifrons*), Bush Mallow (*Malacothamnus fasciculatus*), and Fiddlenecks (*Amsinckia* [*menziesii, tessellata*]) Alliances occur in landscapes with rapid turnover cycles of fire, floods, and other natural disturbance processes.

The book also provides a significant number of other new alliance descriptions for entire suites of plant communities or habitats, including montane coniferous forests, desert scrublands and washes, maritime chaparral, serpentine vegetation types, alpine habitats, montane to subalpine meadows, willow scrubs, coastal and inland marshes, vernal pools, and California grasslands. For

example, we now refer to 15 annual herbaceous types to describe California annual grassland habitat, including many containing native biodiversity such as the Goldfields–Plantain–Annual Fescue (*Lasthenia californica–Plantago erecta–Vulpia microstachys*) Alliance. These new descriptions have come directly from focused vegetation inventory and mapping conducted through the cooperative efforts of CNPS, Department of Fish and Game, National and State Parks, U.S. Forest Service, and many other agencies and organizations.

BEYOND THE SECOND EDITION

Through workshops and regional projects, we have begun to educate the public agencies about using our refined vegetation classification as the standard in their local environmental projects. An important next step will be to continue to work with county, open space district, land conservancy, and consulting biology staff to incorporate this level of detailed vegetation classification when making land-planning and land-management decisions.

While all of this information is incorporated into the new edition of *A Manual of California Vegetation,* our knowledge continues to grow, and we recognize that further additions and modifications to the classification and description of California vegetation will come for decades. Because vegetation classification is also growing and changing nationwide and internationally, this will also influence the ways we interpret vegetation in California.

Stands of desert agave (*Agave deserti*) occur along rocky uplands and washes in and near Anza-Borrego State Park. The Desert Agave Alliance is one of a number of newly described alliances in the updated *Manual*. Photograph by J. Evens.

In preparation for these inevitabilities, we have begun entering the book's content into a database, and hope to produce an online version with yearly updates. This also will enable users to produce customized queries, including lists of types based on common or scientific names, geographic location, and other features. We are actively working on many aspects of the database and portions of the website, especially to display good diagnostic photographs of all the vegetation types described in the book. We also are planning to publish a photographic guidebook as a companion to the manual.

We hope that this book will provide a broad context for anyone who is interested in "reading" the natural landscapes of California. By using the information in the book, the natural history of any part of the state can be understood in a richer way. To those simply curious about nature, we believe it will provide more satisfying answers to questions like "Why do the plants grow so sparsely here?" or "How has this forest changed in the past 50 years?" To a land steward or manager, it can help answer the question, "How can we restore this landscape to a naturally functioning ecosystem?" And conservationists will likely find the book invaluable in answering questions such as "Which site should we acquire to preserve a diverse mosaic of vegetation types?"

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AWARD WINNERS OF THE PHOTOGRAPHY AND BOTANICAL ART CONTESTS FROM THE CNPS 2009 CONSERVATION CONFERENCE

by Josie Crawford

The artists and photographers displayed on the following pages have waited patiently for this moment to arrive. It has been more than a year since the photography and botanical art contests were held at the CNPS 2009 Conservation Conference: Strategies and Solutions, held January 17-19, 2009 at the Sacramento Convention Center. In this article we present the top winners of those contests.

Art is one way of expressing appreciation of our flora and natural landscapes (part of the mission of CNPS). We wanted art and photography as counterpoint to the science in the conference and to remind us of why we are involved in conservation science in the first place. We did not wholly expect to receive the high quality of art that flowed into our office. Many attendees said the art and photography were the highlight of the conference for them.

Each contest was judged by a separate panel of three judges of peers and professionals. Both contests also awarded a Conference Choice award based on the votes of conference attendees. With such a concentration of talent, it was extremely difficult to choose "the best." In this issue we feature the First, Second, and Third Place winners, and the Conference Choice awards. Runners-Up and Honorable Mention awards are also listed.

