Guide to Terrestrial Noxious and Invasive Weeds

Near Lake Tulloch Reservoir



Public Identification, Prevention & Management Guide

Terrestrial Noxious Weeds Near Tulloch Reservoir - 2026

TRI-DAM PROJECT

Purpose

The purpose of this Noxious Weed pamphlet is to assist the Tri-Dam Project in reaching the public to enlist their help in controlling the invasive, alien weeds that are threatening to displace native plants in the natural environment at Tulloch Reservoir. These invasive alien weeds also threaten to displace rare plant populations and reduce wildlife habitat values.

Tri-Dam's FERC License Conditions

The Federal Energy Regulatory Commission (FERC) required specific conditions to be implemented for the renewal of the FERC License for Tri-Dam's Tulloch Hydroelectric Project. FERC required a Vegetation Management Plan to include a plan to manage noxious weeds, in FERC's Article 405, at pages 23- 24, of the Order Issuing New License on February 16, 2006, for the South San Joaquin Irrigation and Oakdale Irrigation Districts' Tri-Dam Project No. 2067-020. The Vegetation Management Plan was approved on July 1, 2008. As part of the plan, a terrestrial noxious weed survey is performed annually by Tri-Dam Staff. Once identified, staff perform mitigation efforts where feasible. To help Tri-Dam prevent the spread of noxious weeds, this pamphlet informs the public around Tulloch Reservoir.

The following plants were found at Tulloch Reservoir by Project biologists and are classified by state and federal agencies as invasive or "Noxious Weeds". These weeds occur in patches on federal lands, state lands, TriDam lands, and private lands around the Tri-Dam Project boundary at Tulloch Reservoir:

1. Barbed Goatgrass (Aegilops triuncialis)
2. Chinese Tree-of-Heaven (Ailanthus altissima)
3. Italian Thistle (Carduus pycnocephalus)
4. Slender-flower Thistle (Carduus tenuiflorus)
5. Tocalote [Malta Starthistle] (Centaurea melitensis)
6. Yellow Star Thistle (Centaurea solstitialis)
7. Bull Thistle (Cirsium vulgare)
8. Klamath Weed [St. John's Wort] (Hypericum perforatum)
9. Himalayan Blackberry (Rubus discolor [procerus] [armeniacus])
10. Medusa-head Grass (Taeniantherum [Elymus] caput-medusae)

Noxious Weed Control Methods

The following pages discuss the biology of the plants listed by State or Federal agencies as "Noxious Weeds" and the control methods that have been reported as successful for each plant. The different methods for controlling weeds are summarized in this pamphlet.

Weed Prevention

The first line of defense against noxious weed invasions is to prevent their introduction into the project area. The following preventive measures should be utilized:

- Avoid disturbance to natural areas, including clearing of native vegetation and planting of nonnative plants.
- Avoid entering areas with existing noxious weed populations, or if entry is necessary, conduct work first in clean areas and then in areas with weeds, to avoid spreading weeds within the project area.
- Remember to clean equipment before leaving infested areas. Do not dump yard waste containing weeds that can spread seeds or re-root. Dispose of weed seed heads in the garbage. Do not mulch invasive weeds.
- Do not purchase or use invasive exotic species in landscaping or for land restoration or erosion control projects.
- Use hay for erosion control that is not contaminated with weeds. Commit to using certified weed-free straw for all construction or restoration projects or, if unavailable, use rice straw.
- For landscaping, use plants that are native to the Central Sierra foothills region as much as possible or those that are not known to be invasive.
- When planting seeds, use weed-free seed to help prevent the spread of most noxious weeds.
- Know your plants. If you are unsure of the identification of a plant, take a sample to a university, arboretum, department of agriculture office, local nature center, or native plant society for assistance. Find out whether it is known or suspected to be invasive. If the exotic plant is closely related to an invasive species, it is likely to have similar tendencies. To be on the safe side, if you don't know it, don't grow it.
- Avoid buying nursery stock that appears unhealthy and discard any unhealthy nursery stock in the trash. Do not mulch these plants on the project site.
- Control exotic invasive plants in your landscape either by removing them entirely or by managing them to prevent their spread outside your property. This may include pruning to prevent flowering and seed dispersal or cutting, mowing, or herbicide use to prevent vegetative spread.
- Do not dispose of aquatic pond or aquarium plants in natural waterways or lakes.
- Clean off your boat's propeller and boat trailer of any plant material before placing it in the lake after boating in other waterways.
- Discuss your concerns about invasive exotic plants with nurseries and garden shops and ask them not to sell these species. Provide them with printed material (such as this) explaining the problem to read later. Ask for non-invasive alternatives instead.

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- Notify neighboring land managers of invasive exotic plant occurrences.
- Offer to assist in exotic plant removal projects. Work with your local government to encourage the use of native plants in their urban and suburban landscapes.
- Provide them with lists of attractive, non-invasive, locally native alternatives that are naturally hardier, pest-resistant, and provide more nutritious food for wildlife than cultivated plants.

Hoeing or Hand Pulling

The hoeing or hand-pulling of small patches of weedy plants has been an effective method of controlling weeds since ancient times. It can prevent the spread of weeds to other areas if the seed heads and roots are bagged for proper disposal and not mulched into the soil.

Mowing

Cutting by hand, mowing with a mechanical mower, or whacking weeds with a string or blade trimmer before the weeds establish seeds may prevent the spread of the weeds to new areas. However, this method usually does not kill the weeds unless they are cut to the root line. This method still helps to control the spread of noxious weeds to new areas, but the mowing or cutting must be repeated periodically throughout the weed's growing period. Mowing must not be done when the weeds are bearing seed, unless the plants are caught in a basket or bag, or the seeds will be spread mechanically.

Solarization

Solarization of noxious weeds, over-shading or out-shading, is done with a thick layer of organic or inorganic mulch that may provide adequate shading and prevent growth of most light-sensitive plants. Most plants require sunlight for adequate growth. If heavy dark plastic is used, the edges must be secured with sandbags or rocks to hold the cover in place and to prevent sunlight from spreading in from the edges. This method may be very effective for controlling weeds in small patches. Solarization must be done at the beginning of the seed germination period. The solarizing cover must be left in place for the entire growing season for the noxious weed targeted. Solarization will kill both noxious weeds and native plants. Revegetation will be needed with fast-growing, hardy native seeds and plants to prevent the reintroduction of noxious weeds into the solarized areas and to prevent erosion of the bare soils left after solarization. Persistent follow-up and twice-yearly monitoring is needed to eliminate many of the invasive thistles, since some weedy thistle seeds can survive up to ten years.

