



A PROJECT OF THE SONOMA-MARIN COASTAL PRAIRIE WORKING GROUP



SPECIES: GRASSES, RUSHES, AND SEDGES

Grasses are usually dominant in coastal prairies and grasslands. Rushes and sedges are grass-like plants that often grow in or adjacent the seasonally wetter areas in coastal grasslands. Most often they are perennials.

A COMPARISON OF GRASSES, SEDGES, AND RUSHES

GRASS FAMILY (POACEAE)

Grasses have round stems and flat leaf blades. The most conspicuous grasses are perennial bunch grasses. Bunch grasses form tufts, clumps, or tussocks by sending up new shoots called tillers. The tillers remain attached to the base of the grass and the plant gradually thickens. Because bunch grasses do not spread out like rhizomatous grasses, they provide an open structure to coastal prairie that enhances biodiversity: the spaces between bunches allow room for a diverse selection of forbs, mosses and other grasses to grow as well as habitat for feeding, nesting, and hiding birds and animals (Darris and Gonzalves 2008).

SEDGE FAMILY (CYPERACEAE)

Sedges often have triangular stems and the female flowers of sedges are enclosed in a single sheath-like scale called a perigynia. Many sedge species spread through have long rhizomes that are useful in erosion control of moister soils. The Sedge Family groups several related genera including *Scirpus*, *Rhynchospora*, *Eleocharis*, *Cladium*, *Schoenoplectus* & others, but the largest genus is the *Carex* with over 130 species growing in California, most of them native.

RUSH FAMILY (JUNCACEAE)

Most rushes have round stems and leaf blades. One exception discussed is *Juncus phaeocephalus*, which has flat leaves and stems with overlapping bases much like an iris. However, the both flat and round leaves usually have septa, characteristic partitions inside the leaves of most *Juncus* species, which can be seen when held up to the light or felt by sliding your fingers down the leaf.

The following table provides a comparison of general characteristics of grasses, sedges and rushes. Exceptions are listed under species discussed below.

Group (Family: Genera)	Stem (culm)	Leaf Blade	Leaf sheath	Fruit
Grasses (Poaceae: many)	round, hollow	flat	open	caryopsis (grain)
Sedges (Cyperaceae: Carex & others)	triangular, solid	flat	closed	nutlet or achene enclosed in perigynium
Rushes (Juncaceae: Juncus, Luzula & others)	round, solid (pithy)	round (usually) with septa (structural partitions)	open or closed	seeds enclosed in capsule

GRASSES

CALIFORNIA OATGRASS (*DANTHONIA CALIFORNICA*) - NATIVE

Grass Family (Poaceae)

Danthonia californica is a native bunchgrass that forms conspicuous scattered dense clumps in many coastal prairie grasslands.

California Oatgrass:

- ▶ Is often dominant or co-dominant in coastal prairie (Ford and Hayes 2007; Sawyer, et al. 2009),
- ▶ Occurs in moist lowland prairies, drier upland prairies and open woodlands (Darris and Gonzalves 2008),
- ▶ Is widespread in western North America and Chile (Utah State University c2001-2002).

California Oatgrass Ecology

- ▶ Drought: California Oatgrass roots penetrate 3-4 feet into the soil (Amme 2003a).



California oatgrass (*Danthonia californica*) plant with roots at the Oakland Museum. Photo courtesy of Mark Stromberg.

► Grazing:

- California Oatgrass is highly nutritious and desirable forage in coastal areas. Some ranchers have called this species the “cotton candy grass” due to cattle’s fondness for grazing on it (Lynn Logier pers. comm.)
- Grazing or browsing animals may overlook the flowering culms (stems) which often lean obliquely or horizontally from the plant. Instead, non-reproductive leaves or neighboring taller species may be targeted.
- Seed production in the stems is probably an effective means for these plants to conceal their progeny from grazers (Dobrenz and Beetle 1966).
- Grazed plants produce more hidden seeds in their culms (flowering stems) than those that are not grazed (Dobrenz and Beetle 1966).
- Grazing stimulates the formation of new stems called tillers (Darris and Gonzalves 2008).
- In heavily grazed or mowed areas, California Oatgrass forms a low mat-like sod (Amme 2003a; Darris and Gonzalves 2008) which is difficult to graze or penetrate. Sod formation occurs when grazing removes or destroys parts of the plant breaking it into isolated tufts (Crampton 1974). The tufts produce new tillers that coalesce into a sod composed of diminutive plants.



