Plant Guide

Schoenoplectus californicus

California Bulrush

USDA NRCS
Natural Resources Conservation Service

LSU AgCenter
Research & Extension

Plant Guide: *Schoenoplectus californicus*
California Bulrush

Nomenclature

Scientific Name – *Schoenoplectus californicus* (C.A. Mey) Palla
Formerly identified as *Scirpus californicus* (C.A. Mey) Palla.

Common Name – California bulrush and California bulwhip are the most widely accepted common names, but literature and informal references also cite bulwhip, whip, giant bulrush, tule, black root, totora, California tule, and southern bulrush as other common names.

Cultivars – "Restorer" is the only known cultivar of *S. californicus* released in 1993 by the Natural Resources Conservation Service through its Georgia Plant Materials Program. Restorer germplasm was originally collected in Hillsborough County, Florida, and Restorer was tested and released primarily as a wastewater treatment plant species.

Similar Species – Softstem bulrush, *Schoenoplectus tabernaemontani* (a synonym for *Scirpus validus*), is very similar to California bulrush and difficult to separate under field conditions. In general, California bulrush is taller, more robust, and has darker green obtusely 3-angled stems. The stem-base of California bulrush is firm to the touch and not easily crushed. Softstem bulrush is generally lighter green, shorter, and has nearly circular stems. Specific to its common name, the stem-base of softstem bulrush is soft to the touch and easily crushed between two fingers.

Description

California bulrush is a herbaceous, native, rhizomatous perennial that forms dense vegetative colonies along shorelines, in open water, or on mudflats. California bulrush spreads primarily by vegetative propagation, producing new stems from an extensive system of underground rhizomes, or, to a limited extent, through seed dispersal. Plant stems are obtusely triangular and generally will range from 5' to 10' in height; taller in nutrient-rich environments. California bulrush leaves are inconspicuous, slender, v-shaped, and at maturity consist of brown sheaths located at the base of the stem. Flowers are branched terminal clusters of brownish, drooping, and erect spikelets that are located 1" to 3" from what appears to be the tip of the stem. An important characteristic of California bulrush is that it can grow in relatively deep water. It is not uncommon for extensive colonies to grow in 36 " or more of water. California bulrush colonies tend to grow parallel to and continuous along shorelines or in unobstructed habitats, in solid somewhat circular stands of an acre or larger. California bulrush has a relatively low tolerance to salinity and is generally restricted to fresh and intermediate marsh habitats.

California Bulrush
Growth Form and Habitat

Use

California bulrush is used primarily to control erosion along shorelines, canal banks, levee banks, and other areas of soil-water interface. In addition, when planted as continuous vegetative barriers across open water, California bulrush has significantly reduced pond fetch and wave energy.

When established in conjunction with shorelines, California bulrush provides an effective buffer that dissipates energy, reduces shoreline scouring, and traps suspended sediments and other solids. Dense stands of California bulrush are efficient users of available nutrients, producing significant amounts of organic matter. The cumulative effects of organic matter production, sediment trapping, and erosion control not only provide shoreline protection but also accelerate sediment accumulation and near-shore building. When used as open-water barriers, California bulrush significantly reduces wave energy, reduces suspended sediments, improves water qual-

ity, and promotes diverse communities of submerged underwater aquatics. Consequently, California bulrush is a sustainable and renewable restoration resource when properly established and, in the appropriate habitat, will persist and potentially remain effective indefinitely.

Habitat

California bulrush is a freshwater plant species with slight to moderate levels of salt tolerance. The ideal salinity range for establishing and growing California bulrush is 0 to 6 parts per thousand, or fresh to intermediate habitats. Numerous field trials have demonstrated that California bulrush will tolerate higher pulses of salts for short periods, but prolonged and frequent exposure to elevated salt water will significantly burn the above-ground portion of the plant and, under extreme conditions, will kill plants.

California bulrush is adapted to a wide range of soils from coarse sands to clays and mucks. Plant establishment and productivity appear to be superior on heavier mineral soils such as mucky clays, silty clays, silty clay loams, and fine sands. Soils with high levels of organic matter pose structural problems and have been problematic in establishing stands of California bulrush. California bulrush will tolerate fluctuating water levels; optimum water depths for establishing plants are 1" to 24", but plantings in deeper water have been successful. Turbidity appears to have little effect on survival or productivity of California bulrush, and no information is available on sulfide toxicity or pH ranges for California bulrush, although neither appears to be problematic.

Plant Form

Little is known about California bulrush seed production and its potential use in restoration. There are no commercially available sources of seed, and seeding is not a recommended practice. For planting purposes, only containerized vegetative transplants, trade-gallon size or larger, are recommended. Bare-root plugs are generally not used except under very specific site conditions. Consult a wetland specialist if there is any question about site suitability. Trade-gallon transplants have been very successful and most reliable when planted properly and on applicable sites.

