SCB's 36th Annual Symposium
Southern California Mountain Botany: You Say Coastal, I Say Cismontane

8:00 a.m. - Registration Begins.
Morning snacks will be provided.

9:00 - 9:15 a.m.
Introductory Comments
Orlando Mistretta, SCB President

9:15 – 10:00 a.m.
An Overview of the Natural History of Southern California Mountains
Allan A. Schoenherr, Botanist
This presentation addresses primarily the Transverse and Peninsular Ranges of southern California. Associated with typical Mediterranean Climate, the region experiences principally winter precipitation and long hot summers, a condition which exacerbates significant temperature and evaporation differences between north-facing and south-facing slopes. Associated with cold sea water, the area also experiences frequent fog and haze, particularly during the spring and summer months. Mountains surrounding the Los Angeles Basin tend to capture winter storms and also create a temperature inversion layer that perpetuates humid conditions on the coastal sides of the mountains, contributing to distinct climatic differences between the cismontane and transmontane slopes of the ranges. Furthermore, the mountains achieve significant topographic relief so that precipitation at higher elevations falls primarily as snow. Finally, Santa Ana winds in the autumn increase the probability of significant fire events.

The sum total of these factors promotes predominantly a drought-tolerant, fire-adapted, scrub type of vegetation that experiences significant dormancy during the summer. Responding to winter rainfall, the primary season for growth and germination is winter, ironically when temperature and photoperiod are not optimal for photosynthesis. Superimpose upon the elevational differences, factors such as slope effect, temperature inversion layers, and rain-shadow effect and one can understand why the southern California mountains demonstrate profound vegetational diversity.

This presentation will feature plant communities, vegetational alliances, and basic adaptations to characterize an overview of the vegetation of the southern California mountains. There will be an emphasis on dominant and subdominant species. Species, such as Tecate Cypress (*Cupressus forbesii*), Knobcone Pines (*Pinus attenuata*), Limber Pines (*Pinus flexilis*), and Beargrasses (*Nolina* spp.), which have unique ecological requirements and specialized distribution also will be featured.

10:00 – 10:45 a.m.
The State of Bryology in Southern California; Can Vascular Trained Botanists Become Good at Collecting Bryophytes?
Jim Shevock, Bryologist, California Academy of Sciences,
Since the days of Bolander in the 1860s, many California botanists during their careers have collected bryophytes. However, most vascular trained botanists have not added measurably to the herbarium record to catalog the California bryoflora, and this has been particularly acute within southern California. This is, in part, based on the exceedingly random event when a bryophyte catches the eye of the collector and it is then added among the other seed plants being collected. Few vascular plant collectors have been trained in the proper methods to 'collect' and 'document' a bryophyte sample and transform it into a high quality herbarium specimen. This factor alone can determine whether a voucher sample is obtained from the field or not. But I view the most critical factor why bryophytes are under-collected is from a lack of awareness of actually 'seeing' how bryophytes partition the available habitat. Inventory efforts for bryophytes requires a completely different sampling scale and methodology than used for documenting vascular plants since even a few inches away can actually represent a considerably different bryophyte community. Due to the small size of most bryophytes, they can easily be overlooked if not systematically sampled. Another factor has been the lack of more localized bryophyte identification manuals to aid in identification of specimens. Fortunately, new bryophyte identification guides and picture books like California Mosses published in 2009 are becoming available to fill this need. With a bit of field training, vascular trained botanists can readily make this transition and therefore can make significant advances toward bryophyte inventories and floristic studies.

10:45 – 11:00 a.m. - Mid-Morning Coffee Break

11:00 - 11:30 p.m.
Flora of the Sierra San Pedro Martir Mountains, Baja California, Mexico.
Fred Roberts, Botanist
Not far south of the U.S.-Mexican border, rise the Sierra San Pedro Martir Mountains of Baja California, Mexico. The mountains run north south following the general axis of the peninsula. The western slopes rise gradually in a series of benches to a broad, somewhat uneven tableland at 7,800 feet with forests of jefferey pine and meadows of grass and sedge. The eastern edge of the tableland rises further to form a crest of granite boulders at nearly 9,500 feet. Offset and east of the crest, rises Picacho del Diablo at 10,153 feet, the highest point along the peninsula. The eastern slope is steep and falls rapidly into the San Felipe Desert below.
At a glance these mountains present much in common with mountains in southern California: coastal sage scrub and