California oatgrass panicle and flower (enlarged). Drawing courtesy of USDA-NRCS PLANTS Database / Hitchcock, A.S. (rev. A. Chase). 1950. Manual of the grasses of the United States. USDA Miscellaneous Publication No. 200. Washington

► Life History:

- California Oatgrass is recognized as a long-lived perennial by most sources, but just how long, we don’t know.
- This species is unusual among perennial grasses in the low number of seeds produced (56-69 seeds per flower stem compared to 2,000 per stem for *Deschampsia cespitosa* (Dobrenz and Beetle 1966)) and the extended longevity of the seeds (Amme 2003a).

- Oatgrass uses two strategies of seed production to enhance opportunities for successful reproduction:
 - 1. Similar to most other grasses, seeds are produced in the florets, have well-developed flower parts, and are fertilized by other individuals.
 - 2. Unlike many other grasses, California Oat Grasses also develop hidden flowers completely enclosed inside the stems that do not open but self-fertilize (Dobrenz and Beetle 1966). Up to 8 seeds can be produced at each node in the stem and the seeds differ from those in the florets in that they are larger and more numerous (25-36 stem seeds, 21-33 floret seeds) (Dobrenz and Beetle 1966, Hurteau 2009). In addition, some of these seeds lack a developed lemma and palea (Dobrenz and Beetle 1966) including the hygroscopic awn.
- Seed dispersal varies depending on the type of seed. Seeds that mature in the floret have well-developed “hygroscopic” awns (see image) that readily take up moisture (Maslovat 2002). The awn allows the seed to disperse across the soil surface as it expands and contracts with alternately wet and dry conditions. In addition, the moisture absorbed by the awns provides moisture to the seed, aiding in germination (Peart 1979).
- Seeds that mature in the stem rely on dispersal of stem parts. In July or August, after the seeds fall from the florets, the basal node of the culm breaks apart and the entire culm with its seeds at multiple nodes falls to the ground. This dehiscence is found in other grasses as well, but California oat grass tends to break more easily at the basal node than at other node locations along the stem (Dobrenz and Beetle 1996). The dry stems with enclosed seed may wrap around the feet or limbs of passing animals (Hurteau 2009 citing Darris pers. obs., Sampson, et al. 1951).

More Fun Facts About California Oat Grass

- ▶ California oatgrass is NOT closely related to European wild oats which are introduced annual grasses in the same genus as cultivated oat (*Avena sativa*).
- ▶ *Danthonia californica* is the host-plant for a nematode (*Cynipanguina danthoniaea*) first discovered on plants at Shell Beach in Sonoma County (Maggenti, et al. 1973). Nematodes are tiny worm-like creatures that feed on plants. There is no information on whether this nematode is detrimental to the health of the plants.
- ▶ California oatgrass nematodes form galls that are found singly or in groups of up to 50 galls.

- ▶ The color of the galls ranges from light green to straw yellow depending on developmental stage.
- ▶ Each gall can house up to 19 adult nematodes; apparently it is unusual for adult nematodes of this genus to occupy the galls, as juvenile stages occupy galls of other species.
- ▶ Adult nematodes can survive for two years inside the leaf galls.



Nematode leaf galls (*Cynipanguina danthoniaea*) on California oatgrass (*Danthonia californica*) near Fort Ross, Sonoma County California. 1 July 2010. Photo by D. (Immel) Jeffery.

TUFTED HAIRGRASS (*DESCHAMPSIA CESPITOSA*) - NATIVE

Grass Family (Poaceae)

Deschampsia cespitosa is a densely clumped native bunchgrass with narrow leaf blades that can reach 3 feet in height.

