



Keeping Landscapes Working

A Newsletter for Managers of Bay Area Rangelands

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A newsletter provided by UC Cooperative Extension Natural Resources Program in the San Francisco Bay Area. This newsletter provides information to managers of both public and private rangelands. RANGELAND, which is land characterized by natural vegetation i.e., grass, forbs and shrubs and managed as a natural ecosystem, is the predominate source of OPEN SPACE in the San Francisco Bay Area.

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Ranchers, Environmentalists, Agencies Establish Landmark Partnership

*California Rangeland Resolution sets stage
for working landscapes conservation*

This summer a group of environmentalists, ranchers and resource professionals from state and federal agencies met at a ranch in Alameda County. Together they drafted a resolution documenting common ground in regards to the conservation of the rangeland encircling the Central Valley and interior coast ranges. The resolution recognized that the numerous imperiled species that these rangelands support is largely due to grazing and other land stewardship practices of the ranchers that own and manage them. See the full text of the resolution and list of signatories below.

The resolution is signed by 32 agricultural organizations, environmental interest groups, as well as state and federal agencies. Together these signatories form the California Rangeland Conservation Coalition. The signatories have pledged to work together to preserve and enhance California rangeland for protected species and common species, while supporting the long-term viability of the ranching industry. An important part of the group's effort will focus on educating the public about the benefits of grazing and ranching on these rangelands.

A summit meeting was held on January 11, 2006, to bring the signatories together to prioritize initial action items. Some first steps include acquiring more federal funding for conservation easements and encouraging landowners to enter into Safe Harbor Agreements, which provide assurances to landowners who proactively protect and enhance endangered species habitat. In addition, these groups will advocate and work with state and federal agencies to better coordinate processes surrounding endangered species consultations and other regulatory requirements to encourage habitat improvements. The summit event drew distinguished guests including California Secretary for Resources Mike Chrisman, California Department of Food and Agriculture Secretary A.G. Kawamura, Renne Lohoefer, Assistant Director Endangered Species, US Fish and Wildlife Service, and Michael Bean, Chair of the Wildlife Program, Environmental Defense.

The California Rangeland Resolution

The undersigned recognize the critical importance of California's privately owned rangelands, particularly that significant portion that encircles the Central Valley and includes the adjacent grasslands and oak woodlands, including the Sierra foothills and the interior coast ranges. These lands support important ecosystems and are the foundation for the ranching industry that owns them.

WHEREAS, these rangelands include a rich and varied landscape of grasslands, oak woodlands, vernal pools, riparian areas and wetlands, which support numerous imperiled species, many native plants once common in the Central Valley, and are home to the highest diversity and density of wintering raptors anywhere in North America;

WHEREAS, these rangelands are often located in California's fastest-growing counties and are at significant risk of conversion to development and other uses;

WHEREAS, these rangelands, and the species that rely on these habitats, largely persist today due to the positive and experienced grazing and other land stewardship practices of the ranchers that have owned and managed these lands and are committed to a healthy future for their working landscapes;

WHEREAS, these rangelands are a critical foundation of the economic and social fabric of California's ranching industry and rural communities, and will only continue to provide this important working landscape for California's plants, fish and wildlife if private rangelands remain in ranching;

THEREFORE, we declare that it is our goal to collaboratively work together to protect and enhance the rangeland landscape that encircles California's Central Valley and includes adjacent grasslands and oak woodlands by:

- Keeping common species common on private working landscapes;
- Working to recover imperiled species and enhancing habitat on rangelands while seeking to minimize regulations on private lands and streamline processes;
- Supporting the long-term viability of the ranching industry and its culture by providing economic, social and other incentives and by reducing burdens to proactive stewardship on private ranchlands;
- Increasing private, state and federal funding, technical expertise and other assistance to continue and expand the ranching community's beneficial land stewardship practices that benefit sensitive species and are fully compatible with normal ranching practices;
- Encouraging voluntary, collaborative and locally-led conservation that has proven to be very effective in maintaining and enhancing working landscapes;

Educating the public about the benefits of grazing and ranching in these rangelands.