chaparral covered hillsides in the western foothills. *Salvia, Arctostaphylos, Adenostoma* are all present. Oak gallery forests are dominated by *Quercus agrifolia*. Higher slopes and the tableland are dominated by pinon *pine (Pinus quadrifolia*) and forests of Jeffrey pine (*P. jeffreyi*). However, closer inspection shows the familiar flora is laced with species rarely or never seen in southern California mountains. *Ornithostaphylos oppositifolia* and *Rosa minutiflora* are widely seen on the western slope. *Yucca schidigera* occurs in chaparral and pine forest. Many familiar genera have species names we are unfamiliar with: *Quercus peninsularis, Nolina palmeri, Symphoricarpos orephilus, and Arctostaphylos peninsularis*, and it is the home to over sixty other species of endemics. The flora of the Sierra San Pedro Martir is both familiar and exotic compared to the floras of the mountains of southern California.

11:30 - 11:50 a.m.
Flora of the San Jacinto Mountains
Scott White, Botanist
(Abstract not yet available)

11:50 - 12:00 a.m.
Question and Answer Session

12:00 - 1:30 - Lunch Break
After announcements, the SCB Board will arrange a speaker's lunch at a local restaurant. Everyone will be invited to joint the group.

1:30 – 2:15 p.m.
Muddy Secrets From the Rare Mountain Lakes of Southern California: 70,000 Years of Climate Change.
Matthew E. Kirby, California State University, Fullerton Department of Geological Sciences
Sediment is deposited in stratigraphic order – from oldest to youngest. As sediments are deposited, they record information related to the conditions of sedimentation. Consequently, sediment archives, such as lake basins, often contain a rich history of these conditions including climate, vegetation, and lake chemistry. In Southern California, natural lakes are rare with the vast majority located at elevation where climate is more temperate than the surrounding low-lying valleys. Most of these alpine lakes are located in the Peninsular or Transverse Ranges bordering the climatological boundary between the coastal Mediterranean climate and the interior Mojave climate. From an ecological perspective, it is reasonable to consider these alpine lakes as located along elevationally-controlled, ecotones. Ecotones, particularly along altitudinal gradients, are highly sensitive to disturbance, such as climatic change. The combination of this climatological and ecological boundary location presents a unique opportunity to examine how these lakes responded – hydrologically – to past climate. Results from several alpine lakes are discussed highlighting the various types of information contained in these rare sediment archives. Perhaps most striking is the strong coupling between centennial-to-millennial scale climate change in the North Atlantic during the last glacial period and the far-field response here in Southern California. Also of interest is evidence for a long-term Holocene (past 10,000 years) drying in Southern California wherein many of these alpine lakes switched from perennial to ephemeral. How vegetation dynamics responded to these past changes in hydrologic variability requires further research, especially in the context of present changing climate, which is predicted by climate models to continue drying for the foreseeable future.

2:15 – 3:00 p.m.
San Diego County Mountains.
Tom Oberbauer, San Diego County Department of Planning and Land Use.
The mountains in San Diego County are a portion of the Peninsular Ranges. They consist of Agua Tibia, Palomar, Hotsprings, and Volcan Mountains, Mesa Grande, the Cuyamaca Mountains, and Laguna, Viejas, and Guatay Mountains as well as Otay Mountain. The highest point is Hot Springs Mountain at 6,533 feet though Cuyamaca Mountain which is visible throughout much of western San Diego County is 6,512 feet. These mountains contain unusual substrates including Gabbro with high concentrations of magnesium and iron, gold bearing metamorphic schists, tonalite and granodiorite and alluvial etchbasins. The gabbro and alluvial deposits on meadow edges support a specialized flora with some species endemic but others disjunct to central California. The overall diversity is high. The vegetation in these mountains includes several forms of chaparral, oak woodlands and various forms of coniferous forests. Some portions of the forest are or were very old, though little now remains of the old growth vegetation due to a series of catastrophic fires in the past decade. Unnatural build up of vegetation caused by fire suppression and extensive forest die off due to droughts and insects provided fuel for intense crown fires that caused the loss of 20-30,000 acres of forest.

3:00 – 3:15 p.m. - Afternoon Break

3:15 - 3:45pm
Santa Ana River Watershed, San Bernardino Mountains.
Naomi Fraga, Conservation Botanist, Rancho Santa Ana Botanic Garden
The upper Santa Ana River watershed lies at the southern end of the San Bernardino Mountains within the San Bernardino National Forest in southern California. A floristic study was undertaken from 2008 to 2010 to document the flora of this region. The study site is ca. 62 square miles in area and ranges in elevation from 1402 m (4600 ft) near Filaree Flat, just below the town of Angelus Oaks to 3033 m (9952 ft) at the summit of Sugarloaf Mountain. The study site is botanically diverse with over

700 taxa documented. A wide range of vegetation and habitat types are represented in the area including pebble plains, chaparral, mixed coniferous forest, meadows, and riparian areas. The primary objectives of this study were to asses the conservation status of plant species that are of conservation concern and to voucher and catalogue the vascular flora of this region. An overview of the flora and vegetation will be presented including recent noteworthy collections, and two botanical mysteries that have yet to be solved.