Re-Seeding

Many weeds are opportunist that colonize disturbed areas where there is little competition from native plants. Re-seeding disturbed areas with competitive native plants is an effective long-term sustainable method of suppressing the weeds and allowing native plants to dominate weedy plants, choking out the weeds. Rapidly growing, competitive native plants should be used in weed control areas. Native

Noxious Weed Control Methods

plants do not require fertilizers or continued care, other than adequate water to establish their root systems. Native plants also provide forage for the local wildlife. Native plants should be seeded or planted at the beginning of the rainy season in the fall, usually around October 15th. Native plants recommended for re-seeding and replanting disturbed areas at the Tulloch Project are found in Tables at the end of this pamphlet. A list of potential native plant and native seed suppliers is also found at the end of this pamphlet.

Grazing

Livestock can readily feed on most seedling noxious weeds at Tulloch Reservoir. However, some of the noxious weeds at the Tulloch Project are toxic or harmful to livestock when mature, especially horses. Goats and sheep are more tolerant of these plants. Some of the seeds of the noxious weeds at Tulloch Reservoir can pass through the digestive tract of livestock, remain viable, and the seeds can be spread to new areas. Grazing livestock in close proximity to this drinking water reservoir can cause contamination with animal feces. Penning a flock of chickens, geese, or turkeys in small patches of seedy weeds for a few weeks can be an effective way of removing the entire year's seed production from that patch of seedy annuals. Seed-eating birds have gullets that can grind up seeds that would normally pass through livestock undigested. A drawback to using portable bird pens would be the potential predation of the birds by the fox and coyotes observed at Tulloch Reservoir. Livestock also eat desirable native plants. Livestock cannot be used in areas zoned by Calaveras or Tuolumne Counties for urban residential or commercial land uses, since livestock grazing is not permitted in these County zoning districts.

Burning

Controlled burns of weedy fields and spot burning of weeds with a propane torch have been reported successful for controlling many noxious weeds in other areas, but burning is not recommended at Tulloch Reservoir due to the following: the narrow band above the waters edge within the project area (below the 515-foot elevation); the project's proximity to residential and commercial structures; difficult access to the shoreline by fire suppression equipment; and the steep canyon surrounding the project area, where fire management would be extremely difficult. Contact your local fire department for burning regulations.

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Herbicides

For situations where other control methods of weeds are not practical or safe, herbicidal control has been reported as an effective option. Herbicides are likely also to damage desirable native plants and may harm animals. Applications can be made during the early spring when most other non-target vegetation is dormant. Herbicides are not appropriate for some infested sites, especially those near water, near Endangered plant habitats, or near Endangered wildlife habitats. Near streams or lakes, particular caution should be taken when using herbicides to avoid polluting the water. Remember that Tulloch Reservoir is used as a drinking water supply for the adjacent community.

Prior to using any herbicide, check with the County Agricultural Commissioner to determine which chemicals are legal to use in this situation. The labels also give more precise information on mixing and safety precautions. Refer to the pesticide manufacturer's label for specific information and restrictions regarding herbicide use. Read the entire herbicide label carefully. All label directions for mixing and applying must be followed. All precautions must be followed, and recommended personal protective clothing and gear must be used. Herbicide use should be done in consultation with a State-licensed Pest Control Advisor (PCA), registered to do such herbicide work in each County. Lists of such licensed PCA specialists are available from your County Agricultural Commissioner.

All pesticides registered for use have a label that has been approved by the Environmental Protection Agency (EPA). The label contains information about the product, including its relative toxicity, potential hazard to humans and the environment, directions for use, storage and disposal, and first aid treatment in case of exposure.

Contact the State Department of Pesticide Regulation for questions regarding the use requirements, restrictions, or recommendations for any herbicide to be used. https://www.cdpr.ca.gov/

Tulloch Reservoir Noxious Weeds

Barbed Goat Grass (Aegilops triuncialis)



Weed Description

Barbed Goatgrass is a winter annual closely related to and resembling winter wheat (Triticum aestivum L.). Stems are erect, spreading, or abruptly bent. Stems branch and spread at the base. Leaf blades are flat, spreading, about 0.1 inch wide, and may be sparsely covered with fine hairs. It grows to 18 inches (45 cm) tall. Stems are solid when young, but become hollow with age. Leaf blades are rigid and not susceptible to rust. Roots are fibrous and develop rapidly to a great depth. The flowering spikelets are 1 per node, are alternate and lay flat against a groove in the zig-zag tip of the stem. Immature spikes are often reddish or purplish. It has 2-3 stiff, sharp, and minutely barbed awns on each spikelet, each 1.5-3 inches long. There are two 1-seeded fruits per joint, with the upper two spikelets sterile. Spikelets adhere to the stem and are difficult to separate from the joint, falling at maturity with the entire flowering head.

Reproduction

The florets of Barbed Goatgrass bloom from May to July. They produce seeds. Barbed Goatgrass seeds germinate in the joints in the field, but joints appear to reduce germination. Germination occurs under a wide range of temperatures, 41-77 degrees F (5°-25° C). Some seeds can remain dormant for up to 5 years. The long barbed awns may attach and be transported on hair, fur, wool, shoes, or clothes.

Control

Some Barbed Goatgrass seeds falling on the ground can survive controlled field burns, because outer portions of the joints protect the seeds. Heavy grazing and high intensity/short duration grazing appears to increase goatgrass density. The awns can pierce and damage the mouth and eyes of livestock. Grazing animals should be removed from infested areas before plants mature. Mowing can be an effective method of reducing seed production. Mowing should occur after flowering, but before goatgrass seeds mature. Early mowing will result in new tiller growth and late mowing will only spread viable seed. Deep tilling has been effective. Hand pulling or hoeing small infestations is effective, if the roots are pulled and air-dried. Harvest transport trucks should be covered and other vehicles thoroughly cleaned before moving from infested fields. Nonselective herbicides such as Glyphosate may be applied to control small infestations. A reseeding program of perennial grasses and legumes, or other desirable vegetation should follow spot treatments.