Tufted Hairgrass:

- ▶ Can be dominant or co-dominant in coastal bluff and terrace prairies (Sawyer, et al. 2009).
- ▶ Also occurs in other California grassland types, both salt and freshwater marshes and can be dominant in some montane and alpine meadows of the Sierra Nevada and Cascade Ranges (Sawyer, et al. 2009).
- ▶ Is widely distributed in temperate and cold climate regions in North America, Eurasia, New Zealand, Tasmania, southeast Australia, and several countries in South America, where it may be introduced (Mark and Dickinson 2001).



Deschampsia cespitosa growing with Douglas' Iris at Sonoma Coast State Beach. 2010 May 10. Photo by D. (Immel) Jeffery.

Tufted Hairgrass Ecology

- ▶ Drought

- With sufficient moisture, often from fog, Tufted Hairgrass can remain green providing year-round forage for grazing animals (Sampson 1924).
- Dead leaves protect the immature green leaves during the winter (Keeler-Wolf, et al. 2007).
- ▶ Grazing
 - Dead leaves protect the growing parts of the plant from grazing animals who tend to avoid dry grass (Mingo and Oesterheld 2009).
 - Overgrazing will destroy tufted hairgrass plants (Sampson 1924).
 - However, undergrazing is harmful as well: coyotebrush (*Baccharis pilularis*) and velvetgrass (*Holcus lanatus*) has replaced Tufted Hairgrass grassland in ungrazed roadsides in Point Reyes National Seashore, Marin County (Edwards 1995).
- ▶ Fire: Dead leaves protect the growing buds from fire (Walsh 1995a).
- ▶ Life History: A single plant can live 30 years or more and produce over 500,000 seeds in one season (an average of 2,000 seeds per panicle) (Davy 1980).
- ▶ Species Interactions:
 - Tufted hairgrass is one of two coastal prairie grasses that are host plants for the umber skipper (*Poanes melane*, W.H. Edwards, 1869; Hesperidae). The caterpillars feed on the leaves and live in the shelter of rolled or tied leaves. The adults survive on flower nectar (presumably from wildflowers) California brome (*Bromus carinatus*) is the other host. (Opler, et al. 2010).
 - Tufted hairgrass is one of the most important range forage species in the western United States (Crampton 1974). Native Tufted Hairgrass meadows in Colorado and Utah are sometimes cut for hay (Walsh 1995a).

More Fun Facts About Tufted Hairgrass

- ▶ There are about 18 subspecies in Europe and Asia, six in North America, and two in South America (Chiapella and Zuloaga 2010).

PACIFIC REEDGRASS (CALAMAGROSTIS NUTKAENSIS) - NATIVE

Grass Family (Poaceae)

Pacific reedgrass is a perennial bunchgrass with wide rough-to-the-touch leaf blades that grow in dense tufts to form large distinctive tussocks reaching almost 5 feet in height.

Pacific Reedgrass:

- ▶ Can be dominant or co-dominant on coastal terraces and bluffs (Sawyer, et al. 2009).
- ▶ Is found only in the coastal zone in coastal prairie and freshwater marshes (usually in wetlands, occasionally in non-wetlands)(Calflora 2011).
- ▶ Is distributed from easternmost Siberia down the Aleutian Islands and along the Pacific coast to San Luis Obispo County (Sawyer, et al. 2009; Utah State University c2001-2002).



Pacific reed grass (*Calamagrostis nutkaensis*) along Kortum Trail, California State Parks, Russian River District. Photo by D. (Immel) Jeffery 2010.

Pacific Reedgrass Ecology

- ▶ Fire: Plants do not readily burn (low flammability) and reedgrass resprouts vigorously from underground buds that can survive the heat of the fire (Sawyer, et al. 2009)
- ▶ Species Interactions: Pacific reedgrass can hinder the ability of purple velvet grass (*Holcus lanatus*) to invade coastal prairie presumably because it shades out seedlings (Thomsen and D'Antonio 2007).