For the photography contest, entries had to be taken in California and feature plants native to the state. The images could be species specific macro shots, wide angle landscape photos, or pictures of people or animals interacting with the natural environment of California. Photos could be of, but were not limited to, rare or common plants, flowers, trees, shrubs, vines, grasses, or bryophytes. The judges of the photography contest included photographers Ree Slocum, Sally Mack, and Nick Jensen. Stacey Flowerdew organized and chaired the contest. There were 105 photo entries by 37 artists.

For the botanical art contest, entries could be original artwork in any two-dimensional medium. They had to reflect the beauty and uniqueness of California flora, and adhere to high standards of botanical accuracy. Judges of the botanical art contest included botanical illustrators Kristin Jakob, Lee McCaffree, and Geri Hulse-Stephens. The committee responsible for organizing the show was comprised of Geri Hulse-Stephens and Judy McCrary, co-chairs, and Susan Blazell. Thanks also go to Kristin Jakob and Lee McCaffree, who provided invaluable support. There were 53 botanical art entries by 31 artists.

The next CNPS conference will be held in mid-January 2012. Check the state website in 2011 for details of the next conference photo and art contests. There may also be a category for landscape art in 2012.

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PHOTO CONTEST WINNERS

First Place: Bruce Barnett, "Vernal Pools"
Second Place: Paul Johnson, "Family Values"
Third Place: Dylan Neubauer, "*Limnanthes douglasii* & Syrphid Fly"

Conference Choice: Reny Parker, "Coast Buckwheat"

RUNNERS-UP

Judy Kramer, "Garden Among the Joshua Trees"
Brian Wright, "Moonlit Bristlecone"
Toni Rizzo, "Coast Indian Paintbrush"

HONORABLE MENTIONS

Dylan Neubauer, "*Agoseris grandiflora*"
Michael Kauffmann, "Siskiyou Sunrise"
Judy Kramer, "Pennyroyal Bud"
Paul Johnson, "Pinyon Beauty"
Paul Johnson, "Buttonwillow"
Paul Hankamp, "*Camissonia claviformis*"
Spring Strahm, "*Calochortus catalinae*"
Linda Donnelly, "Jackass Meadow, Sierra Nevada"

DR. BRUCE BARNETT
FIRST PLACE PHOTOGRAPH
"VERNAL POOLS"

Dr. Bruce Barnett is a Ph.D. biologist living in Davis. He has been an environmental consultant for over 25 years and worked throughout California and the western U.S., Mexico, Central and South America, Europe, Africa, and India. Dr. Barnett combines his ecological knowledge with a keen interest in aerial photography to provide a unique perspective on the diversity and beauty of California's natural and manmade landscapes.

"As an avid powered paraglider pilot, I spend many hours exploring and photographing the region's diverse natural and agricultural landscapes from the air. I regularly visit the impressive vernal pool landscape at the Glide Tule Ranch, approximately 10 miles south of Davis, as much to record yearly variations in flowering patterns and extent as to admire its sheer beauty. Though these large pools, or playas, are beautiful anytime, they are most striking in early morning or late afternoon light, which emphasizes textures and infuses a distinct richness to the colors. Though I may sometimes make minor adjustments to my photos to remove haze, increase sharpness, or adjust contrast, my goal is for the viewer to see what I see from my aerial perch. Why fix what doesn't need fixing?"

www.flickr.com/photos/bioflyer

PAUL G. JOHNSON
SECOND PLACE PHOTOGRAPH
"FAMILY VALUES"

Paul Johnson is a wildlife biologist who spends much of his spare time studying and photographing insects in their natural surroundings. He uses his camera to immerse himself in nature and to share the beauty he finds there. His winning entries in the CNPS photo contest (he also received two honorable mentions) were all taken during insect expeditions.

This photo depicts a "family that delights in one of the finest wildflower shows in California held at Shell Creek in San Luis Obispo County."

pjpolliwog@yahoo.com

DYLAN NEUBAUER
THIRD PLACE PHOTOGRAPH
"*LIMNANTHES DOUGLASII* & SYRPHID FLY"

Dylan Neubauer is an amateur botanist and photographer who really enjoys combining the two pursuits.