3:45 – 4:30 p.m.
Assembling the San Bernardino Mountains (floristically speaking).
Scott Eliason Mountaintop District Botanist, San Bernardino National Forest.
The rich flora of the San Bernardino Mountains is a product of geology, terrain, climate, fire, and floristic influences from every direction. Habitat associations, disjunct plant populations, and phylogenetic patterns all provide hints at how, when, and from where elements of the flora have been assembled. Pebble plains, wet meadows, and carbonate habitats support among the most highly-concentrated assemblages of disjunct plant taxa, and each reveal shadowy tales of large-scale vegetation response to climate change around the end of the Pleistocene.

Cancelled **Mapping a Century of Change in the San Jacinto Mountains.**
Rusty Russell, Botany Department, Smithsonian Institution
Historic records of plant collecting (herbarium specimens, personal journals, published observations, etc.) provide a view of past species coverage and distributions that cannot be understood any other way. Herbarium specimens, specifically, represent the most unambiguous record in that they have a physical presence and you can revisit them and the interpretations of them by previous researchers. But is the herbarium record sufficiently complete to permit useful analysis of change over time? To attempt to answer this question, in 2004 an effort was begun which focused on the San Jacinto Mountains region and incorporated the digital content of 16 different herbaria. Using teams of volunteers and students, certain locations were targeted for recollection in an attempt to locate species for which there were no post-1960 records, and to actively target species for which no previous record existed. The initial results of this resurvey are presented. In addition, other planned analyses of historic records are presented. These include 1) documentation of species preferences for elevation, slope, aspect, soil type, and hydrology in an attempt to improve resolution of specimen localities, 2) stable isotope analysis of specimens to help determine changes to habitat, and 3) interpretation of non-native records to better understand introduction vectors. Finally, there will be a discussion on how these data and results will be used to develop science curricula on climate change in local middle and high schools.

4:30 – 5:00 p.m. - Closing Remarks

5:00 – 6:00 p.m. –Poster session

6:00-9:00 p.m. Banquet at Fullerton Arboretum

Banquet keynote speaker Gary Wallace presenting: ***Botanists and Botany of southern California Mountains***

Poster Abstracts:

Influence of wash disturbance and summer rainfall on dispersion and production of bajada vegetation in the Mojave Desert.
April R. Newlander[1], David R. Bedford[2], Jason K. Blackburn[3], John Carroll[3], David M. Miller[2], and Darren R. Sandquist[1]
[1]Department of Biological Science, California State University, Fullerton.
[2]U.S. Geological Survey,
[3]Department of Geography, California State University,
In Mojave Desert bajada ecosystems, water infiltrates to root-zones in greatest proportion via washes. As such, washes have a pronounced effect on plant dispersion and size across these landscapes. Desert roads alter the natural spatial patterns of bajada washes and potentially affect plant production and distribution. As a winter-rainfall dominated ecosystem, climate changes in the Mojave that increase summer precipitation may also play an important role in altering vegetation processes influenced by washes. The purpose of this project is to examine how road disturbance and increased summer precipitation may affect vegetation properties of a bajada in the Mojave National Preserve. Road effects on the spatial distribution of desert plants were assessed by evaluation of plant cover and height using LiDAR data. Plant responses to summer precipitation were quantified by measuring ecophysiological responses of two dominant perennial plants, *Larrea tridentata* and *Ambrosia dumosa*, to a pulse of isotopically (δD) labeled water distributed directly into a wash. Responses included net photosynthesis (A_{net}), stomatal conductance (g_s), xylem water potential (Ψ_x) and stem-water stable isotope ratio (δD). LiDAR data revealed that mean maximum height of *Larrea tridentata* is consistently taller in areas where water has been enhanced by road culverts (2.46 m) compared to those where flow has been cut-off by the presence of a road/railroad (1.67 m) or where undisturbed (1.78 m). Plant cover (cm^2 vegetation/m^2 ground) was also greatest in water added areas (4.10); nearly 7x larger than in undisturbed areas (0.60) and 100x greater than in water cut-off areas (0.04). Significant clustering of large plants (1-4m) was also found in water added areas, with no clustering in the water deprived areas, and uniform dispersion across undisturbed areas. Clusters were located primarily along washes in younger geologic substrates. For all ecophysiological traits, both species showed pronounced responses to the