SIGNED BY:

Alameda County Board of Supervisors
Alameda Co. Resource Conservation
District
American Land Conservancy
Audubon California Society
Bureau of Land Management
Butte Environmental Council
California Association of Resource
Conservation Districts
California Cattlemen's Association

California Dept of Fish and Game
California Dept of Food and Agriculture
California Farm Bureau Federation
California Grazing Lands Coalition
California Native Grasslands Association
California Native Plant Society
California Oak Foundation
California Rangeland Trust
California Resources Agency
California Wildlife Foundation

Cal-Pac Section Society of Range
Management
Central Valley Farmland Trust Council
Defenders of Wildlife
Environmental Defense
Institute for Ecological Health
Natural Resources Conservation Service
San Joaquin Raptor/Wildlife Rescue Center
San Joaquin Valley Conservancy
Sierra Foothills Audubon Society

The Nature Conservancy
Trust for Public Land
US Fish and Wildlife Service
US Forest Service
VernalPools.org
Wildlife Conservation Board
WildPlaces

January 25, 2006

California Native Grasslands: A Historical Perspective

A Guide for Developing Realistic Restoration Objectives

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Reprinted from *Grasslands*, Winter 2006.

California's grasslands cover approximately 25% of the state, either in open grassland, oak woodland, or savanna. Although they are largely dominated by nonnative annual species, they provide essential hydrologic functions (capture, storage, and safe release of water), important wildlife habitats (Giusti et al. 1996), and repositories of native flora diversity. Around 90% of species listed in the Inventory of Rare and Endangered Species in California (Skinner and Pavlik 1994), inhabit California's grassland ecosystems. In addition to their important ecological values, California's grasslands provide forage for range livestock, a leading agricultural commodity in the state. Despite its value for native biological diversity and range livestock, California grassland habitat is increasingly reduced in acreage and quality not only because of conversion to cropland and residential and urban development, but also because of invasion by woody species and continued nonnative species invasion. Invasion by woody and nonnative species often occurs on conservation lands, which have been protected from grazing and other disturbances.

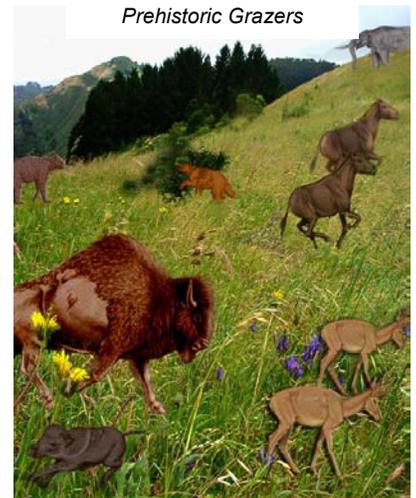
Conservation land managers are increasingly aware that acquisition alone doesn't necessarily result in conservation. They recognize that, without management, California grassland habitats can be degraded by accumulating mulch and domination of undesirable species, such as black mustard (*Brassica nigra*), fennel (*Foeniculum vulgare*), medusahead (*Taeniatherum caput-medusae*), coyote brush (*Baccharis pilularis*), or Harding grass (*Phalaris tuberosa*). Although these species can be controlled with mowing, prescribed fire, herbicides, cultivation, or livestock grazing, deciding on realistic management and restoration goals, followed by an effective management plan, are difficult first steps.

Here we review the history of animal and human impacts that led to the current composition and condition of California grasslands. We also include a history of restoration and management efforts on California grasslands. This history may help land managers recognize the difference between past uncontrolled grazing practices, which undoubtedly assisted in the invasion of our grasslands with

nonnative species and degraded the resource as a whole, and today's use of managed grazing as a resource management tool. An understanding of California native grassland history should also help land managers identify realistic restoration goals. We conclude with a discussion of considerations to assist land managers in identifying measurable restoration and management objectives.