"Every now and then, through some miracle, an amazing moment is captured by the eye of the camera. That's what happened with the shot of the syrphid fly—it was one of my very first pictures."

dylan1111@sbcglobal.net
www.flickr.com/photos/28585246@N00/

RENY PARKER
CONFERENCE CHOICE PHOTOGRAPH
"COAST BUCKWHEAT"

Reny Parker is author/photographer of the photographic field guide, *Wildflowers of Northern California's Wine Country & North Coast Ranges*. She is past president of the Milo Baker Chapter and lives off the grid in northern Sonoma County.

"This coast buckwheat was in a perfect setting at Point Reyes to make a 'winning' photograph."

www.renyswildflowers.com/

RUNNERS-UP PHOTOGRAPHS (not pictured)

Judy Kramer
"Garden Among the Joshua Trees"

Judy Kramer is a past president of the Palo Alto Camera Club, and her photographs are used by several local environmental organizations. She captured this image in April 2008 heading to Walker Pass in Kern County along California Route 178.

"The carpet of spring color beneath the Joshua trees caught my eye, and the high clouds added drama to the scene."

www.earthwitnessphoto.com

Brian Wright
"Moonlit Bristlecone"

Equipped with medium format film cameras and using only moonlight for illumination, **Brian Wright** spends countless hours every summer trying to capture the nighttime beauty within the groves of the Ancient Bristlecone Pine Forest near Bishop.

"This five-hour exposure reveals the hidden detail and color of one remote tree beneath the majestic night sky."

brianwrightphoto.com

Toni Rizzo
"Coast Indian Paintbrush"

Toni Rizzo lives near Fort Bragg on the Mendocino Coast, where she makes a living as a freelance writer specializing in medical, science, nature, and outdoor topics. She loves hiking and photographing native plants, especially macro photography of flowers.

"This photo of Mendocino Coast Indian paintbrush (*Castilleja mendocinensis*) was taken on the bluffs of Glass Beach in Fort Bragg."

BOTANICAL ART WINNERS

First Place: Maria Freeman, "Santa Cruz Cypress"
Second Place: Peggy Irvine, "Golden Iris"
Third Place: Peg Steunenberg, "Mt. Diablo Buckwheat"

CONFERENCE CHOICE WINNER

Maria Freeman, "Santa Cruz Cypress"

HONORABLE MENTIONS

Eliza Jewett, "Toyon"
Jade Paget-Seekins, "Black Morel"
Lesley Randall, "*Eremalche rotundifolia*"

MARIA CECILIA FREEMAN
FIRST PLACE AND CONFERENCE CHOICE
BOTANICAL ART
"CUPRESSUS ABRAMSIANA"

Maria Cecilia Freeman, a CNPS member for 25 years, is a botanical artist based in Santa Cruz. Her work includes scientific illustration and botanically accurate fine art that serves the goals of education and conservation. She portrays native plant species with a view to their preservation. "*Cupressus abramsiana*" is watercolor and colored pencil on paper 18" x 24". It is included in the American Society of Botanical Artists' exhibition, "Losing Paradise? Endangered Plants Here and Around the World," currently traveling in the U.S.

"I live ten minutes from two of the five remaining populations of Santa Cruz cypress (*Cupressus abramsiana*). When I set out to study the cypress, I consulted Stephen McCabe, CNPS Conservation Committee chair for the Santa Cruz Chapter, and coordinator of research at the University of California's Santa Cruz Arboretum. Steve helped me identify the distinctive characteristics of this cypress species, showed me specimen plants at the Arboretum, and gave me small cuttings with cones to study and draw in detail. I visited the trees repeatedly to study their branching habit, bark, leaves, and cones as the seasons changed. After a wildfire in June 2008, I visited the Bonny Doon Ecological Preserve and photographed the blackened remains of the cypresses there. In the spring of 2009 I returned and found the ground covered with tiny seedlings of the species."

www.mcf-art.com; 831-457-2365

PEGGY IRVINE
SECOND PLACE BOTANICAL ART
"GOLDEN IRIS"

Peggy Irvine began working at botanical illustration in 2004.