summer wash pulse of water. These responses varied generally as a function of distance from wash for both species, but *Larrea* plants showed responses at > 5 m from the wash whereas *Ambrosia* responses extended only to 3 m. *Larrea* also had a greater duration of response, not returning to pre-pulse values for at least 75 days on average. *Ambrosia*, in contrast, returned to baseline values within 50 days on average. Understanding how climate and landscape changes alter ecosystem productivity will be greatly aided by knowing the relationships between vegetation and physical properties of the landscape, especially when, as demonstrated here, that landscape, and its disturbance, can have pronounced controls on plant dispersion, physiological responses and production.

Independent Hydraulic Units and Hydrolic Redistribution in Alkali Goldenbush, *Isocoma acradenia*

Cheryl Sevilla, Fernando Vargas. California State University, Fullerton, Fullerton, CA.*

Desert shrubs are hypothesized to increase their chance of survival by dividing into independent hydraulic units (IHUs). Nocturnal hydraulic redistribution (HR) of water via deep roots to shallow soil layers, where most of the roots reside, is thought to increase water availability during the day. We hypothesized that the desert shrub, Alkali Goldenbush, *Isocoma acradenia,* uses these mechanisms to cope with water stress. To test for both mechanisms, we conducted an experiment on sandy soil in the Mojave Desert using a watering tube to introduce water on one side of the shrub, 0.7 to 1.0 meters deep. Un-watered shrubs served as controls. Stomatal conductance and branch water potentials were measured one day before and one day after watering. Basal stems of the shrubs were examined for their degree of segmentation into IHUs. To test for HR, we placed sensors 20 cm deep under the edge of each plant's canopy to record soil moisture before and after watering. The watering treatment did not result in a difference among shrub modules either for stomatal conductance or water potential. Basal stems were highly segmented. Soil moisture in the upper soil layer did not increase in the watered group relative to the control, suggesting that *I. acradenia* does not use HR. Our findings show that the species is divided into IHUs, but each IHU appears to have individual access to deep soil water, as physiological responses did not appear to differ between modules. Longer-term studies would allow better evaluation of how *Isocoma acradenia* copes with aridity.

Mule Deer Effects on Catalina's Native Plants: Impacts to an island ecosystem and post-fire regeneration.

Dvorak, Tyler and Sarah Ratay*
Catalina Island Conservancy,

Mule deer (*Odocoileus hemionus*) are an introduced ungulate on Catalina Island and are present at a population level affecting the health and abundance of native plants. Preferred forage of mule deer includes both Catalina's rare and endemic plants, and common native species; all crucial to restoring ecosystem health and function during recovery from recent fires equaling 13% of the island. Within the last decade feral pigs and goats have been eradicated from Catalina and bison are under herd management, mule deer remain the only non-native herbivore without a sufficient level of control available. Mule deer are owned and managed as a game species on Catalina Island by the California Department of Fish and Game; annual sport hunting is the only available conservation action to limit population size.

Invasive Aquatic Weeds: Implications for Mosquito and Vector Management Activities.

Charles E Blair, MD, Trustee, Mosquito and Vector Management District of Santa Barbara County (MVMDSBC) and active member of Cal-IPC & CNPS , Lompoc, Ca.*
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Healthy natural wetlands ARE FAR LESS LIKELY to be breeding areas for disease-carrying mosquitoes than degraded ones. Degradation of these bodies of water by invasive aquatic weeds and other influences can result in their being potential habitat for mosquitoes that can carry the West Nile Virus, encephalitis, and other diseases. Control of these invasive plants can be an important part of the Integrated Weed/Pest Management efforts of both Weed Management Areas and Mosquito and Vector Control Agencies. Adverse effects of Water Hyacinth, *Eichhnorina crassipes,* hydrilla, *Hydrilla verticillata,* Water Evening-primrose, *Ludwigia spp,* Smooth Cordgrass, *Spartina spp., S. densiflora foliosa,* and other species on water quality and facilitating mosquito breeding will be shown. Presentations on the importance of *S. spp.* In San Francisco Bay were made at recent statewide Cal-IPC **and** Mosquito and Vector Control Conferences. Demonstration of these relationships can enhance both agency and public awareness of their importance.