Historical Perspective: Animal and Human Impact on California's Native Grasslands

For millions of years, California's original grasslands were grazed, browsed, and trampled by now-extinct megafauna, which included medium to large herbivores, such as ground sloth, bison, camel, horse, mammoth, mastodon, and ox (Edwards 1996). Undoubtedly, the combined influence of these large herbivores, the activity of smaller mammals, and fire played an important role in the development of California's native grassland species. When the megafauna became extinct some 10,000 years ago, pronghorn antelope (*Antilocapra americana*), black-tailed deer (*Odocoileus hemionus*), tule



elk (*Cervus elaphus nannodes*), grizzly bear (*Ursus arctos*), and small mammals, such as California ground squirrel (*Spermophilus beecheyi*), gopher (*Thomomys* spp.), rabbit (*Sylvilagus* spp.), and kangaroo rat (*Dipodomys* spp.), continued to impact California's grasslands.

Early reports from explorers indicate that vast herds of grazing animals in the Central Valley rivaled the numbers of bison on the Great Plains. For example, McCullough (1971) estimated a population of 500,000 tule elk in aboriginal central and western California. The specific impact of these grazing animals on the grasslands is difficult to discern, because these animals are not obligate grazers but rather browsers and/or grazers, consuming broadleaf plants, woody plants, and grasses (Wagner 1989). Also, the Central Valley's early grassland landscape included significantly more wetlands, including riparian woodlands, freshwater marshes, and vernal pools. If, for example, tule elk, which prefer marshy areas, consumed large amounts of wetland plants, their impact on mesic native grassland species may have been limited (Wagner 1989).

Whatever the impact of grazing animals on native grasslands following the extinction of the megafauna, human impact became significant when intensive management of grasslands, or "prairies," began. Native

Californians burned, dug, tilled, and pruned native vegetation to maintain the biological resources they used for food, medicine, and construction materials (Blackburn and Anderson 1993). Early expeditions in California made note of the open grasslands managed by the native Californians:

Within the forests, at all elevations from sea level to the top of the ridges, there were small open patches, known locally as "prairies," producing grass, fern, and various small plants. Most of these patches if left to themselves would doubtless soon have produced forests, but the Indians were accustomed to burn them annually so as to gather various seeds. These prairies were of incalculable value to the Indians, not alone for their vegetable products, but also for the game found upon them.

In most regions of the state, native species are only a minor component of the grassland flora, comprising less than 1% of the standing grassland crop.

SUMMARY OF AN ENCOUNTER WITH REMNANT "PRAIRIES" IN HUMBOLDT COUNTY BY R. MCKEE EXPEDITION OF 1851 (LOUD 1918).

These open, productive prairies described by early explorers began to change with the arrival of Spanish settlers some 200 years ago. Fires were suppressed; livestock (i.e., cattle, horses, and sheep) were introduced, and hunting nearly exterminated the

elk, pronghorn antelope, and deer. Although the Spaniards never extended their livestock management into the Central Valley, the Native Americans drove domestic livestock into the valley. By 1819 the native Californians were breeding their own stock and their herds started to grow. Many of their cattle and horses escaped, and became large uncontrolled herds of feral animals. Reports from the 1830s and 1840s mention the San Joaquin prairies swarming with wild horses and Sonoma County abounding with wild cattle and horses (Wagner 1989).

An actual ranch industry in California did not develop until the discovery of gold in 1848. Ranchers began shooting wild horses, rounding up cattle and elk, and breeding their own herds. Herds of cattle were driven in from the east to build up numbers to support the growing demand for meat after the Gold Rush. From 1850 to 1880, excessive numbers of livestock grazed California's rangelands, including 3 million cattle, and 6 million sheep. These numbers decreased temporarily during a devastating drought from 1862 to 1864, where from 200,000 to 1,000,000 cattle may have starved (Wagner 1989). Although today the number of cattle on California's rangelands approaches the number of cattle in California in the late 1800s (2.9 million), the number of sheep have substantially declined to less than a half million.