Tulloch Reservoir Noxious Weeds

Chinese Tree-Of-Heaven (Ailanthus Altissima)



Weed Description

Chinese Tree-of-heaven, also known as Ailanthus, is a rapidly growing, deciduous tree native to Central China. Ailanthus has smooth stems with pale gray bark and chestnut brown twigs. It has large compound leaves, which range from 1-4 feet in length. These leaves are compound of 11-25 smaller leaflets, which are arranged alternately along the stems. Each leaflet has 1-3 coarse teeth and odor glands near the base. Mature trees can reach 80 feet or more in height. In the spring, small yellow-green flowers are found at the tips of branches. The seeds are enveloped by papery sheaths called samaras, which are slightly twisted, making them spin as they fall. Ripe samaras are greenish yellow or reddish brown in color. The wood of ailanthus is soft, coarse-grained, and creamy white to light brown in color. All parts of the tree, particularly the flowers, have a strong unpleasant odor, suggestive of rancid or burnt nuts.

Reproduction

Ailanthus reproduces both sexually via seeds and asexually via vegetative sprouts from the roots. Flowering occurs in June. Ailanthus is dioecious, with male and female flowering on separate trees. Female trees produce seeds from late summer to early fall. A single tree can produce around 325,000 to 350,000 seeds each year. Seeds are found inside papery, twisted, winged structures called samaras, which are well adapted for wind dispersal. Samaras occur in large clusters from September to October, and may remain on the female tree through the winter, but can be dispersed any time from October to the following spring. Mature trees also produce suckers from the roots and re-sprout rapidly from cut stumps and root fragments.

Control

Due to its rapid growth, abundant seed production, high seed germination rate, and root and stump sprouting capabilities, the removal of Ailanthus requires more than one year of treatment and follow-up monitoring. Seedlings can be pulled or dug up, but removal or poisoning of the entire root system is important to prevent fragments from regrowing. Cutting Ailanthus trees may be ineffective unless the roots are also treated or poisoned, because the plant can produce stump sprouts and root suckers (connected to a pre-existing lateral root). Establishing a thick cover of native trees or shrubs will help shade out establishments of Ailanthus seedlings. The use of the herbicides Glyphosate, Triclopyr, Imazapyr, and Dicamba has been reported to be effective in Ailanthus control. Herbicides may be applied according to the state-approved pesticide labels to the leaves, the basal bark, cut stump, or the interior of the tree by injection.

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Black Mustard (Brassica nigra)



Weed Description

Black Mustard is an annual plant, which grows erect, 2-8 feet tall. Its stems are long, thin, and erect. The upper stems are smooth while the lower stems are covered with stiff hairs. The leaves also have a few stiff hairs and are 2-10 inches in length. The upper leaves are toothed and the lower leaves are deeply lobed. Leaves are dark green, have stalks (petioles) and are not clasping around the stems. The bright yellow flowers of this plant are 1/3 inch across and are positioned at the ends of branches. Each flower has four petals and six stamens. Seed pods are smooth and short, about 0.4-1 inch long. The seed pods remain closely pressed to the stem. The seeds of Black Mustard are dark reddish brown in color.

Reproduction

Black Mustard flowers April-July. The flowers have both male and female organs. The plant is self-fertile and is also pollinated by bees. Seeds are produced in seed pods, called siliques, which remain tightly pressed to the stems until the seed pods dry in the fall and split open to release their seeds.

Control

Preventing disturbed bare soil will discourage the growth of Black Mustard. The leafy rosette with its taproot can be hand-pulled in the spring when the ground is moist in small patches. Mowing before seed pods are formed in the spring and early summer was reported effective for controlling the spread of Black Mustard, an annual. Grazing is not recommended because concentrated mustard oils contain isothiocyanates and glycosides that can damage the liver and kidneys of livestock. An effective biological control was reported with the seed-feeding fly (Urophora strytata Fabricius), which eats the seeds of mustards. The oils of Black Mustard inhibit the growth of annual grasses like wild oats and bromes. The herbicides Glyphosate, Triclopyr, and Dicamba have been reported effective in the control of Black Mustard.

Note: Concentrated mustard oils contain isothiocyanates and glycosides that can irritate the skin, and protective gear should be worn when handling this plant.

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Red Brome (Bromus rubens)



Weed Description

Red Brome is a tufted annual bunchgrass introduced from Europe. It is 2- 20 inches (20 cm to 50 cm) in height. It has a branched, densely tufted, reddish-purple flowering head. The basal flowers open first. Each floret has stiff awns and sharp points. The stems of this grass are fuzzy, covered with short, soft hairs. Red Brome has a very shallow root system.

Reproduction

Germination is dependent on elevated soil moisture levels generally occurring towards the end of November, but can continue throughout the fall, winter, and spring. The optimum germination conditions for this species are temperatures between 68-77 F with greater than 2.5 inches of rainfall. Seedlings grow slowly throughout winter with peak growth rates at the end of March and into May. Red Brome becomes extremely competitive with other grasses and displaces native species. Flowering occurs from March to June, and flowers are self-pollinated. The average plant produces about 76 seeds, which are dispersed in the summer by wind and scattering by animals, such as rodent excavations. Seeds are also dispersed in flooding sediments and contaminated seed grain and feed. Vegetative growth terminates in the spring when floral development begins.

Control

Red Brome is an annual grass with stiff, sharp florets that pose a threat to livestock and native fauna. Only during the winter months, when it is young and green, is it palatable to grazing livestock, primarily sheep and goats. The nutritional value and land-stabilizing potential are limited. Grazing and burning may increase the amount of Red Brome by clearing vegetation and providing adequate disturbed sites for the seeds to germinate. Burns conducted in late-fall may damage Red Brome seedlings while encouraging the early growth of perennial grasses. Control of this species is highly feasible, because less than 2% of seeds maintain their viability over a one-year period. Mowing the plants prior to seed development usually kills Red Brome, especially when cut at soil level repeatedly. Shading and nutrient competition from crowding of other plants during early grass development will reduce the number of individuals. Uprooting or hoeing seedlings before seeds mature will prevent seed dispersal. Even mature plants can be easily removed because of their shallow root systems. Covering the grass with thick black plastic or a thick layer of mulch during the germination period will reduce successful germination.

