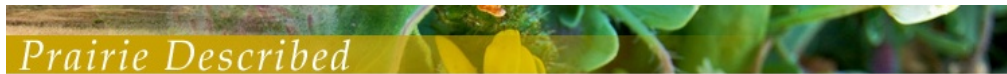




A PROJECT OF THE SONOMA-MARIN COASTAL PRAIRIE WORKING GROUP



VALUE OF GRASSLAND AND PRAIRIE

The world's economies are based on the goods and services derived from ecosystems" and "human life depends on the continuing capacity of biological processes to provide their multitude of benefits" (White, et al. 2000). Grasslands are no exception. They perform essential services necessary to support life, contribute to human well-being, and provide beneficial goods and services that extend to local, regional, and global communities. Indeed, we owe the very development of our civilization to grasslands, which are the source of species that are staples in our diet, and enabled the development of agriculture and domestication of livestock (Diamond 1997).

In this section, we provide a perspective on why grasslands are of value to humans. We provide information on the added value provided when grasslands are dominated by native species.



Modified from White R, Murray S, Rohweder M. 2000. Pilot analysis of global ecosystems: grassland ecosystems. World Resources Institute. Washington DC. 69pp. [Modified from Campbell et al. 1996:3].

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AESTHETICS AND RECREATION

- ▶ Grasslands are open habitats, providing great coastal views, gorgeous wildflower displays, and wonderful hiking opportunities.
- ▶ Coastal grasslands define the coastal California experience.

AGRICULTURAL USES

Native perennial grasses are used in Mediterranean vineyards and orchards to prevent erosion, suppress weeds, and maintain nutrients in the soil without competing for irrigation water during the drought of summer (Volaire, et al. 2009). Characteristics of native perennial grasses that make them especially well-suited to this task are:

- ▶ **Obligate Summer Dormancy** - Some perennial grasses enter a summer dormancy period when they cease to grow and remain in dormancy even if watered. This minimizes competition with the main crop when water is scarce. Native grasses that will go dormant even with summer water are one-sided bluegrass (*Poa secunda*, subsp. *secunda*), big squirrel tail (*Elymus multisetus*), and California melic (*Melica californica*) (Volaire, et al. 2009).
- ▶ **Deep Roots** - The deep roots of perennial natives provide erosion control throughout the year, long after annual grasses die.
- ▶ **Slow Nutrient Cycling** - Perennials are superior to annuals in holding onto nutrients and preventing them from leaching from the soil.
- ▶ **Pest Management** - Native grasses help protect trees from rodent damage as rodents eat seeds and leave trees alone (CNGA Meeting).

CLIMATE REGULATION

Grasses have an exceptional capacity for carbon storage. All plants "harvest" carbon dioxide (CO₂) from the air and bind the carbon tightly into "chains" of glucose which are stored in the tissues of plants (White, et al. 2000) -- both above and below ground. If you have ever tried to pull grasses out when weeding your garden, you know how dense, thick and tenacious grass roots are. Most of the biomass in grasslands is in the soil in the form of grass roots.

When grasslands are grazed or cut, the roots die back, and then plant begins the process of regrowing above and below ground mass. This process effectively acts like a carbon pump, pulsing carbon deep into the soil.

In the Midwest:

- ▶ Prairies remove more carbon from the atmosphere than any other ecosystem in America. (National Park Service, Tallgrass Prairie National Preserve, Kansas).

- ▶ Over 25% of the root systems in Midwest prairies are replaced each year (Dahlman and Kucera 1965).
- ▶ Restored perennial grasslands that were once cultivated take from 55-75 years to accumulate the same amount soil organic carbon found in uncultivated prairie sites (McLauchlan, et al. 2006).

A similar capacity has been found in the coastal prairies of Marin County at the [Marin Carbon Project](#):

- ▶ Soil organic matter of coastal prairies is approximately 50% carbon.
- ▶ Certain grazing practices have been found to increase the amount of carbon removed from the atmosphere and stored in the soil (Jasper 2008).

CONSERVATION AND WILDLIFE HABITAT

- ▶ California's relatively intact grasslands are reservoirs of biodiversity containing about 40% of California's [native plant species](#) (Wigand 2007).
- ▶ Grasslands provide habitat and forage for both [wildlife and domestic animals](#).

EROSION

Compared to annual grasses, native perennial grasses are deep-rooted. The plants capture, filter and store water, and anchor the soil in place with their deep fibrous roots. Because they are perennial, they additionally providing erosion control throughout the year long after annuals die. Perennial grasses take advantage of early Fall rains, immediately greening up and absorbing water before the annual seeds have a chance to germinate.

FORAGE VALUE OF NATIVE PLANTS

Coastal prairie plants are considered excellent forage and continued to be so after reportedly over 100 years of grazing use (Heady, et al. 1977:734). Heady reported average forage production as exceeding 3,000 lbs/acre/year. This may in part be due to the occurrence of native perennial grasses. "Unlike annual grasses, perennial grasses turn green faster, stay green longer, and produce more biomass. This equates to more protein and higher value forage for both wildlife and livestock" (Griffith 2004).