"The subject of my illustration, Del Norte County iris (*Iris innominata*), is from my garden. It's an interesting subject for painting, as its bud, mature flower, and seed pod can all be present at the same time. In addition, this little native California iris grows so vigorously that one can dig up a specimen for illustration, with roots attached, and still have most of the plant left to admire in the garden."

pjirvine@suddenlink.net

PEG STEUNENBERG
THIRD PLACE BOTANICAL ART
"MT. DIABLO BUCKWHEAT"

Peg Steunenberg creates visual educational images for publications and product lines. The focus of her work is the preservation of California's flora and fauna. She has exhibited in a number of shows, including the Picturing Natural History exhibit at the National Museum of Natural History, the Smithsonian Institution, New York State Museum, and the St. Louis Botanic Garden. She received the Gold Medal 2000 award from the San Francisco Society of Illustrators.

"With the help of Michael Park, Seth Adams, and the Jepson Herbarium, I was able to render the painting of Mt. Diablo Buckwheat (*Eriogonum truncatum*). Live specimens, museum mounts, and photography provided the necessary reference material."

www.pegsteunenberg.com/

ROLAND PITSCHEL: 1942–2009

by Jake Sigg and Barbara Pitschel

Roland Pitschel, CNPS Fellow, long-time Yerba Buena Chapter Board member, and active native plant and grassland restoration activist, died on August 1, 2009, two weeks before his 67th birthday, after bravely contending for seven months with aggressive cancer.

Born in Germany in 1942, Roland immigrated to Chicago with his mother and sister in 1950. The environmental wisdom and comfort with camping and studying wild areas that followed him throughout his life were fostered by his youthful experiences as an Eagle Scout in the Lake Michigan area.

After high school, Roland worked at the bindery of the University of Chicago, where his sister was a graduate student. During this period, the *Chicago Review* declined to publish some contemporary writing it deemed obscene, prompting Roland and his sister to work with many notable literary heroes to create *Big Table Magazine*, thus ensuring publication of William Burroughs *Naked Lunch* and other important literature.

Roland produced beautiful silk screen prints and posters. This period was the first public revelation of the brilliant woodworking, metalworking, graphic arts, book arts, mechanical, artistic, creative, and problem-solving skills (and also intelligence and humor) that defined his entire life.

In Chicago, Roland worked as stage manager and lighting coordinator at the Gate of Horn, noted folk club of the 1950s and 1960s, which featured luminaries including Josh White, Odetta, and Lenny Bruce. He and his future wife Barbara both worked as support staff at Second City, the legendary leader in the tradition of improvisational theater, when it was founded in Chicago just 50 years ago, on December 16, 1959.

Roland and Barbara moved to San Francisco in 1963, where they were married in City Hall. Daughter Justine was born in 1965. In early San Francisco years, both worked as support staff for The Committee, Alan Myerson's successor to Second City and another leader in the improvisational theater movement. Because of Roland's amazing stage construction and creative carpentry work, The Pitschel Players, a successor group, adopted his name.

Roland worked for many years as a freelance carpenter, cabinet maker, and creator of artistic wood carvings, jewelry, bird calls, bookbinding equipment, furniture, and much more. "He was a craftsman in wood, metal, and ceramics," said Ted Kipping, arborist, who was Roland's friend for 25 years. "He was a master at anything he did."

In 1966, the Pitschels settled on Bernal Heights, an urban island that still harbored many of San Francisco's native plant species. Early on, they helped protect the hilltop from development by working to ensure its transfer from the Department of Public Works to the Recreation and Parks Department. Roland continued to be an environmental leader in conservation of San Francisco natural areas for the rest of his life. He spent thousands of volunteer hours working to restore the slopes of Bernal Hill to its native bunchgrass-wildflower ecosystem. The Pitschels were key members of a group of neighborhood people who worked to preserve what was left of the original landscape of the city. Much of the group's work involved rooting out invasive nonnative species.

Roland Ritschel. Photograph by Margo Bors.

Roland served in myriad capacities for the Yerba Buena Chapter, including vice-president from 1992 to 2009. Through his decades of support, he could always be counted on to serve and to contribute his skills in whatever capacity was needed.