More Fun Facts About Pacific Reedgrass

- ▶ There are two additional native *Calamagrostis* species distributed in coastal prairie in Sonoma County:
 - *C. bolanderi* is distributed from Sonoma County to Humboldt County— Sonoma County records from Consortium of California Herbaria list Sea Ranch; Stewart's Point, Sonoma Coast State Park; Joy Road; Del Mar (University of California 2009).

- A species formerly known as *C. crassiglumis*, Thurber's reed grass—a minor variant of the more widely distributed *C. stricta* (subsp. *inexpansa*) according to Jepson Interchange (University of California 2009). Distributed in wet prairies in Sonoma County (Bodega Head) and in Marin County (near radio station at Point Reyes National Seashore and Mount Tamalpais (University of California 2009).

PURPLE NEEDLEGRASS (*NASSELLA PULCHRA*, *STIPA PULCHRA*) - NATIVE

Grass Family (Poaceae)

Purple Needlegrass:

- ▶ is the most widespread native perennial bunchgrass in California.
- ▶ Is usually a subdominant species in coastal prairie in Sonoma and Marin Counties, occurring mainly on south-facing slopes in northern Sonoma County, but becomes a dominant grass in coastal terrace prairies south of Morro Bay (Bartolome, et al. 2007).
- ▶ Occurs in other California grasslands, shrub and woodlands.
- ▶ Is restricted to California.

Purple Needlegrass Ecology

- ▶ Drought: Roots can extend 20 feet into the ground (Stromberg and Kephart n.d.).
- ▶ Life History:
 - Long-lived perennial—one of the most long-lived grasses, some plants may be 100-200 years old (Hamilton, et al. 2002).
 - Self-sowing mechanism—twisting awns and pointed seeds work their way into the ground (Bartolome 1981).
- ▶ Species Interactions:



Purple needlegrass inflorescence. Photo courtesy of the Santa Monica Mountains National Recreation Area, National Park Service <http://www.researchlearning>

- Purple needlegrass was an important food source for California Native Americans,
- Provides food for over 330 wildlife species (State of California 2004)
- Continues to be an important food source for cattle (State of California 2004).

More Fun Facts About Purple Needlegrass

- ▶ Purple needlegrass is the official California State Grass (State of California 2004).
- ▶ Purple needlegrass can quickly colonize disturbed sites because its seeds germinate readily, seedlings grow vigorously, and established seedlings can produce seeds in as little as two years (Bartolome 1981).
- ▶ There are five *Nassella* species growing in California, three native and two introduced (Amme 2003b). Purple needlegrass (*N. pulchra*), nodding needlegrass (*N. cernua*) and foothill needlegrass (*N. lepida*) are native to California and northern Baja California. The introduced species are *Nassella manicata* (previously misidentified as *N. formicarum*), native to Chile, and Mexican feather grass (*N. tenuissima*), native to Texas, New Mexico, northern Mexico, and Argentina (Amme 2003b).
- ▶ The authors of the Second Edition of the Jepson Manual have reappointed purple needlegrass from the genus *Nassella* back to its former genus *Stipa* (University of California 2009).

RED FESCUE (*FESTUCA RUBRA*) - NATIVE

Grass Family (Poaceae)

The native red fescue is a loosely to densely tufted grass, sometimes with very short rhizomes. It can be identified by its culms (grass stems) which are usually red or purplish at the base.

Red Fescue:

- ▶ Can be dominant or co-dominant on coastal terraces, bluffs, toe slopes and headlands (Sawyer, et al. 2009), though it rarely forms dense stands (Crampton 1974).



Red fescue at Mount Burdell Open Space Preserve in Marin County. Photo by D. (Immel) Jeffery 2010.

- ▶ Occurs in many plant communities, including wetland and riparian areas (equally likely to occur in wetlands or non-wetlands) (Calflora 2011).
- ▶ Has a wide distribution in the cooler parts of the northern hemisphere. On the California Coast, its range extends from the northern California to Monterey (Hitchcock 1971:72-74).