Here we present some introductory information on the forage value of a few highly palatable and nutritious species. If you are looking for more information, we recommend:

- ▶ The [Fire Effects Information System](#) which provides lots of information including forage values for domestic and wild animals.
- ▶ Native American forage plants. 1924. AW Sampson. Designed for use by stockmen, farmers and for students of general agriculture, forestry and applied botany and primarily for those who wish to pursue grazing work as a specialty. It is essential to know the habits and requirements of the more important pasture plants. In part one, Plant Life of the Pasture, the author discusses the principles of botany and plant physiology as they relate to grazing. In part two,

Citation: Jeffery (Immel), D., C. Luke, K. Kraft. Last modified February 2020. California's Coastal Prairie. A project of the Sonoma Marin Coastal Grasslands Working Group, California. Website: www.cnga.org/prairie.

Important Native Forage Plants, the author discusses individual species of grasses, forbs, and grass-like plants, many with illustrations.

CALIFORNIA OATGRASS (*DANTHONIA CALIFORNICA*)

California oatgrass was the dominant species in many northwestern California grasslands (Biswell 1956). Much of the original oatgrass in coastal prairies was destroyed due to overgrazing by sheep, grazing exclusion and competition from native and exotic perennial grasses (Amme 2003). Because of its palatability to grazing animals, California oatgrass stands can be easily destroyed by overgrazing (Crampton 1974). However, moderate grazing can increase foliar cover (Hatch, et al. 1999). Cooper (1960) calls *Danthonia* a “champagne grass.” It increases and forms a sod when grazed moderately heavy, is highly palatable, and contains between 8 and 26% protein, with the low percentage in January after leaching by rains

TUFTED HAIRGRASS (*DESCHAMPSIA CESPITOSA*)

Provides good to excellent forage for all types of livestock (Hitchcock 1971: 292). Needs protection from overgrazing as cattle prefer it to other grasses and graze it to the ground (Stromberg, et al. 2007:Table 21.1, South Ranch, Diablo Canyon, San Luis Obispo coastal terrace prairie restoration project.). If not overgrazed, it can provide abundant forage over the growing season (Walsh 1995a).

BLUE WILD RYE (*ELYMUS GLAUCUS*)

Blue wild rye is among the best of the ryegrasses for pasture because it is fairly palatable forage and, because of its strong root system, remains green and moderately tender throughout the growing season and can withstand a “more than average amount of trampling by stock” (Sampson 1924).

PURPLE NEEDLEGRASS (*NASELLA PULCHRA*)

Purple and nodding needlegrass (*Nassella pulchra* and *Nassella cernua*, respectively) can serve as valuable forage during the fall and winter (Green and Bentley 1957).

IDAHO FESCUE (*FESTUCA IDAHOENSIS*)

Idaho fescue is an important forage perennial bunch grass for elk, mule deer, pronghorn antelope and domestic cattle, horses and sheep. It performs best under light to moderate grazing regimes and decreases if heavily grazed (Zouhar 2000). Idaho fescue is considered a “climax species” and is common in many “pristine,” “undisturbed,” or “relict” areas (Zouhar 2000).

RED FESCUE (*FESTUCA RUBRA*)

Red fescue is tolerant of close grazing when not overgrazed. Given enough time to recover between grazing cycles, it can maintain or even increase yield over the years (Walsh 1995b).

CALIFORNIA BROME (*BROMUS CARINATUS*)

California brome is a vigorous competitor and is palatable throughout its life cycle (Whitson 2002). *Bromus carinatus* is considered one of the best forage grasses on western rangelands with a forage value ranked as “excellent” for cattle and horses and “good” for domestic sheep. Late-season protection from grazing may be necessary. Deferred and rotational grazing is recommended to prevent overgrazing (Tollefson 2006). California brome is excellent forage for deer and elk. The seeds are a food source for a variety of birds (e.g. California quail, various songbirds) and small mammals (e.g. pocket gophers) (Tollefson 2006).

MEADOW BARLEY (*HORDEUM BRACHYANTHERUM*)

Meadow barley is often used for soil stabilization because of its high seedling vigor, wide soil tolerances and rapid development (Darris 2008). It is sometimes used as a cover crop in California vineyards. This native is the most valuable of the barleys for forage because, unlike the introduced barleys, it has short, fine awns, which are fairly safe for stock consumption (Sampson 1924 as *Hordeum nodosum*). Forage value is rated from low to medium for livestock, high in spring for deer (Darris 2008).

POLLINATION

Bees, bumblebees, beetles, hummingbirds, bats, butterflies, moths, and flies are some of the pollinators needed by 90% of flowering plants and over 30% of food crops (Pollinator Partnership 2010). Grasslands provide food and shelter for bees and other insects that pollinate our food crops. The importance of these native pollinators, especially ground and twig nesting bees, is increasing due to the current collapse of populations of the European honeybee (Pollinator Partnership 2010).