A trade-gallon container of California bulrush will have 4 to 8 aerial stems that are 18" to 36" tall. California bulrush produces new tillers (stems) and spreads almost entirely from rhizomes, underground modified stems. Consequently, a well-developed rootmass is critical to the survival and productivity of transplants. Roots of containerized plant materials should be viable and actively growing, as indicated by a proliferation of new root development within the container. Transplants should have sufficient growth so that a soil-rootball remains formed when the transplant is removed from its container.

A complete description (specification) for trade-gallon container plants is available from the Natural Resources Conservation Service.

Planting Guidelines

Planting Date – As a general rule, California bulrush can be planted between April 1 and September 30. Other considerations include:

California bulrush can be planted anytime past the last frost date if there is a need to plant earlier and available transplants are actively growing. In some areas this may be earlier than April 1.

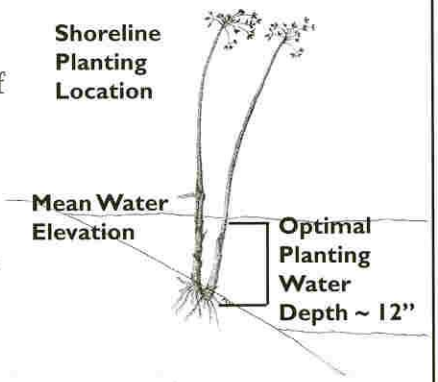
Newly established transplants are more susceptible to salt damage. Planting dates should be timed to avoid seasonally high levels of salt.

In interior marshes with poor water circulation, avoid planting between mid-July and the end of August. Elevated water temperatures are generally detrimental to new transplants; limit July and August plantings to lakes, bayous, and other areas of frequent tidal exchange.

Late fall plantings in October and November have been successful, but they should be limited to sites that are well protected and have minimal winter storm effect.

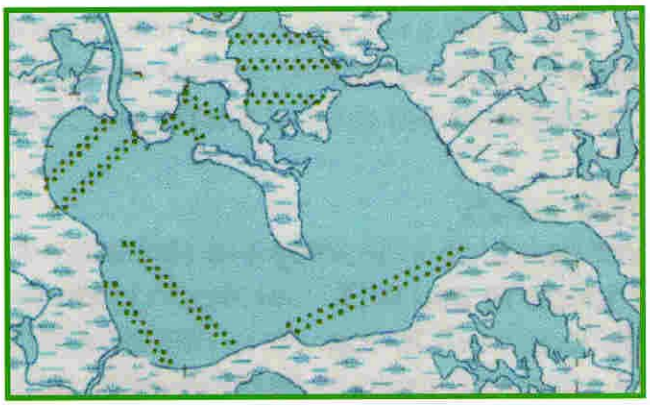
Planting Location – California bulrush is not restricted to the inter-tidal zone and can be planted in any fresh to intermediate site that meets the water depth criteria. California bulrush can be used for erosion control along shorelines, canal banks, levees, and other areas of soil-water interface. In addition, California bulrush can be planted in open water ponds to form vegetative islands or as linear vegetative terraces.

Shoreline Plantings – Shoreline plantings are typically planted as a single row parallel to the shoreline. Transplants can be planted at any point between 1" and 24" of water; an optimum water depth is about 12". Plant spacing within the row can vary according to the rate at which full coverage is desired. Trade gallons generally are planted on 5' to 10' centers. Under applicable site conditions, California bulrush will spread laterally, filling spaces between plants, and will grow up to its highest elevation and down to its lowest elevation. It is not uncommon for California bulrush to produce 8' to 10' of lateral spread in one growing season.



Depending on site conditions and the planting objective, two rows of California bulrush are occasionally planted. A two-row planting will provide quicker and denser short-term coverage than a single-row planting. If two rows are planted, rows should be parallel to each other and about 10' apart using the same plant spacing within rows as that of a single row. Plants within the two rows should be staggered on center so that plants alternate between spaces.

Open Water Plantings – In addition to planting shorelines, California bulrush can be used as vegetative terraces in open water. The planting configuration should be designed to provide maximum reduction in fetch lengths or to create hydrologic dead spaces. Generally two rows are planted parallel to each other and 25' apart. Plants within rows are planted on 10' centers. On applicable sites, a solid stand of vegetation will develop within two years, creating an effective wind and wave break.