Red Fescue Ecology

- ▶ Fire: Plants survive fire by resprouting (Walsh 1995b).
- ▶ Grazing: Plants can withstand close grazing (presumably because moderate grazing stimulates development of rhizomes or tillers) but decrease when over or improperly grazed (Walsh 1995b).
- ▶ Life History: A single individual plant reproducing through tillers (and possibly short rhizomes) can spread to form a large, long-lived single individual. The largest recorded red fescue clone, growing in Scotland, was 220 meters in diameter and estimated by its rate of growth to be over 1,000 years old (Cook 1983; Harberd 1961; Walsh 1995b).

More Fun Facts About Red Fescue

- ▶ There are two forms in California that are sometimes described as subspecies: *ssp. rubra* and *ssp. densiucula* (Sawyer, et al. 2009).
- ▶ The native red fescue in northern California's coastal prairies grows more during winter than any other of the world's varieties of red fescue (Amme 2003a).
- ▶ Non-native forms are known in the horticultural trade as a sod-forming rhizomatous grass, and are sold as a forage and turf grass. Some horticultural forms are naturalized in California (Hickman 1993).
- ▶ Some sources distinguish between 10-12 subspecies of red fescue growing in North America, but their separation is complicated because natives can hybridized with introduced varieties from Eurasia as well as with the hundreds of varieties developed and widely distributed as turf and sod cultivars (University of California 2009; Utah State University c2001-2002).

BLUE WILD RYE (*ELYMUS GLAUCUS*) - NATIVE

Grass Family (Poaceae)

Blue wild rye is a tall perennial bunchgrass that grows in tufts composed of only a few stems per plant (Sawyer, et al. 2009).

Blue Wild Rye:

- ▶ A common subdominant of coastal prairie in Sonoma and Marin Counties where it rarely forms large stands, but is instead scattered in groups of from one to several long slender segmented flower spikes waving above shorter vegetation:
- ▶ Part of California oatgrass (*Danthonia californica*) coastal prairie at Ocean Song in Sonoma County (Sawyer, et al. 2009).
- ▶ Regularly distributed throughout portions of tufted hairgrass (*Deschampsia cespitosa*) coastal prairie at Point Reyes National Seashore (Personal observation, D. (Immel) Jeffery. 2011).
- ▶ Endemic to Western North America from Baja California to Canada and east to the Great Plains (Johnson 1999).
- ▶ Occurs in many plant communities but is most abundant in moist woodlands especially in the central Rocky Mountains (Johnson 1999).



Blue wild rye flower spike. Photo Copyright © 2006 Laura Ann Eliassen. Park. Photo by D. (Immel) Jeffery 2010.

Blue Wild Rye Ecology

- ▶ Drought: deeply rooted, and fairly drought-tolerant (Crampton 1974; Sampson 1924).
- ▶ Fire:
 - Burns quickly with little downward transfer of heat (Stannard 2010).
 - Resprouts readily from buds on branches and culms (Sawyer, et al. 2009).
- ▶ Grazing:
 - Mature stands need occasional grazing to stimulate spread (presumably from stimulating growth of stolons and/or rhizomes) (Elkhorn Slough National Estuarine Research Reserve 2001).

- Strong root system that can withstand moderately high trampling by livestock (Sampson 1924).
- Will not survive if heavily grazed (Stannard 2010).
- ▶ Life History:
 - Short-lived perennial bunchgrass, sometimes with short rhizomes.
 - Seedlings develop deep roots, are vigorous and fast growing and often used in restoration projects (Johnson 1999; Sampson 1924).
- ▶ Species Interactions:
 - Seedlings and adults can compete well with exotic perennial grasses. Adult plants can even exclude exotic annual grasses (Elkhorn Slough National Estuarine Research Reserve 2001).
 - Kashaya Pomo food: Wild rye (*Elymus* sp.) grains were parched in baskets with hot coals and ground into a very fine dried seed meal (*pinole*) that was either eaten dry or pressed into cakes (Goodrich, et al. 1980). Wild rye *pinole* was used either by itself or mixed with other grains and seeds to produce different flavors.
 - A wild rye harvest by Kashaya Pomo at Fort Ross as describe by Otto von Kotzebue, Post Captain in the Russian Imperial Navy: “For the winter they lay up a provision of acorns and wild rye: the latter grows here very abundantly. When it is ripe, they burn the straw away from it, and thus roast the corn, which is then raked together, mixed with acorns, and eaten without any farther preparation” (Kotzebue 1830).