In 1983, Roland joined the Facilities Department of Oakland's California College of the Arts where he continued to work until two weeks before his death. He was respected and beloved by his colleagues. His amazing skills provided great forward impetus to the work of the college; his nonconfrontational personality helped move initiatives forward. He is one of the few people we know who had no enemies! His coworkers have planted a native plant garden and cast a plaque in his memory, bearing his epitaph: "'Sometimes the magic works; sometimes it doesn't.' —*Little Big Man,* 1970."

"He was a quiet man, very low key," said Jake Sigg, a longtime friend. "He gave new meaning to the term self-effacing."

"Roland lived well and he died well, surrounded by his family," said Barbara. In addition to his wife of 45 years, Roland is survived by one daughter, two granddaughters, one great-grandson, one sister, and two nephews and their families.

Roland bequeathed his body to the UCSF whole body donation program for scientific research. The family did not plan a formal memorial service at the time of his death, but still hopes to celebrate Roland's life and work with a joyful party in the future.

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BOOK REVIEWS

California Mosses by Bill Malcolm, Nancy Malcolm, Jim Shevock, and Dan Norris. Micro-Optics Press, Nelson, New Zealand, 2009. 430 pages. $68 hardcover. ISBN 0-9582224-5-2.

California Mosses is a stunning demonstration of the capabilities of modern publishing, a full-color photographic guide. This collaboration between a pair of photomicroscopists and a pair of field bryologists has resulted in a near magical fusion of effort. This book was heralded by the previous work of the Malcolms, *Mosses and Other Bryophytes, An Illustrated Glossary* (second edition, 2006), where their beautiful images of moss leaf structure first received wide attention.

The heart of this book is the assemblage of 290 pages of color pictures. The images are grouped by "plates." Each plate focuses on one species and contains seven to nine pictures, typically consisting of 1) a dry, vegetative shoot, slightly magnified, 2) a fertile shoot or a capsule, slightly magnified, 3) a single leaf magnified about ten times, and 4) cells of the leaf apex, leaf margin, middle of leaf, and basal corner of the leaf, magnified about 100 times. It is the latter group of photomicrographs that makes the book so useful, in addition to being so spectacularly beautiful.

Every genus in the California moss flora is included, with almost half of the 600+ species of California mosses given a full plate. Each page also includes a brief discussion of the species' growth form, habitat, and a description of leaf and capsule characteristics. Comments mention the geographic range of the species, whether it is rare or of concern, and notable distinguishing characteristics.

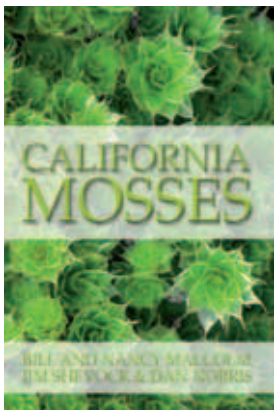
The photomicrographs (photos taken through a microscope) are dramatic for two reasons. First, the Malcolms treat all specimens with potassium hydroxide (KOH) before making microscope preparations. This clears the cells of contents so that the cell walls stand out. Second, they photograph with differential interference optics, an elaborate technique that exaggerates the depth of field and contrast of the cell walls.

This combination of techniques, rarely used by American bryologists, gives the images a somewhat unnatural appearance. The KOH tends to color the cell walls yellow to orange to red, so the images do not look green like fresh leaves in a traditional wet mount. Their optical system enhances the internal structure of cell walls and imparts a syrupy 3-D effect to cell walls that are nearly transparent under ordinary microscope optics. It is important to remember these artificial effects when comparing fresh specimens with the plates.

The authors intend that this book will help people identify mosses without having to use a hand lens. This can be accomplished by matching leaves to illustrations in the book, and then reading the text. To assist in this matching process is an 80-page section that contains close to a thousand leaf diagrams (called thumbnails). The thumbnail section is itself divided into two parts, the first with leaves sorted into 26 distinctive leaf types and the second part with the species arranged by genus.