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Italian Thistle (Carduus pycnocephalus)



Weed Description

The Italian Thistle is an annual, broadleaf weed with slender spiny-winged stems. It is typically 1-4 feet in height, but can grow up to 6 feet tall. The leaves are deeply cut into 5 pairs of spiny lobes. The upper surface of the leaf is smooth and the underside is covered with woolly hairs. Flower heads are covered with dense matted hairs. Its cylindrical flowers are purplish or pinkish in color. Flowers appear at the ends of branches, singly or in clusters of 2-5, and are about 12-3/4 inch long. Italian thistle has a branched, slender taproot.

Reproduction

Italian Thistle is bisexual and pollinated by many different insects. It reproduces only by two types of seeds - brown seeds and silver seeds. A single plant can produce 20,000 seeds. Brown seeds generally remain in the flower heads, falling with them to the ground at the end of the season, and germinate at lower temperatures than the silver seeds. Silver seeds have a large feathery pappus and are dispersed by wind. They can remain dormant in the soil longer than the brown seeds (8-10 years). Seeds can germinate from depths of three inches, but usually germinate at less than one inch. Germination occurs in the fall after the first rain. Seedlings grow through the winter as rosettes and flower from May to July, before the summer drought. In addition to wind dispersal, seeds are also dispersed by contaminated hay or feed, water, animals, and machinery. Seedlings establish best on bare, disturbed soil.

Control

Mechanical removal such as digging will kill Italian Thistle, but the root must be cut at least four inches below ground level so the plant does not regrow. Plants can regrow from the base even if the thistle is repeatedly mowed at 3 inches. Plants should be pulled before seeds set. Grazing by sheep, goats, and horses has also been known to be effective in controlling this thistle. Three species of insects, Psylliodes chalsomera, Rhinocyllus conicus, and Ceutorhynchuys trimaculatus damage vital parts of the thistle, impacting seed production. Concern that these insects may prey on several of California's endangered native thistles in the genus Cirsiuт. Infection by two fungal rusts, Puccinia and Alternaria, is known to significantly reduce growth of this Thistle. A variety of herbicides including Diquat, Picloram, Glyphosate, Clopyralid, Milestone and 2,4-D have been reported successful in the control of this plant.

Tulloch Reservoir Noxious Weeds

Slender-Flower Thistle (Carduus tenuiflorus)



Weed Description

Slender-flower Thistle is a broadleaf, winter annual weed with slender stems and is typically 1-6.5 feet in height. It has triangular shaped large stem wings with spiny tips. The leaves of this thistle are cut into 6-8 pairs of spine-tipped lobes and the undersides are covered with woolly hairs. The flowers are purplish or pinkish in color and appear at the ends of branches, typically in clusters of 5-20. This thistle resembles Italian Thistle, but Slender-flower thistle usually has more than five cylindrical flower heads per cluster, its bracts are not hairy, and it has leaves with 12-20 lobes. Seeds are gray-brown. Some references felt this thistle is an indistinct species from Italian Thistle.

Reproduction

Slender-flower Thistles reproduce only by seed. Germination occurs in the fall after the first rain when temperatures reach 36-86 degrees F (2-30 degrees C [Centigrade]). Seedlings grow through the winter as rosettes, and flower from May-July, before the summer drought. Its small seeds have a large pappus and are well adapted for wind dispersal. Seeds are also dispersed by contaminated hay or feed, water, animals, and machinery.

Control

Mechanical removal such as digging will kill Slender-flower Thistle, but the root must be cut at least four inches below ground level so the plant does not regrow. Plants can regrow from the base even if the thistle is repeatedly mowed at 3 inches. Plants should be pulled before seeds set. Grazing by sheep, goats, and horses has also been known to be effective in controlling this thistle. Three species of insects, Psylliodes chalsomera, Rhinocyllus conicus, and Ceutorhynchuys trimaculatus damage vital parts of the thistle, impacting seed production. Infection by two fungal rusts, Puccinia and Alternaria, is known to significantly reduce growth of this Thistle. A variety of herbicides including Diquat, Picloram, Glyphosate, Clopyralid, Milestone and 2,4-D have been reported successful in the control of this plant.

Tulloch Reservoir Noxious Weeds

Tocalote (Malta Starthistle) (Centaurea melitensis)



Weed Description

Tocalote is an annual or biennial thistle with several stems from the base and branched in the upper part. Its erect or drooping stems have narrow wings and are 4-36 inches high. Most leaves are thin oblongs with deep lobes, 2-4 inches long. Leaves are alternate on the stem. Flowers are yellow and 0.3-0.5 inches long. Flower heads are in the upper leaf axils and are globe-shaped with firm bracts that are hairy when young. The margins of the bracts have several very short tan spines near the tip, with reddish, pinnately spiny bases. The seed pappus bristles are in several series. The similar weed, Yellow Star Thistle, has longer, yellow spines.

Reproduction

Tocalote blooms from May to June. Tocalote is insect-pollinated and reproduces by seed. Seed production is highly variable. Plants can produce 1-60 or more seeds per head and 1-100 or more heads per plant. Seeds fall near the parent plant or are dispersed to short distances by the wind, water, and soil movement. Seeds are often

Spread by humans, machinery, and livestock via the transportation of contaminated crop seed or hay. Seeds are also spread by road maintenance and moving livestock, which can contribute to the long-distance spread of the seeds. Wild birds such as quail and finches feed heavily on the seeds and are capable of long-distance dispersal. The seed bristles have microscopic barbs that can adhere to clothing, hair, and fur for seed dispersal. Seeds germinate after the first fall rains. Plants exist as basal rosettes through winter and early spring until flowering stems develop. Young seedlings are especially resistant to the effects of fall drought.

Control

Methods used to control Yellow Star Thistle can be applied to Tocalote. High-intensity, short-duration grazing by goats or sheep can be implemented. Mowing and spot burning can be very effective if done before spines form on the flower heads. Mowing too early can result in higher seed production. Monitoring and spot eradication of plants when they are discovered can also prevent the spread of this thistle. Hand pulling or grubbing, removing as much root as possible, may be useful in eradicating small infestations. Re-seeding with competitive native plant species is an effective long-term sustainable method of outcompeting Tocalote. Wild oat (Avena spp.) litter appears to inhibit Tocalote germination. The herbicides Clopyralid, Milestone, and Picloram have been reported to be effective in controlling Tocalote.