A significant change in vegetation coincided with the arrival of domestic livestock and the growth of the ranching industry; nonnative grasses and forbs spread throughout California's coastal prairies, foothills, and valleys (Burcham 1956). Although nonnative species, such as the annual forb, filaree (*Erodium cicutarium*), were present in California before settlement in 1769 (Mensing and Bynre 1998), the vast majority of nonnative species invaded and spread in the late 18th and early 19th centuries (Hendry 1931). Over the past 200 years, the nonnative species have

become the most abundant plants across California's grasslands.

Although dominance of nonnative species and the accompanying decline in native grassland species have been attributed to uncontrolled livestock grazing, several other factors, including tillage for crop agriculture, fire suppression, elimination of land management by Native Americans, climate change, and competition from nonnative species have played an important role in the conversion. Some researchers have concluded that nonnative, annual grasses are so competitively superior that they could have displaced native grasses solely through competition and greater seed production (Heady 1977; Bartolome and Gemmill 1981; Murphy and Ehrlich 1989). Regardless of which factors were responsible for the decline of native-dominated grassland, today in most regions of the state, native species are only a minor component of the grassland flora, comprising less than 1% of the standing grassland crop.

Historical Perspective: Restoration Efforts and Management for California's Native Grasslands

Although efforts to restore native grasses to California's grasslands are relatively recent, beginning with the conservation movement of 1970s, range scientists and agronomists have long been interested in improving California's grasslands. University of California, Berkeley, agronomist Dr. P. B. Kennedy began testing native and exotic perennial grasses and legumes in 1912. He was searching for alternative forage species to improve California's rangelands for livestock production (Kay et al. 1981). His relative success with establishing nonnative perennials over native perennials led to the introduction of smilo grass (*Oryzopsis miliacea*) and Harding grass (*Phalaris tuberosa*) in California. Sampson and McCarty (1930) were also interested in perennial grasses for rangeland improvement. They studied purple

needlegrass (*Nassella pulchra*) because of its palatability, nutritional value when dry, and long green forage period. They also considered the impact of grazing on perennial grasses by conducting clipping studies. Based on their clipping studies, they concluded that purple needlegrass plants would fully recover and produce seed under moderate grazing intensity in the fall and winter, whereas late spring grazing could injure the plants.

The University of California's interest in improving California's rangelands continued in the 1940s. The University of California, Davis, hired agronomist, R. M. Love to find replacement forage species, and he spent 15 years testing native perennial grass species, including *Nassella* spp., *Melica* spp., *Danthonia californica*, *Agrostis* spp., *Bromus* spp., *Elymus* spp., and *Sporobolus* spp. (Kay et al. 1981). Love also considered the impact of grazing on these species. He seeded perennial grasses and legumes and studied the effect of spring grazing treatments with sheep. He found that early intensive grazing before the annuals headed out reduced the competition and resulted in the most vigorous perennials, which included

purple needlegrass and nodding needlegrass (Love 1944). He later devoted special attention to needlegrass (*Nassella*) species (Love 1951, 1954). Love's research led him to select two strains of purple needlegrass and nodding needlegrass to be certified by the California Crop Improvement Association in 1948 (Love 1948). Lack of interest in the public and private sectors kept these certified strains from being widely planted in California rangelands. Nonnative perennial grass species, such as Harding grass and orchard grass, proved to be easier to reseed and more palatable to livestock (Kay et al. 1981).

Meanwhile, other researchers acknowledged the naturalized annual-dominated grassland in California and began learning about appropriate grazing management practices for this grassland ecosystem (Bentley and Talbot 1951; Love 1945). They studied how to manage annual grasslands for vegetation composition (Heady 1956) and for soil protection and forage production (Bartolome et al. 1980). They also began studying grazing strategies to control invasive, less-desirable exotic species, such as foxtail

Interest in restoration has renewed interest in understanding how to establish and manage native California grassland species. Research projects focused on restoring native perennial grasses have reaffirmed the challenge of their establishment, especially from seed (Dyer et al. 1996; Stromberg and Kephart 1996). Other studies have determined that the more abundant and faster-growing annual grass species can form dense stands, monopolize resources, and restrict the growth and survival of perennial grass seedlings (Bartolome and Gemmill 1981; Dyer et al. 1996; Dyer and Rice 1997, Hamilton et al. 1999; Brown and Rice 2000). A comprehensive review of native grassland research conducted throughout California attempted to quantitatively evaluate the potential for use of grazing and prescribed fire as tools to enhance native grass populations (D'Antonio et al. 2001). Unfortunately, they found only a few studies that examined the impact of grazing and fire on native plants, and many of these studies lacked replication of treatment or controls to be included in a quantitative analysis.