Although identification using picture matching based on hand lens examination of whole leaves will work with many mosses, most people desiring to identify mosses will need a compound microscope in order to see the cellular details depicted in the plates. They can use this book in conjunction with the keys to *California Mosses* by Norris and Shevock (2004, *Madroño* 51:2). I have student-tested the book in an advanced bryology workshop and found it enormously useful. Students key out a moss, and then turn to *California Mosses* to see if the specimen matches the illustration of what it keyed out to. *California Mosses* is also helpful when a student has a hunch as to the identity of a specimen, because the student can go directly to an illustration in the book to see if that hunch might be correct, or at least close. The illustrations are just as useful for ruling out possibilities as they are to verify proposed names.

The sequence of species follows a taxonomic arrangement not familiar to many moss students, so that users will find the guide on pages 22-23 to be a valuable supplement to the index in the back of the book.



The authors note that in the years since publication of the 2004 Norris and Shevock keys, 48 species have been added to the state's moss checklist and 29 have been removed. New species remain to be formally named. As with any flora, updates are inevitable. This guide will serve us admirably in the near future; the not-so-distant future will incorporate corrections and additions into a revised, bigger, better second edition. The reasonable price for this volume should afford it a place on the bookshelf of anyone interested in California mosses.

David Wagner
Northwest Botanical Institute

A Rare Botanical Legacy: The Contributions of Ruby and Arthur Van Deventer. Rick Bennett, Susan Calla, and David Wallace. Heyday Books, 2009. 154 pages, illustrated.

A Rare Botanical Legacy proves to be much more than an oversized coffee table book with floral paintings and a striking dust jacket watercolor of a menacing cobra lily. The legacy belongs to Ruby Steele Van Deventer, long-time school teacher and amateur plant collector, and her husband Arthur, forest ranger, rancher, and amateur artist.

Ruby grew up in a cabin along Smith River in California's isolated Del Norte County, Arthur on a ranch in Southern California. They both attended UC Berkeley, she a language major, he in engineering, but first met during the spring of 1915 in Brookings, Oregon, a lumber village started by

Walter Brookings and Arthur. It was love at first sight, and they eloped from a Fourth of July dance and were married on July 6 in Eureka. They first lived near Siskiyou National Forest where Arthur worked. In 1923 they moved with three-year-old daughter Dwayne to Ruby's homestead near Crescent City.

Interested in the local flora, Ruby began her plant collections, and her husband, who had dabbled with art since childhood, began to sketch and paint her specimens. After Ruby's rejection of his first attempt—a wilted saxifrage portrayed as wilted—his artistry improved immensely. Meanwhile, during the 1920s, Ruby's entries from Del Norte County at San Francisco flower shows won so many prizes that she was finally told not to enter anymore.

In San Francisco Ruby had become acquainted with Alice Eastwood of the California Academy of Sciences, who invited her to coauthor a flora. Ruby declined, feeling unqualified. But her visit with University of California botanist Dr. Willis Jepson on August 24, 1936 resulted in her becoming involved in the flora nevertheless. Jepson was working on his monumental *Flora of California*, and here was Ruby, a plant collector from Del Norte, who informed him she already had a collection of some 1,500 plants from this botanically unique region and could send him a fresh specimen of Indian Pipe (*Monotropa uniflora*), not known from California.

In early September Jepson received her Indian Pipe specimens. He quickly replied that this first official California record for uniflora would be in the next section of his *Flora*, soon on its way to the printer. Congratulating Ruby, he wrote "You will be duly and appropriately immortalized in the *Flora of California*"(3:32). In Ruby's 1937 letter to Jepson she asked if there were any special specimens that Jepson would like, mentioning common butterwort (*Pinguicula vulgaris*) (not in *The Jepson Manual*!), and included an ink sketch of pipsissewa (*Chimaphila umbellata*) by Arthur. Thus began a long lasting and productive friendship.

Jepson would pay a visit to the Van Deventers in late July of 1937, their field excursion to Poker Flat abruptly ending with his breaking an ankle, two weeks in a hospital, and prolonged recovery. But Ruby would become Jepson's floral source for the unique Del Norte County, eventually contributing more than 400 specimens to the Jepson Herbarium. And the Van Deventers soon became his valued correspondents for the following decade until Jepson's death, with some 74 letters going back and forth.