Tulloch Reservoir Noxious Weeds

Yellow Star Thistle (Centaurea solstitialis)



Weed Description

Yellow Star Thistle is gray-green to blue-green in color. It grows from 0.5 to 3 feet in height and has deep taproots. Flowers are bright yellow, with long, sharp spines surrounding the flower base. Stems and leaves are covered with soft wool. Basal leaves are deeply lobed and 2-3 inches in length. Upper leaves are sharply pointed and only 0.5-1.0 inches in length.

Reproduction

Yellow Star Thistle is a non-woody annual plant. It flowers from late May to September, sometimes into December or later. With low levels of self-fertilization, this thistle depends on honeybees, bumblebees, and other insects for pollination. Each seed head can produce approximately 35 to 80 seeds. Pappus-bearing seeds are dispersed after the flowers drop their petals, while non-pappus-bearing seeds may remain on the plant well into the winter. Without effective wind dispersal mechanisms, most seeds fall to the ground at the base of the parent plant. Even the plant's pappus-bearing seeds fall within 2 feet of the parent plant 92% of the time.

Dispersal over greater distances is assisted by animals and human beings. Birds such as house finches, goldfinches, pheasants, and quail feed on its seeds and transport them far from the parent plant. Long-distance dispersal of the seeds is also assisted by vehicles, contaminated hay or crop seed, and moving livestock. Germination occurs throughout the rainy season (October - June), with the maximum germination after the early fall rains when the seeds are exposed to moisture, light, and favorable temperatures of 50-68 F (10-20°C). Seeds remain dormant until they have adequate amounts of moisture.

Control

For small patches, manual removal works well. Hand-pulling or weed-whacking is best done before full flowering or viable seed production (May-June). Grazing by cattle, sheep, or goats can reduce abundance, growth, and productivity when done during May-June, after the plants have bolted, but before the buds produce spines. Toxic to horses. Re-seeding with competitive native plant species is an effective long-term sustainable method of outcompeting C. solstitialis. Competitive grasses used in re-vegetation programs for thistle management include native perennial grasses, such as big bluegrass (Poa ampla) and thick-spike wheatgrass (Elymus lanceolatus). The herbicides Clopyralid, Picloram, 2,4-D, Dicamba, Milestone, and Triclopyr have been reported to be effective in controlling Yellow Star Thistle as well.

Tulloch Reservoir Noxious Weeds

Bull Thistle (Cirsium vulgare)



Weed Description

The Bull Thistle is a biennial plant 2-5 feet in height. Stems are erect, hairy, spiny-winged, and branched. Lance-shaped leaves are short and broad, usually measuring less than 12 inches in length, and are very wavy or crinkled. They are prickly above but cottony underneath, giving the underside a grayish appearance. The leaves are lobed with 3-4 points per lance-shaped lobe, and each point ends in a long yellow spine with shorter spines between. In the first year, leaves form a rosette. Mature leaves alternate along the stem, causing the stalk to be prickly and winged. Flowers are found at the tips of branches, singly or in clusters. They are pinkish-purple and 1 ½ - 2 inches wide. Flower-head bracts are covered with spines. The pappus-bearing seeds of the Bull Thistle are oblong and straw colored.

Reproduction

The Bull Thistle flowers from June to September. It reproduces solely by seed. Mature plants can produce up to 4,000 seeds each. Seeds are typically 5 mm long and have a downy pappus making them well suited for wind dispersal. Establishment is promoted by soil disturbance, which increases nutrient, water, and light availability to seedlings and reduces the vigor of competing vegetation

Control

The best control measure for Bull Thistle is to prevent the production and movement of seeds. Cleaning equipment before leaving infested areas, feeding hay that is not contaminated, and planting weed-free seed will prevent the spread of this thistle. Mowing or hand-cutting before the production of viable seeds will also prevent the spread of Bull Thistle. Mowing should be done after the pappus of the earliest seeds displays color and before they turn brown. When digging, the root should be dug at least 2 inches below ground level. Heads that are beyond the bud stage should be selected and placed in a tight container to be buried in a landfill. The Government has approved a biological control for Bull Thistle; however, it may attack other native Cirsium thistles. The herbicides 2,4-D Amine, Chlorsulfuron, Picloram, and Dicamba have been reported effective in the control of Bull Thistle when applied during the rosette stage of growth. Other herbicides reported successful in the control of this plant are Metsulfuron, Imazapic, Clopyralid, Milestone, and Triclopyr.

Tulloch Reservoir Noxious Weeds

Pampas Grass (Cortaderia selloana)



Weed Description

This perennial grass is six to thirteen feet tall. It grows in clumps called tussocks. Its long bluish to pale green leaves have razor-sharp edges and are approximately 6 feet in length and 1-3 inches wide. They are V-shaped in the cross-section. Pampas grass has large plume-like flowers ranging in color from light violet to silvery-white. Plumes can reach 4 feet in length. It is native to the Argentine Pampas and is used as a landscape ornamental.

Reproduction

Pampas Grass produces flowers two to three years after germination. Flowering usually occurs in late summer, August-September, and sometimes into the winter. The species is functionally dioecious, with female flowers on some plants and hermaphroditic flowers functioning as males on others. Viable seeds, genetically identical to the parent, are produced without pollination. Seeds are dispersed by wind, animals, and humans. Seedlings sprout in the spring and require adequate light and moisture. Vegetative reproduction can occur from root tiller fragments that can sprout when the soil is moist. The lifespan of perennial Pampas Grass is about 15 years.

Control

Prevention of the use in landscaping will assist in preventing the spread of Pampas Grass at Tulloch Lake. Pulling or digging out the plants while small is best for removal. The large mature plants are more difficult to remove, but can be uprooted using a pickax and shovel, with a choker cable. It is important to remove the entire crown and top part of the roots to prevent re-sprouting. It is best to manually remove the plant in the winter and spring when the soil is moist. Detached plants left lying on the soil surface may take root and reestablish under moist soil conditions. Removing and burning the plumes helps to prevent further seed dispersal. Seedlings can be out-shaded with native plants, because their survival is low in shaded areas. There are no known biological control agents, but grazing by cattle has been reported successful in controlling the grass in New Zealand. The herbicide Glyphosate plus a penetrant, has been reported effective in the control of Pampas Grass.