Identifying Realistic Restoration Goals

Many conservation efforts on California grasslands have focused on the goal of restoring grasslands to some pre-settlement condition. This goal has proven to be unrealistic because not only is it difficult and costly to establish native perennial grasses, there is also uncertainty about the historical composition and extent of California native grasslands. One popular theory suggests that California's pristine prairie was dominated by purple needlegrass (*Nassella pulchra*) (Clements 1934). Clements came to this conclusion by observing nearly pure stands of purple needlegrass along railroad rights-of-way.



Purple Needlegrass Grassland, Vasco Caves, Contra Costa County

The theory that many of California's current grasslands were formerly dominated by woody vegetation and not "pristine" prairie (Cooper 1922) has been less popular, but is receiving growing scientific support (Hamilton 1997). Cooper noted numerous examples where repeated burning, often intentionally, was sufficient to eliminate woody vegetation and replace it with weedy annuals. Some annual grassland sites may have in fact previously been dominated by coastal scrub (Hopkinson and Huntsinger 2005) or native annuals (Solomeschch and Barbour 2004) and not perennial bunchgrasses.

Given the uncertainty about the assemblage of native plants on a given site, restoration project planning must be characterized by clear thinking and fact-finding that leads to feasible goals and measurable objectives. Questions that might help planners define restoration goals and objectives include:

- What do you hope to achieve?
- Is your objective to maintain the native perennial species that currently exist on the site or is it to increase the vigor and density of the existing native perennial species?
- Are there native perennials that do not currently exist on the site that you would like to add?
- Are there specific exotic or woody species that should be targeted for control?

During fact-finding, project planners must determine if the goals and objectives are feasible based on current knowledge:

- Are your objectives achievable given the capabilities, constraints (soil depth, rainfall, etc.), and history of the site?
- Are there proven restoration practices that will allow the project to successfully reach restoration objectives?
- Can these practices be applied to the proposed restoration site?

Site capabilities and constraints:

Vegetation stand establishment,

productivity, and longevity are greatly influenced by the characteristics of the site(s) of interest. Rainfall and soil moisture-holding capacity must be sufficient to support the establishment and maintenance of a native perennial stand. Although we may have incomplete knowledge of the rainfall requirements of native perennials, we know from rangeland improvement research in the 1940s and 1950s (Jones and Love 1945; Bentley et al. 1956) that seedings of native and exotic perennials and annuals have been more successful when rainfall exceeds 20 inches and soil depth is at least 24 inches. A shorter dry season (longer rainy season) may also improve perennial grass restoration success (Jackson and Roy 1986). To increase the chances of grassland restoration success, it may be prudent to focus restoration effort on coastal and upland sites, where rainfall and rainy season length are greater, and to avoid sites with shallow soils. Soil surveys, published by the USDA Natural Resources Conservation Service (NRCS), contain information about soils and ecological sites that can be helpful in determining site capabilities

Examples of Measurable Objectives

Reduce medusahead to less than 15% of the groundcover. This objective will be achieved by burning pasture #3 late in May when medusahead is still green and most other annuals are dry. The burn will be conducted in cooperation with the California Department of Forestry and Fire Protection.

Maintain coyote brush cover at less than 5%. This objective will be achieved by maintaining a seasonal grazing program. Cow-calf pairs will graze the property from November to June.