Professor Jepson's encouragement to Ruby that she should write a book on her county's flora is most likely responsible for spurring her great productivity. When the Van Deventers died in the early 1970s, there remained Ruby's legacy of 1,100 pages of manuscript and 4,000 plant descriptions, plus Arthur's 400 paintings and drawings . . . but all unpublished!

It was increasing northwestern California community interest that brought the Van Deventer dream to fruition. *Legacy's* two coeditors, Rick Bennett and Susan Calla, aware of the unpublished manuscript and paintings, together with the Del Norte County Historical Society, proposed and subse-

quently received a major grant from the U.S. Forest Service for The Van Deventer Botanical Legacy Project. With the encouragement of publisher Malcolm Margolin of the Heyday Institute—which was devoted to publications of significant California import—*A Rare Botanical Legacy* was printed by Heyday Books. Meanwhile, in 2008, 600 people attended the Ruby Van Deventer Wildflower Show, attesting to the general public interest in their work.

In *Legacy,* the 116 large plates of beautiful, realistic floral watercolors by Arthur dominate. Each plate contains an informative caption that includes the scientific and common name, along with descriptive, historical, and anecdotal information (e.g., "The Marsh Pea: Ruby collected her specimen at Bower's Swamp and sent it to Jepson in 1938.") There is no index for the plates, but readers familiar with plant families will soon realize the arrangement is alphabetically by families, with monocots listed last. Following the plates is an appendix that elucidates how the Tolowa and Yurok Indians used many of the plants. Preceding the watercolors are 13 pages of text by the coeditors, who wrote separate prefaces from quite different vantage points, and a biographical sketch of the Van Deventers by noted nature writer David Wallace.

How the book's coeditors became involved in the project is a story in itself. Coeditor Rick Bennett first became acquainted with Ruby when the two of them were teaching at Crescent City High school years earlier. In 2004, driving past the Van Deventer's old Smith River homestead, Rick discovered that their grandson's widow, Marilyn Heye, still lived there and "had some of Ruby's stuff," including a lengthy book manuscript and hundreds of her husband's flower paintings. Rick became entranced. Coeditor Susan Calla had moved to the Klamath-Siskiyou region in the late 1970s, some time after the Van Deventers had passed away. She, too, got to know Marilyn, and was impressed with tales of the spunky Ruby, as well as the couple's past contributions to the community and to botany. The two coeditors viewed a possible Van Deventer book as "a marriage of science and art, of pioneer history and community." (In Calla's preface appear maps of the northwest coast region.)

Following Rick's and Susan's personal reminiscences, biographer David Wallace provides a readable portrait of the Van Deventer lives. Accompanying it is a delightful variety of illustrations, from Van's flower paintings to family and landscape photographs, reproductions of Jepson field diary entries, and relevant correspondence. Wallace concludes with Ruby's speech for the 1967 dedication of the Van Deventer Forest Park, where she planted a redwood seedling from the old Van Deventer homestead nearby.

Richard G. Beidleman
University and Jepson Herbaria

NOTES AND COMMENTS

A POTENTIAL FELLOW IN YOUR MIDST

CNPS strives to recognize any member who has made an outstanding contribution to our organization. One way to accomplish this is through the Fellows program. The nomination of a CNPS member to become a Fellow can be made at any time by any CNPS member, chapter, board, committee, or officer. The successful candidate is a member who has made a significant contribution to the success of the Society and furthering the appreciation and conservation of California's native flora. The Fellows Committee knows there are potential candidates that have made a difference in your chapter or on the statewide level. Help us to make their recognition possible.