Tulloch Reservoir Noxious Weeds

Bermuda Grass (Cynodon dactylon)



Weed Description

Perennial Bermuda Grass has long, slender rhizomes and stolons. Its gray-green leaves are smooth, with a ring of white hairs where the blade and sheath come together. Decumbent or drooping stems have papery leaf sheaths at each node and spread across the soil surface, becoming rooted at the nodes. It forms a very tough sod. It has deep roots. The bulk of the root mass is within 24 inches (60 cm) of the surface. Flowering stems are upright and have 3-7 thin terminal branches, like fingers on a hand.

Reproduction

Bermuda Grass begins to grow in late spring, flowers in the summer (June-August), and becomes dormant in the fall. It remains dormant and brown during cold winter temperatures. Bermuda Grass reproduces by seeds, but it spreads most rapidly by stolons and rhizomes (asexually). It can root at each stem node. Both stolon and rhizome branching is more vigorous in higher light and nutrient levels. Bits of these structures can be transported by water, livestock, machinery, and contaminated hay. Seeds are dispersed by animals and remain viable even after passing through the digestive systems of livestock. Near Bakersfield, California, Bermuda Grass emerged when soil temperatures at a depth of 2 inches (5 cm) reached 63 degrees Fahrenheit.

Control

Preventing the use of Bermuda Grass in landscaping will assist in preventing the spread at Tulloch Lake. This plant requires high light intensity to thrive and can be out-shaded by planting tall native plants. A thick layer of organic or inorganic mulch, or thick dark plastic, may provide adequate shading. Tilling may not be effective, because each piece with a node can sprout roots. Grazing is not recommended, because Bermuda Grass is toxic to livestock and the tiny seeds remain viable after passing through livestock. Periodic flooding may not be effective because seeds also remain viable after submergence in water for 50 days. Herbicides can also be used as a control method, with Glyphosate having been reported effective against Bermuda Grass.

Note: handling may cause contact dermatitis.

Tulloch Reservoir Noxious Weeds

Edible Fig (Ficus carica)



Weed Description

This deciduous Edible Fig tree can reach up to 30 feet in height. Some trees may have several trunks. The trunks and branches are covered with smooth light gray bark. The trunks are rarely more than 7 inches in diameter. They have thick green, palmate leaves with 3-7 lobes, 2-10 inches in length, and alternately attached. The upper leaf surface is rough, and the underside has soft cottony hairs. The ripe fruits are sweet, are typically 2-4 inches long, and bell-shaped or pear-shaped. Edible figs have been widely cultivated, and the color of ripe fruits of different cultivars ranges from dark purple-black in the 'Mission' fig to pale greenish yellow in the 'Kadota' and 'Genoa' figs to white with a purple blush in 'Conadria' figs. Clusters of flowers are located inside a fruit-like structure called a synconium and are not visible unless the synconium is cut open. These plants contain copious milky latex. The root system is typically shallow and spreading, sometimes covering 50 feet of ground.

Reproduction

Edible Figs reproduce by seed and by vegetative growth. They flower from June to September. Pollination is by an agaonid wasp, and the seeds ripen inside the edible fruit from August to September, but two crops are possible. Seeds number from 30 to 1,600 per fruit. The flowers are monoecious (individual flowers are either male or female). Both male and female flowers are found on the same plant. Figs are self-fertile. Seeds germinate at temperatures between 50 and 85 degrees F, but only if humidity remains high or if they are in contact with soil that is continuously wet. The deciduous leaves of Figs drop in mid to late autumn and reappear in early spring (March-April).

Control

Edible Figs are planted as a commercial agricultural crop and a landscape tree. They resprout vigorously after cutting and are difficult to control without herbicides. Edible Figs are shallow-rooted and usually grow in wet soils, making mechanical removal easy when the plant is young. No biological control species are approved by the USDA for this species. However, figs are subject to damage from nematodes, tree borers, and rust. The herbicides Triclopyr and Glyphosate have been reported effective in the control of the Edible Fig. Triclopyr has been reported to be effective when applied to the cut stump, the basal bark, or inside the trunk using the hack-and-squirt method. Repeated treatments may be required to prevent resprouting.

Tulloch Reservoir Noxious Weeds

Klamath Weed (St. John's Wort) (Hypericum perforatum)



Weed Description

Klamath Weed stands 1 to 4 feet tall and has numerous rust-colored branches. Leaves are green, opposite, oblong-shaped, covered with tiny transparent dots, and are usually no more than an inch in length. Flowers have five separate petals and are bright yellow in color. The petals are about 0.5 inches long and dotted with black glands around the edges of each petal. Yellow colored stamens are arranged in three groups. The seeds are shiny black to brown and approximately 1 mm long. Seeds are often coated with a sticky, gel-like material that assists in dispersal. The taproot of this perennial plant may reach depths of 4 to 5 feet and allows it to survive year-round. Lateral roots typically grow 2 to 3 inches beneath the soil surface.

Reproduction

Klamath Weed is a perennial plant that reproduces by seed and by vegetative sprouts. Root systems are capable of forming buds, which grow into new plants separating from the parent plant. Klamath Weed flowers from June to September, with peak flowering occurring from mid to late June. Plants typically produce an average of 15,000-30,000 seeds each season. Seeds may be produced without fertilization. Developing seed capsules become moist and sticky. These sticky capsules can disperse by wind or water or by adhering to animals and humans. Seeds are hard-coated and remain intact even after being consumed by seed predators. Seeds may remain viable in the soil for up to 10 years. Germination occurs from fall through spring. Brief exposure to fire (212-284° F) often increases germination, while small amounts of calcium may affect the permeability of the seed coat and inhibit germination.

Control

Klamath Weed is known to be poisonous to animals, including causing brain lesions in livestock, and is generally avoided by grazers. So, grazing is not recommended for control. However, several beetles, including Chrysolina hyperici and Chrysolina quadragemina, feed on the foliage and have been used successfully as biological controls. Mechanical removal, such as mowing of Klamath weed, may stimulate vegetative reproduction from the roots. Herbicides that have been reported as effective for control of this Hypericum include 2,4-D, Picloram, and Glyphosate.