Site characteristics also influence the practices that can be applied to manage for native perennials. Native grass seed producers have proven that native grasses can be grown using normal farming practices (tillage, irrigation, fertilization, and weed and pest control). Dryland farming practices can also be used to grow native grass seed. However, many sites suffer from the "toos." They are too steep, too rocky, too dry, too salty, or too wet for application of normal farming practices. On these sites, seeding practices and weed and brush control practices become more limited. On some sites, vegetation management may be limited to manipulation of fire and grazing.

Site History: Knowledge of historical land uses may be helpful in understanding the site's herbaceous composition, including seed bank, and determining appropriate management practices. For example, on the Hastings Natural History Reservation near Monterey, the frequency of native perennials depends on whether the site has been cultivated. Few native perennials grow on sites that were cultivated before 1937; on sites that have not been cultivated, native perennials, such as purple needlegrass, comprise up to 37% of the total aboveground standing crop (White 1967). Increasing native grass cover on sites that have been cultivated may require reseeding as well as vegetation management. Because seeds of native perennials no longer reside in the seed bank on many annual dominated sites (Rice 1989), seeding or plug planting accompanied by management of invasive annual plants will be required on most sites, especially inland sites.

Measurable objectives: Development of specific objectives will help project managers determine what practices to apply in the project; furthermore if the objectives are measurable, not only will it be clear what should be monitored but also if progress is being

achieved. For example some measurable objectives might be:

- Reduce medusahead to less than 15% of the groundcover.
- Eradicate Harding grass.
- Increase *Nassella pulchra* cover to at least 20% of the groundcover.
- Maintain coyote brush cover at less than 5%.

With measurable objectives stated in this manner, project managers can develop a management plan, practices and strategies that have been shown to successfully reach these objectives (see “Examples of Measurable Objectives” sidebar). Past experience and science-based information should be the basis for selecting restoration practices. Measurable objectives also define what a manager needs to monitor to demonstrate practice effectiveness and project progress. Monitoring also helps the manager recognize the need

to make management changes in response to changing conditions. With a restoration planning process that includes measurable objectives, implementation of effective practices, and monitoring, restoration projects can be successful.



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Where to view a native grassland...

Coastal Grassland

Tilden and Wildcat Canyon

Regional Parks

• Location:

Tilden and Wildcat Canyon Regional Parks are in Wildcat Canyon, which is near Berkeley. The coastal grassland site is on Nimitz Way, a paved trail on the east side of the parks that is accessible to wheelchairs and bikes. Follow Highway 24 east of the Caldecott Tunnel and take the Orinda exit to Camino Pablo Road. Then take Wildcat Canyon Road to Inspiration Point, which is just before the park. From Inspiration Point, follow Nimitz Way for nearly a mile (across from the second park bench) to the grassland site. More information is available at <http://www.ebparcs.org/parks/tilden.htm> or 510-562-7275.



Brush encroachment in a Native Grassland Site (Tilden Park)

• Overview:

Tilden Park (2,077 acres) adjoins Wildcat Canyon Park (2,428 acres) and both are part of the East Bay Regional Park District. This coastal grassland is noted for its wide variety of native grasses. In addition, Nimitz Way has another coastal grassland site between the Havey Canyon Trail and the Mezue Trail; the area near the cattle loading corral has one of the most superb, densely packed native bunchgrass stands in the state. This site has abundant Purple needlegrass and the only sizable stand of the native wildflower *Iris longipetala* known in the East Bay.

• **Best Time to Visit:**

March-May: The best time to see this coastal grassland site is during the spring, when the perennial grasses are green and flowering and the wildflowers are blooming.

Site Description:

• **Geography and Climate:**

The elevation is about 1,000 feet and the soil is clay with bands of gravel and rock. The area is semi-arid, with cool winters (40-60 F) and mild summers (50-75 F).

• **Plant Communities:**

This coastal grassland has a wide variety native grasses including Big squirreltail, Idaho fescue and Purple needlegrass. Bentgrass and Blue wild rye grow near the Nimitz trail, while California brome dominates further up the hill from the trail.