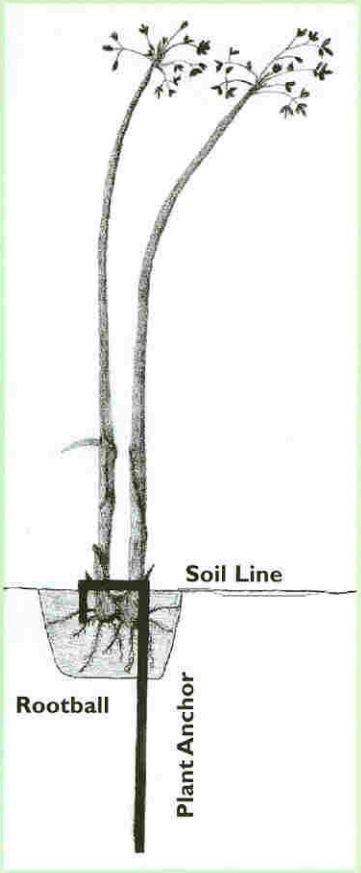


Two Rows Open Water Planting

Planting Methods – Trade-gallon transplants should be planted in a hole dug for that purpose. Post-hole diggers, gas drills with modified bits, or any other methods of digging are satisfactory. The planting hole should be the same size or only slightly larger than the rootball and deep enough so that the top of the rootball is flush or slightly below ground. The top of the rootball should not protrude above nor be more than 2" below normal ground. The planting hole should be tightly closed around the plant to prevent the plant from wobbling. Plant height should be closely correlated with water depth so that 8" to 12" of plant stem are above water. Transplants should remain erect and should not be completely submerged after planting.

Planting sites where high wave energy is a problem may require the addition of a plant anchor. A plant anchor consists of 1/4" mild steel re-bar bent into a crosier hook (candy-cane shape) and pushed down into

the soil so that the hook lies across the rootball, pinning it to the ground. Anchors are generally about 30" in overall length and will add to the cost of the planting. Anchors, however, are generally necessary at unusually problematic sites to prevent plants from washing out.



Fertilization – There is no consensus on the effectiveness of fertilizer when used in saturated and/or anaerobic soils, but the added cost of fertilizer is a small investment, given the overall cost of vegetative restoration. High nitrogen slow-release fertilizer tablets will add about .08 to .10 cents to the cost of an individual plant.

Slow-release fertilizer tablets are commercially available in a range of weights and analyses. Recommended tablet weight should be between 15 and 25 grams and have a nitrogen content of not less than 15% or more than 30%. When using tablets with trade-gallon plants, push the tablet into the top 3" of the rootball immediately before or immediately after planting. The resulting hole should be pinched closed.

Plant Materials Source

Plant materials are generally obtained from two sources, a donor wetland site or commercial nurseries. Using donor wetlands to obtain young plants will eventually affect the health and vigor of the donor stand, regardless of the care taken in frequency, spacing, and location of plant removal. Also, removing plant materials without the applicable permits may violate state and federal regulations. Removing plant materials from donor stands is not recommended.

Nursery-grown stock is generally the most reliable and ecologically appropriate way to obtain plant materials. A number of commercial nurseries produce and maintain California bulrush transplants. Trade-gallon transplants are the most common size, and seed is not currently commercially available.

Vegetative specifications should be used to tailor plant material quality and quantity to a specific project. They should include acceptable sources, ecotypes, plant size, stem height, container specifications, and extent of root development. In addition, other requirements such as climatic hardening and procedures for transportation and handling are commonly included.

A list of commercial wetland plant nurseries and assistance in developing plant material specifications are available from the Natural Resources Conservation Service.

Other Considerations

A number of other site-specific elements should be considered when working with California bulrush. These conditions represent extremes and should be thoroughly investigated before committing to a significant project if any of these conditions occurs.

Soil load-bearing properties - It is not uncommon for soils (especially in dredge deposit sites) to be fluid to the point that they will not support the weight of plants. This is an indicator of soils with a very high water-to-mineral ratio.

High organic soils – California bulrush will not survive in soils with extremely high levels of organic matter. These soils are described as having very low bulk density and are problematic. When soil texture approaches the consistency of peat moss, there is potential for low plant survival.

Shoreline configuration – Abrupt and steep cut-banks are indications of high wave energy and/or highly erodible soils. Special precautions may be required to keep transplants from dislodging before becoming established.

Herbivore grazing – California bulrush is a favorite of numerous grazing animals. In areas of heavy nutria population, caging plants may be required to protect newly planted material.

Smothering – Take precautions when planting in areas of heavy water hyacinth infestation. Smothering and mechanical damage by floating rafts of water hyacinths are common.

If any of these conditions is present, consult a wetland specialist for additional information and/or possible alternatives.

Materials prepared by: Mike Materne, Plant Materials Specialist, NRCS

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