Tulloch Reservoir Noxious Weeds

Fennel (Foeniculum vulgare)



Weed Description

Fennel is a perennial plant with a thick taproot and 10-20 branching stems originating from the base. Fennel is 4-10 feet tall. Fennel plants usually have a mixture of both living and dead branches attached to the smooth green stems. Branches join the stems at prominent nodes. The finely divided leaves of the fennel plant are almost feathery in appearance and sheath the stems where they meet. Its small yellow flowers are about 14 inches across and are clustered in umbrella-like groups, approximately four inches across. The flowers have 5 stamens, but no sepals. The petals narrow at the tips. The seeds are oblong and ribbed. Fennel smells strongly of anise or licorice.

Reproduction

Fennel can reproduce from both its root crown and its seeds. Flowering occurs in mature plants (18 months-2 years) from May to September. Flowering stems die back in the winter, but some stay alive towards the base, producing new leaves from the nodes along the stems. Seed production occurs during the summer and autumn (May-November), peaking in August and September. Viable seeds may remain in the soil for a few years before germinating. Germination can occur almost any time of the year. Reproduction by root division promotes the invasion of fennel in new areas and allows the species to become well established. Fennel root systems may be transported by water, earthmoving machinery, or cultivation equipment.

Control

Digging out individual Fennel plants by hand is preferable to plowing or dozing to avoid large soil disturbances. Removal of the root system prevents resprouting. Cutting and mowing only slows re-sprouting. Repeated cutting may eventually exhaust the resources of the taproot. Cutting while plants are producing seed may promote dispersal. Revegetation of the site with native plants will discourage the re-establishment of Fennel by preventing soil exposure to sunlight. Use of livestock to control Fennel will probably be ineffective. Grazing of above-ground shoots will slow, but not prevent, vegetative spreading. If livestock are in pastures when Fennel is producing seed, they will spread the seed to new areas. Experiments on Santa Cruz Island indicate that burning is not an effective control method unless followed by herbicide sprays the following two springs, which was shown to reduce Fennel cover by 95 to 100 percent. The herbicides Triclopyr and Glyphosate were reported successful in controlling Fennel when applied in the early spring. 2,4-D was also reported effective when applied before the flowering stage.

Tulloch Reservoir Noxious Weeds

Common Velvet Grass (Holcus lanatus)



Weed Description

Common Velvet Grass is a velvety, greyish perennial mat-forming grass. This grass has closely clustered stems, approximately 3 feet in height. Its long, pointed leaves are flat, about 14 inches wide, and flop over at the ends. The leaves and stems are covered with dense soft hairs and are grayish-green in color. The velvety leaves give the plant its name. Inferior leaves are striped with purplish-red vertical lines. Flowers are plume-like and light green to purplish in color. Flowers are paired in spikelets. The seed heads of Common Velvet Grass are initially purple and spiky, with branches folded tightly against the stem. The branches spread during flowering, opening up the seed head. As the seeds mature, the seed head turns straw-colored, and the branches fold up against the stem again.

Reproduction

After reaching maturity in its second year, Common Velvet Grass flowers from June to September. It is wind pollinated with rare events of self-fertilization. The plant begins to produce seeds in its second year. Seeds are dispersed by attaching to animals, humans, and mud on Machinery and vehicles. Viable seeds can also be spread in animal manure after passing through grazers. Seeds germinate after landing in moist soils with adequate exposure to sunlight. Germination can occur at a cool 46 F (7-8 C). Seeds buried 1.2 inches (3 cm) or deeper in the soil have a much lower chance of emergence. Seeds remain viable for two years. Each mature plant can produce approximately 10 adult plants per year. Vegetative regeneration can occur when drooping shoots reach the soil and produce roots at the nodes.

Control

Physical removal of Common Velvet Grass, such as hand pulling or hoeing, is an effective control method. Repeated mowing or intense grazing may also reduce the plant's ability to spread and should be done before the seeds are dispersed. Trampling reduces its survivability. However, eradication of the grass is difficult because of its ability to regenerate vegetatively. Insects and fungi that attack this grass also attack food grains and are undesirable. The herbicide Dalapon, along with a large variety of other herbicides, has been reported effective in the control of Common Velvet Grass. Spraying should be done in spring when the seed head first appears.

Tulloch Reservoir Noxious Weeds

Himalayan Blackberry (Rubus discolor)



Weed Description

The Himalayan Blackberry is an evergreen shrub with long, bending branches or canes and hooked prickles. Its canes can grow to twenty-three feet long in a single season. This species grows in dense thickets forming mounds up to 10 feet in height. Its flowers are white (or pinkish) and usually appear in clusters of 3-20. They have broad petals and usually measure 0.8-1 inch across. It has compound leaves, with 5 leaflets on prime canes and 3 on minor canes. Leaflets are broad, narrowing at the tip. The upper surface is smooth and green, while the underside is light and densely hairy. It has large (3/4 inch long), shiny black compound berries when ripe.

Reproduction

The Himalayan Blackberry generally flowers from May to July. Fruit ripens from July to September, and seeds are dispersed in the fall. Its blackberry thickets can produce 7,000 to 13,000 seeds per square meter. However, when grown in dense shade, most blackberries do not produce seeds. Seeds are covered with a hard coat and remain viable after ingestion by animals. They are dispersed by many bird and mammal species. In order to break the seed coat and allow germination, most blackberries require a minimum of a 90-day warm period (68-86 degrees F) followed by a 90-day cold period (36-41 degrees F). Most seeds germinate in the spring, but dispersed seeds can remain viable in the soil for several years. It can also reproduce asexually when drooping branches reach the soil and produce roots, forming daughter plants. Suckers or shoots occasionally sprout from the roots and may emerge from a depth of 18 inches (45 cm). Blackberries also readily propagate from root pieces and cane cuttings.

Control

Mechanical control techniques for Himalayan Blackberry, such as cutting, still allow vegetative reproduction and are more effective if followed by grazing or revegetation. Planting native shrubs or trees can out-shade these blackberries, preventing re-establishment. Grazing by goats, sheep, and horses can prevent the shrub from spreading. Roots can be removed by hand digging, but care must be taken to remove the entire root system to avoid resprouting. Since this blackberry often grows in riparian areas, herbicides may not be the best option for control. In addition, some herbicides do not prevent vegetative growth from lateral roots. The herbicides Fosamine and Triclopyr ester have been reported effective in the control of Himalayan Blackberry.