More Fun Facts About Blue Wild Rye

- ▶ Leaf color changes from green to blue green with aging.
- ▶ All but one *Elymus* species in California are perennials, most of them native. The single annual is the introduced noxious weed Medusa head (*Elymus caput-medusae*, formerly *Taeniatherum caput-medusae*) (University of California 2009).

CALIFORNIA BROME (*BROMUS CARINATUS* VAR *CARINATUS*) - NATIVE

Grass Family (Poaceae)

California Brome is a short-lived perennial.

California Brome:

▶ *Bromus carinatus* var. *carinatus* is a common component of coastal prairie (Ford and Hayes 2007; Tollefson 2006) and also occurs chaparral, plains and open woodlands (University of California 2009).

▶ Is endemic to western North America and distributed widely from British Columbia to Baja California.



California Brome along Ridgecrest Trail, California State Parks, Marin. Photo by D. (Immel) Jeffery 2010.

California Brome Ecology

▶ Grazing:

- fairly resistant to grazing because of its deep, fibrous root system (Tollefson 2006).
- California brome is a nutritious wild pasture forage grass (Hitchcock 1971:3).

▶ Fire: plants can re-sprout after fire, depending on severity of fire (Tollefson 2006).

▶ Life History:

- Rapid-growing, sometimes short-lived perennial with an average lifespan of 3-10 years (Tollefson 2006).
- California brome produces abundant seeds which germinate readily; there is conflicting information on how long the seeds remain viable in the soil (Tollefson 2006).
- California brome can exhibit either a prostrate or erect form depending presumably on ocean exposure.

► Species Interactions:

- California brome is one of two coastal prairie grasses that are host plants for the umber skipper (*Poanes melane*). Tufted hairgrass (*Deschampsia cespitosa*) is the other host. The caterpillars feed on the leaves and live in shelters of rolled or tied leaves. The adults survive on flower nectar, presumably from wildflowers (Opler, et al. 2010).
- Grizzly bears are known to forage on California brome in Montana (Tollefson 2006).

Fun Facts About California Brome

- California brome is often used for erosion control and restoration projects because of its rapid establishment and extensive root system (Darris 2007).
- *Bromus carinatus* is separated into two varieties, “California brome” and “mountain brome” (*B. carinatus* var. *marginatus*), by some authors (including those in the second edition of the Jepson Manual of Higher Plants in California) divide the species into subspecies (University of California 2009).

MEADOW BARLEY, CALIFORNIA BARLEY (*HORDEUM BRACHYANTHERUM*) - NATIVE

Grass Family (Poaceae)

Meadow and California Barley

- The only native barley found in abundance in coastal prairie where it can be dominant or co-dominant (Sawyer, et al. 2009).
- Occurs in many plant communities, usually in wetlands, occasionally in non-wetlands (Calflora 2011)

Meadow Barley Ecology

- Drought: Meadow barley is not as drought tolerant as many other grasses, occurring at many elevations usually in moister areas. Meadow barley occurs in the moister coastal prairies (Ford & Hayes 2007:198).



Meadow barley flower spike. Photo courtesy of Stephen Laymon, Bureau of Land Management.

- ▶ Fire: Meadow barley resprouts readily from underground buds and rhizomes (Sawyer, et al. 2009)
- ▶ Grazing:
 - Responds well to mowing and grazing (Elkhorn Slough National Estuarine Research Reserve 2001).
 - Because it matures early at high and low elevations, it is considered of limited value as forage for livestock (Crampton 1974:81).
- ▶ Life History:
 - Short- to medium-lived perennial bunch grass that is often used for restoration sites
 - Like California brome, California barley takes on a prostrate form when growing on windswept bluffs (Howell, et al. 2007).
 - Can tolerate serpentine soils (Utah State University c2001-2002).