The east-facing slopes of the Wildcat Canyon have large coast live oaks, bay laurels and a scattering of bigleaf maples and madrones. North-facing slopes have some nearly pure stands of bay laurel with coast live oak on the edges. High up, the north-facing slopes have moist chaparral with coyote brush, elderberry, poison oak, snowberry, blackberry and bracken fern.

• **Animals:**

Wildcat Canyon has abundant wildlife, including the deer, ground squirrels and voles that forage during the day, and the foxes, opossums, raccoons, skunks and great horned owls that forage at night. In addition, gopher snakes, king snakes and western racers live in the fields and meadows; garter snakes hunt in the ponds and stream verges; and rubber boas and ringneck snakes live in the forest. The canyon is also home to a variety of songbirds and raptors, including American kestrels, hawks (Cooper's, redtail and sharp-shinned) and turkey vultures.

• **History and Current Management:**

In 1935, the East Bay Regional Park District acquired the southern part of Wildcat Canyon to create Tilden Regional Park. Named for Charles Lee Tilden, the first president of the Park District Board of Directors, Tilden Park is one of the District's three oldest parks and has been called the

jewel of the system. Tilden Park's recreational activities include a pony ride, carousel, golf course and Lake Anza. The park also has a spectacular 10-acre Botanic Garden where you can explore the state's diverse native flora by walking through areas that represent defined floral regions of the state, including seacoast bluffs, coastal mountains, interior valleys, arid foothills, alpine zones, and two kinds of desert.

In 1952, EBMUD sold the northern part of Wildcat Canyon to private interests and in 1966 Standard Oil drilled exploratory wells but these did not justify further drilling. The Park District began buying land in the northern part of the canyon in 1967 and created Wildcat Canyon Regional Park in 1976. Since then, Wildcat Canyon Regional Park has grown from 2,197 to 2,428 acres.

Wildcat Canyon Regional Park's grasslands are grazed by cattle, which control brush by trampling it. In the early 1990s, a two-year demonstration grazing project in the park showed that managed grazing can be compatible with both promoting recreational values and conserving resource values, such as maintaining native perennial cover.

Conducted by the Contra Costa Resource Conservation District and funded by the U.S. Environmental Protection Agency, the 400-acre demonstration project consisted of installing a well and trough to provide water for the cattle, fencing to exclude the cattle from wetland areas, and using a rotational grazing system.

In contrast, there have been no livestock in Tilden Park since the 1930s. This has led to the encroachment of coyote brush in many natural areas of the park. Jim Roof, former director of the Botanic Garden in Tilden Park, was fond of describing the diverse wildflowers that used to cover Tilden's slopes before the coyote brush moved in. However, without vegetation management, the coastal grassland site along Nimitz Way and many other grasslands in Tilden Regional Park are likely to change to coastal scrub.

• **Conservation Status:**

Encroachment by woody species is among the greatest threats to California's coastal grasslands. Historically, large hooved animals likely controlled brush encroachment on grassland in California. Today, cattle can effectively control this encroachment.

For more profiles on California Native Grasslands with photos visit: <http://www.cnga.org/guide.php>



Upcoming Spring Workshops

Offered by the California Native Grasslands Association

See www.cnga.org for registration information

Workshop: Grazing for Effective Grasslands Management

April 12, 2006 8 am to 4:30 pm

Instructors: Sheila Barry, Kent Reeves, and Joe Morris

Location: Fatjo Ranch, Pacheco State Park

Fees: \$120 for CNGA members and \$160 for non-members

Resource management professionals recognize the role of grazing livestock in the conservation of remnant native grasslands and restored grassland sites across California's annual grasslands. A successful planned grazing program requires managers to work with clearly defined goals that guide their monitoring activities, and their management decisions. Spring is a great time to monitor grasslands.

This workshop will be held at the Fatjo Ranch in Pacheco State Park. The ranch has a diversity of native grasses, including purple needlegrass, pine bluegrass, California brome, California oniongrass, and creeping wildrye. The ground around these perennial grasses is carpeted with wildflowers, including bluedicks, butter-and-eggs, cowbag clover, goldfields, navarretia, and popcorn flower.