Tulloch Reservoir Noxious Weeds

Medusa Head (Taeniantherum [Elymusl caput-medusae)



Weed Description

Medusa-head is an aggressive winter annual grass with slender stems. It reaches 6-24 inches in height. Leaf blades are approximately 1-3 mm (<0.1 inches) wide and roll inward at the margins. There are typically 24 blades per stem. The awns or spikes at the tips of the plant are 1-4 inches long, minutely barbed, are compressed into the center when green, and twist apart upon drying. This species matures 2-4 weeks later than most other annual grasses and stands out green against surrounding brown grasses. After producing seeds, Medusa-head turns light gray or tan in color. The seed heads do not break apart as seeds mature.

Reproduction

Medusa-head reproduces by seed. Seeds are dispersed by wind, water, and also by attaching to the coats of animals, machinery, vehicles, and clothing. Medusa-Head flowers in May-June and is predominantly self pollinating. An average of 8-15 seeds are produced per spike in late spring or early summer. Seeds usually disperse by mid-summer and can remain dormant for over six months. Seeds typically germinate after the first rains in October or November, and the germination rate is high. Germination occurs under a broad temperature range (optimal 10-150 C or 50-59 F). The seeds of this plant are capable of germinating and growing in the dense leaf litter layer, without making contact with the soil. If they suffer desiccation, the primary root dies, but a new root develops if they are moistened again. Seeds can emerge from soil depths of up to 3-4 inches. Medusa-head continues to grow and produce seeds later than most grasses.

Control

Mowing for two consecutive years can help reduce infestations of Medusa-head. Mowing in combination with grazing, was found to be effective in reducing infestations. Heavy grazing by sheep in early spring (when it is still palatable) can assist in controlling it, but animals should be removed before seed heads form to limit dispersal. The stiff awns and hard florets can injure eyes and mouths of grazing animals. Plow•ng or discing before seeds set are also effective means for control. Revegetation with competitive native species, like Squirreltail grass (Elymus elymoides), may prevent Medusa-head from regaining dominance after control treatments. Burning stands of Medusa-head prior to seed dispersal is reported as an effective control measure. The western U.S. endemic crown rot fungus (Fusarium culmorum) is a potential biocontrol agent adapted to dry soils. The herbicides Atrazine, Glyphosate, and Paraquat have been reported effective to varying degrees, though they may cause harm to other species.

Tulloch Reservoir Noxious Weeds

Wooly Mullein (Verbascum thapsis)



Weed Description

Woolly (Common) Mullein is an erect herb that grows 1-7 feet high. Its fuzzy, felt- like leaves are bluish gray-green in color and alternate along the flowering stalk, with the larger ones toward the base. The basal leaves are generally 3-20 inches long and 1-5 inches wide. In the first year, Woolly Mullein is a low-growing rosette. Plants reach maturity in the second year and produce a conspicuous flowering stalk. The sulfur yellow flowers have five petal lobes, each flower about 1 inch wide. Flowers are arranged in a leafy spike. The brown seeds are small and rough, with wavy ridges and deep grooves.

Reproduction

Woolly Mullein takes two or more years to flower and die. During the first summer, it produces a taproot and a rosette of leaves. The rosette continues to grow until temperatures drop during the autumn and winter. In the spring of the second year, plants flower from June to August, with the flowers maturing on the stalk from the base to the tip. Longer stalks can continue to flower into early October. The plant produces seeds during the summer, and then dies. Each plant can produce approximately seeds, which may remain viable in the soil for decades before germinating. The seeds are dispersed mechanically near the parent plant during the autumn and winter.

Control

Hand pulling, followed by sowing the site with fast-growing native plants to out-shade Woolly Mullein seedlings, will decrease successful germination. Livestock will not eat Wooly Mullein because of its fuzziness. Because Mullein seedling emergence depends on the presence of bare ground, sowing sites with early successional native grasses or other plants may decrease Mullein seed germination. Two insects have been used as biological control agents. European curculionid weevil (Gymnaetron tetrum). has been determined by the U.S. Department of Agriculture to be specific to Mullein. The weevil larvae mature in the seed capsules and can destroy up to 50% of the seeds. The mullein moth (Cucullia vetbascO has been tested in the U.S. and is considered to be a relatively safe control agent because of its consistent feeding and development on mullein species. Although tests showed limited feeding on other native species, the larvae did not survive significantly longer than those individuals tested in the absence of food. Herbicidal control is also an effective option when hand-pulling is not possible. Tebuthiuron, 2.4-0, glyphosate, and Triclopyr have been reported effective in controlling Woolly Mullein.

Sudden Oak Death

Sudden Oak Death (SOD) is a serious plant disease that can kill certain oak and tanoak species. It is caused by the water-mold pathogen Phytophthora ramorum. The disease can spread through infected plants, contaminated soil, and plant material, and it can affect the health of trees and surrounding vegetation.

SOD has caused significant tree mortality in parts of coastal California. However, the USDA's current list of California counties with confirmed detections of SOD does not include Calaveras or Tuolumne County, nor has a case ever been observed in either county. This does not guarantee that the pathogen cannot reach the Lake Tulloch area, so continued awareness and prevention are important.

Although not every discolored or dying oak tree has Sudden Oak Death, recognizing possible symptoms and taking simple precautions can help protect the trees and natural resources around Lake Tulloch. To report a possible case of SOD, contact the Tri-Dam Project at 209-965-3996

Symptoms



- Dark, bleeding areas on the trunk: Reddish-brown to black ooze or staining on the bark.
- Bark cankers: Dark, sunken or cracked areas on the trunk or larger branches.
- Leaf discoloration: Leaves may turn brown, wilt, or die back.
- Branch dieback: Sections of the tree canopy may become thin or die.
- Tree decline: An oak may gradually lose its canopy and eventually die.

How to Prevent Spread



- **Buy Healthy Plants** - Purchase plants from reputable nurseries and avoid planting nursery stock that appears unhealthy.
- **Clean Equipment** - Remove soil and mud from boots, tools, tires, trailers, and equipment before moving between properties or natural areas.
- **Avoid Moving Potentially Infected Material** - Do not transport suspicious leaves, branches, bark, soil, or firewood from one location to another.
- **Clean Tools** - Disinfect pruning tools and other equipment when working on potentially infected vegetation.

Sudden Oak Death cannot be confirmed by appearance alone. Similar symptoms can be caused by drought, insects, other diseases, and environmental stress. A laboratory test is necessary to confirm the presence of Phytophthora ramorum.

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