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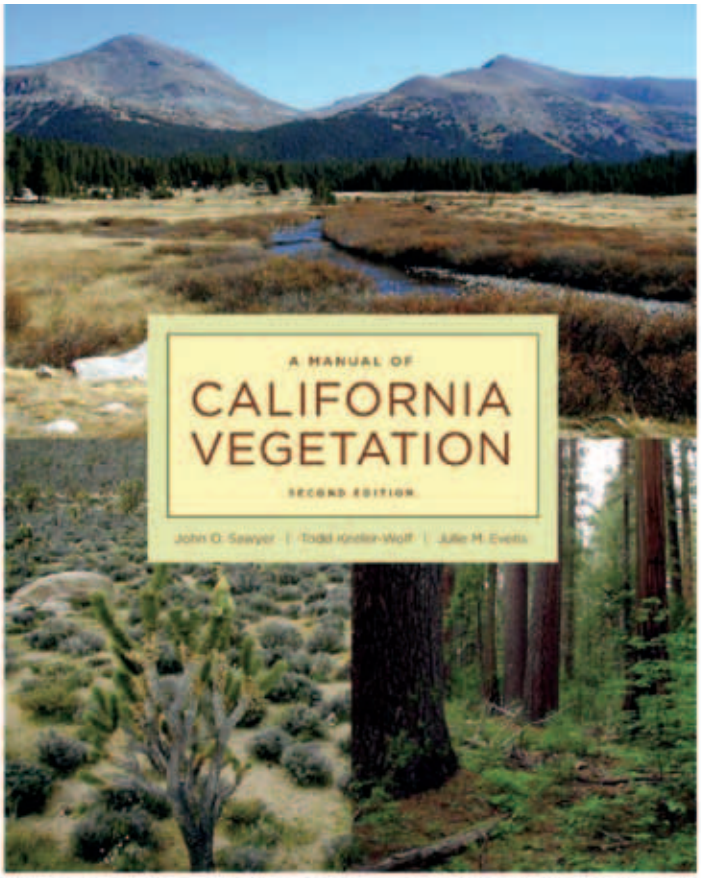
To view a list of members who have been designated as Fellows, go to *www.cnps.org/cnps/support/fellows.php*.

CORRECTION

On page 10 of the last issue of *Fremontia* (Vol. 37, No. 2), in the chart "Additions to the *Flora of Sonoma County* From the Cedars," the species *Moehringia latifolia* should have been listed as *Moehringia macrophylla.* The author regrets making this error.



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Jake Sigg is a CNPS Fellow and a past president of the Society. He has served on the Yerba Buena Chapter board since 1988 as conservation chair, and for eight years as president. He has worked with the Pitschels on many chapter projects, including the monthly restoration work parties on Bernal Hill.

David Wagner is a botanist specializing in ferns and bryophytes. Formerly director of the University of Oregon Herbarium, he now operates the Northwest Botanical Institute, focused on research and education.

MATERIALS FOR PUBLICATION

Members and others are invited to submit material for publication in *Fremontia*. Instructions for contributors can be found on the CNPS website, *www.cnps.org*, or can be requested from *Fremontia* Editor Bob Hass at *bhass@cnps.org*.

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(*continued on inside back cover*)

FROM THE EDITOR

It is both sad and alarming to see the extent to which people today have become disconnected from nature. Examples of this disconnect pervade our society and include our willingness to produce and use substances (knowingly or not) that are toxic to ourselves, our air, waterways, soil, wildlife, and to the native plants and plant communities we care so deeply about.

I believe the reason we are leading an unsustainable lifestyle is due, in considerable part, to how little contact most of us have anymore with nature. It becomes much more difficult to ignore or rationalize the damage we are causing to our ecosystem when one gets out in nature and experiences its incredible gifts. A majestic mountain range can inspire awe, a crystal-clear blue lake tranquility and peace, a wildflower-carpeted valley delight, and a sun-drenched beach comfort and freedom. To those who have experienced these things, the possibility of losing them seems unthinkable.

Global warming is the latest, and perhaps the most devastating consequence yet, of this disconnect to nature. Yet scientists, conservationists, some policymakers, and nature lovers of all kinds are hoping for two things to turn this situation around. One is that we humans will take decisive action to significantly reduce our impacts on the environment. The other is the knowledge that, in the past, nature has proven to be extremely resilient and able to recover from major destructive events, whether caused by man or nature.

The lead article in this issue of *Fremontia* detailing Guadalupe Island's beginning signs of recovery from years of destruction caused by feral goats and then a devastating fire, reminds us once again of nature's ability to restore itself if given sufficient time. It's also the sort of story that offers hope to all of us.

—Bob Hass