The workshop will begin in the classroom where participants will learn about developing social, economic, and resource goals for the management of a grassland and will hear from Joe Morris about his goals for managing the Fatjo Ranch.

In the field, biological monitoring will be discussed and demonstrated. Workshop participants will have an opportunity to work in small groups to conduct biological monitoring. Biological monitoring allows you to evaluate grassland health as defined by energy flow, water cycle, mineral cycle, and succession. We will also visit parts of the ranch where grazing livestock have been excluded for a number of years. We will conduct biological monitoring on ungrazed sites for comparison. The results of our biological monitoring will allow us to discuss future strategies for grazing management to achieve the defined goals.

Enrollment will be limited to ensure an intimate field experience. Morning coffee, lunch and supplementary course materials will be provided.



Workshop: Using Native Grasses and Graminoids in Restoration and Revegetation

April 19 & 20, 2006 8 am to 4:30 pm

Instructors: This workshop is taught by a team of CNGA members and most probably will include John Anderson, Sheila Barry, David Kelley, Richard Nichols, Chris Rosa, and Jeanne Wirka.

Location: Bouverie Preserve, 13935 Hwy 12, Glen Ellen, CA

Fees: \$250 for CNGA members and \$290 for non-members

This two-day workshop provides in-depth training on techniques for the establishment and maintenance of native grasses and associated native species in ecological restoration and revegetation projects.

Workshop topics include:

- identifying potential uses of native grasses in land management
- information on morphological and physiological characteristics of native grass species
- selection of appropriate species and sources of plant material
- site evaluation and preparation
- planting techniques
- informed purchase of seeds and plugs
- prescribed fire
- prescribed grazing
- erosion control
- weed management

Workshop registrants receive a comprehensive training binder with the full curriculum and supporting materials. Breakfast, lunch and snack breaks are included.

Registration is limited and will be confirmed on a first-paid, first-registered basis. Waiting lists will be maintained.

Annual Conference Workshops

Thursday, May 4, 2006 Chico CA.

1. Ecology and Management of California's Vernal Pool Grasslands

Instructors: Jaymee Marty and Dr. Bob Holland

2. Using California Native Grasses in the Urban Landscape

Instructors: Steve Nawrath and David Amme.

(Workshops continued)

Workshop: Identifying and Appreciating the Native and Naturalized Grasses of California – Central Coast CA

May 24 & 25 (tentative pending facility confirmation)
8 am to 4:30 pm
Instructors: David Amme and John DiGregoria
Location: Point Reyes Station and Point Reyes National Seashore
Fees: \$220 for CNGA members and \$260 for non-members

Workshop: Using California Native Grasses in the Urban Landscape

Date and Time: June 2, 2006 8:00 am to 4:00 pm
Instructors: Steve Nawrath and David Amme.
Location: East Bay Regional Park District Trudeau Center, Oakland, CA
Fees: \$120 for CNGA members and \$160 for non-members

Concord Tule Elk Are Being Relocated

California State Fish and Game staffers and citizen volunteers began removing tule elk from the Concord Naval Weapons Station on Monday, February 13. “The weapons station basically has outlived its usefulness as far as tule elk are concerned,” said Terry Palmisano, a senior wildlife biologist with the California Department of Fish and Game.

The elk are captured with “net guns” fired from helicopters. They are fitted with blindfolds and hobbles and then transported to a staging area where a veterinarian examines them. The elk will be moved to three different reserves around the state: the Cache Creek Natural Area in Lake and Colusa counties, the Grizzly Island Wildlife Area in Solano County and the San Luis National Wildlife Refuge in Merced County.



The elk herd at the Naval Station currently includes 39 individuals. They are fenced in and the population has been limited by inadequate forage and water. The decision to move them to new locations was in part to avoid conflicts with future plans for the Naval Station, which may include housing and commercial development.

The elk were introduced into the weapons station in 1976. At that time, tule elk, which are one of three subspecies of North American elk, were slowly recovering from near extinction. The Concord herd was used as a seed group to establish other herds around the state.



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