More Fun Facts About Meadow Barley

- ▶ Meadow barley is one of five native of barley species found in California (University of California 2009).
- ▶ There are two subspecies (Howell, et al. 2007; Utah State University c2001-2002):
 - Meadow barley (*H. brachyantherum* ssp. *brachyantherum*)—is widely distributed and native to western
 - California barley (*H. brachyantherum* ssp. *californicum*)—is restricted to California at elevations below 500 meters (1640 feet).
 - ▶ Meadow barley is sometimes sown as a cover crop in California vineyards (Darris 2008) and is often used at restoration sites.

SEDGES

DENSE SEDGE (*CAREX DENSA*) - NATIVE

Sedge Family (Cyperaceae)

Dense sedge grows in densely clumped tufts with short rootstocks.

Dense Sedge:

- ▶ Is distributed in California and Oregon with its northernmost distribution in southern Washington where it is listed by Washington State as a threatened species (Washington State Department of Natural Resources 2009).
- ▶ Occurs in seasonally wet meadows and slopes in coastal prairies.
- ▶ Can be dominant or co-dominant in marshy areas where it is interspersed with other native plants found in coastal prairies including California buttercup (*Ranunculus californicus*) and the native shrub coyotebrush (*Baccharis pilularis*); some non-natives that co-occur are cutleaf geranium (*Geranium dissectum*), wild oats (*Avena barbata*), and purple velvetgrass (*Holcus lanatus*) (Keeler-Wolf, et al. 2007).
- ▶ Occurs also in northern coastal scrub, valley grassland and in some woodland communities in western North America (Ca Flora 2011).



Inflorescence and cross-wrinkled leaf sheath of dense sedge (*Carex densa*). Photo courtesy of Neal Kramer, Copyright © 2008.

Dense Sedge Ecology

- ▶ Species Interactions: Maria Copa, Coast Miwok identified *Carex densa* as a plant whose roots were used for basketry (Kelly 1996). Maria Copa reports that the “roots” (of the specimen that Isabel Kelly collected) were gathered about September, split, stored and later cleaned for use in baskets (Kelly 1996). It is probable that the specimen was misidentified (either by Kelly or Copa) as dense sedge does not have the long rhizomes (“roots”) generally used in basketry, but is cespitose or bunch-like with only short roots.

COAST SEDGE (*CAREX OBNUPTA*) - NATIVE

Sedge Family (Cyperaceae)

Coast sedge is a rhizomatous (growing horizontal underground stems) perennial that forms large dense beds of tussocks that can reach almost 5 feet high. The flat leaves are creased into a W-shape. The long inflorescences often droop. An

easy way to remember the species name is by thinking “ob-droop-ta” (Shelly Benson, CPEFS Botanist, pers. comm..).

Coast Sedge:

- ▶ Is native to California and is distributed in western North America from California’s Central Coast to British Columbia.
- ▶ Grows in wetter areas of coastal prairies
- ▶ Is often associated with Pacific reedgrass (*Calamagrostis nutkaensis*).

Coast Sedge Ecology

- ▶ Species Interactions:
 - The shiny dark brown fruits (perigynia enclosing achenes) are eaten by many grassland birds and animals.
 - The leaves were gathered and used for both the wrapping and twining in “grass” baskets that are still made by Canadian Indians on Vancouver Island (Stevens and Hoag 2006).
 - The leaves are so sharp it is reported that Hesquiat men in British Columbia used them for shaving (Moerman 2003)



Coast sedge (*Carex obnupta*) with drooping inflorescence at Sonoma Coast State Beach 2010 May 10. Photo by D. L. Immel.

More Fun Facts About Coast Sedge

- ▶ Coast sedge is also known as slough sedge. The word slough was used in the past in a derogatory sense to describe muddy and wet regions that required improved drainage and implies a degraded condition. We now use words like “wetland” more often to describe the wetter marshy areas formerly known as sloughs.
- ▶ The plants are used for erosion control and streambank stabilization (Stevens and Hoag 2006).

RUSHES

TOAD RUSH (*JUNCUS BUFONIUS*) - NATIVE

Rush Family (Juncaceae)

Toad rush is a small native rush and one of the few annual *Juncus* species.

Toad Rush:

► Is common in low wet places and dry pools in coastal prairies in Sonoma and Marin Counties, and is distributed world-wide.

Toad Rush Ecology

► Life History: Often found in disturbed areas, toad rush is considered a weed in gardens and irrigated fields (Best, et al. 1996).



Toad rush (*Juncus bufonius*). Photograph by Kristian Peters. Wikimedia Commons.

More Fun Facts About Toad Rush

► The taxonomy of the world's toad rushes is unclear and needing of further study. There are three varieties listed in the Second Edition of the Jepson Manual on-line: var. *bufonius*, and var. *occidentalis* are native and var. *congestus*, native to northern Europe, is naturalized in California (University of California 2009).

**SPREADING RUSH, CALIFORNIA GRAY RUSH
(*JUNCUS PATENS*) - NATIVE**

Rush Family (Juncaceae)

Spreading rush is a native perennial that can be distinguished by its characteristic blue-gray hue. The fresh stems are bluish gray-green and have distinct grooves with greater than 14 ridges per side (Hickman 1993; University of California 2009).



Spreading Rush:

▶ Is distributed from northwestern Mexico to southern Washington (Flora of North America Editorial Committee eds. 1993+).

Juncus patens at Golden Gate National Recreation Area in Marin County. Photo courtesy of Robert Steers © 2010 National Park Service.

▶ Can be dominant in wetter areas within coastal prairie and is often associated with coast sedge (*Carex obnupta*), brown-head rush (*Juncus phaeocephalus*), toad rush (*Juncus bufonius*), Italian rye grass (*Lolium perenne*), and bull clover (*Trifolium wormskioldii*).

Spreading Rush Ecology

▶ Life History: Spreads by short rhizomes to form dense gray-green clumps.

▶ Species Interactions: Tom Smith, Bodega Coast Miwok, told Isabel Kelly that *Juncus patens* was sometimes used, root-end down, for house covering, although it leaked (Kelly 1996). The specimen that Smith and Kelly examined was gathered along the road from Bodega Bay to Duncan's Point on December 19, 1931.

BROWNHEAD RUSH (*JUNCUS PHAEOCEPHALUS*) - NATIVE

Rush Family (Juncaceae)

Juncus phaeocephalus is a short stature rush to 1 ½ feet high that can form dense stands by sending out creeping rhizomes. Brownhead rush looks like a sedge or an iris because it has flattened instead of round stems and leaves. It can be easily distinguished as brownhead rush instead of a sedge or an iris by running your closed thumb and forefinger down one of the flattened leaves. You will feel regular internal ribs formed by structural partitions or crosswalls within the leaf called the transverse septa that is characteristic of many *Juncus* species.

Brownhead Rush:

- ▶ Is native to California and is distributed in meadows and wetland borders in coastal regions from Los Angeles County to Oregon.
- ▶ Is a rhizomatous perennial that will grow on serpentine soils.
- ▶ Co-occurs in coastal prairies and with meadow barley (*Hordeum brachyantherum*), tufted hairgrass (*Deschampsia cespitosa*) California buttercup (*Ranunculus californicus*), and non-natives including purple velvetgrass (*Holcus lanatus*), and Italian ryegrass (*Lolium perenne*). (Sawyer, et al. 2009).

Fun Fact About Brownhead Rush

- ▶ Brownhead rush gets both its common and scientific name because it has dense heads of tiny dark dusky- or reddish-brown flowers.



Brownhead rush flowers at Point Reyes National Seashore. Photo courtesy of Robert Steer © 2010 National Park Service.