

Conservation Almanac

Trinity County Resource Conservation District

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The Battle Against Yellow Starthistle

CAN WE STOP THE THRIVING THISTLE?

One of the most noxious weeds in Trinity County is yellow starthistle (*Centaurea solstitialis*), which infests roadsides, pastures, hay fields, and other disturbed areas. Since its introduction from Europe in the mid-1800's, yellow starthistle has spread through California at an alarming rate, infesting an estimated 10 million acres. Its rapid spread has been to the detriment of California's native flora, particularly the grasslands. Conservationists now worry that yellow starthistle is a serious ecological threat to the biodiversity of California's flora.

Yellow starthistle is such an invasive weed because of its highly successful biology, which allows it to out-compete and displace native

plants. It is an annual that germinates after the fall rains and is well established by the spring, when native perennials plants are just beginning to develop. Yellow starthistle also sends down a long taproot, which enables it to obtain moisture even on hot, dry sites, when other plants are under water stress. Yellow starthistle also produces an enormous quantity of seed each year, with seeds remaining viable in the soil for up to ten years.

Despite yellow starthistle's spread, several methods have been developed for controlling this weed.



Unfortunately, no single treatment or application will work on its own. But by using one or several of these techniques, repeated at the appropriate time over several years, it is possible to control, or even eradicate, yellow starthistle.

Commonly used methods for controlling yellow star thistle are cultivation, mowing, livestock grazing, biological controls, seeding, prescribed burning, and chemical control.

• **Cultivation**

An effective way to control yellow starthistle is to till infested areas after the first fall rains to eliminate any starthistle seedlings. Because tilling will also bring buried seeds up to the surface, the area should be tilled a second time in the spring to remove this second flush of seedlings. A third tillage may be necessary in late spring or early summer to remove subsequent starthistle germination. Although

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Don't Wait! Spring is the time to control starthistle on your property!

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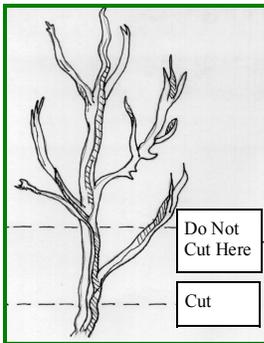
tilling will remove seedlings, it will also expose the bare soil, making it prone to erosion. It is important, therefore, to seed after treatments to establish ground cover. To establish other plants in the area, it is recommended that tillage be done for two years to reduce the starthistle seedbank, followed by seeding with a perennial grass mixture.

- **Mowing**

Mowing is an easy tool that landowners can use to control relatively small yellow starthistle infestations; however, timing is critical for mowing to be effective. Starthistle should be mowed in its budding stage, when about 5% of the flower heads are in bloom, and flowers are bright yellow in color. If mowed before this early flowering stage, the number of starthistle plants will only be increased, while late mowing may help to distribute mature seed.

Not only does timing have to be considered when mowing, but also the height of the mower blade. Adjust the mowing height so that the main stem is cut below the branches, as shown in the drawing below.

Additional mowing, one to three times during the growing season in late May through September, will be needed to crop any re-growth.



When mowing starthistle, make sure you cut below the lowest stems.

- **Livestock Grazing**
Short-duration, high-intensity grazing with cattle, sheep and goats is another effective tool for controlling yellow starthistle, especially in pastures and other large areas. As with mowing, timing is critical for grazing to be effective. Plants need to be grazed during the ‘bolting’ stage in May and June, when the plants are sending up erect stems and before spines appear on the plants (see photo at right). Yellow starthistle should never be grazed in March and April, during the rosette stage, when plants only have a basal rosette of leaves and no stems are present. Grazing during this stage will only encourage the growth of the starthistle.

After initial grazing, one to three additional grazing periods at two-week intervals (May through August) are needed to crop any re-growth of starthistle. Although grazing alone will control (prevent spread of) yellow starthistle, this technique will not eradicate (completely eliminate) infestations.

Horses should not be grazed on starthistle, because prolonged ingestion can lead to the fatal nervous disorder, equine nigropallidal encephalomalacia or “chewing disease.”

- **Biological Controls**

In 1994 the Agricultural Commissioner released populations of insects that prey upon yellow starthistle, at several locations throughout Trinity County. These natural predators included the yellow starthistle bud weevil, *Bangasternus orientalis*. It was hoped that these insects would establish populations to keep starthistle in check.

Although the use of biological agents to control starthistle is



Yellow starthistle in the bolting, pre-spiny stage. At this stage, control by livestock is optimum

promising, more time and research is needed to see if these controls will be effective.

- **Seeding**

Although the methods mentioned so far will control starthistle, additional measures are needed to re-establish other plants, especially in areas of heavy infestation. Seeding with perennial grasses has been tested, but results have been mixed. The slow-growing perennials tend to be out-competed by fast growing starthistle. Although research has suggested herbicides are needed initially to establish grass stands, the hazards associated with herbicides must be considered. Also, hand pulling starthistles is an effective alternative to chemicals in smaller plots where such physical treatment is feasible. Once established, perennial grass stands have the potential to reduce starthistle by

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shading and out-competing it for water. Subsequent measures, such as periodic mowing or grazing, would be needed to prevent starthistle from re-emerging. Recommended grasses include native species such as blue wildrye (*Elymus glaucus*) and California brome (*Bromus carinatus*), and pasture grass such as 'Berber' orchardgrass and 'Luna' pubescent wheatgrass. Research has also shown the potential for high density seeding of forage annuals such as 'Lana' vetch (*Vicia villosa*) and subterranean clover (*Trifolium subterraneum*).

- **Prescribed Burning**

Recent studies have shown that controlled burning can dramatically reduce yellow starthistle infestations. Burns need to be conducted in late spring before starthistle seed has matured, and should be done consecutively for at least two to three years. This year the RCD and the California Department of Forestry and Fire Prevention will be conducting a prescribed burn in Hayfork to see if this technique will be effective in controlling yellow starthistle in Trinity County.

- **Chemical Control**

Although chemical herbicides have been used to control yellow starthistle and re-establish perennial plants, many people worry about the hazards of these chemicals. Due to such environmental concerns the RCD discourages the use of herbicides for controlling yellow starthistle.

For further information on controlling yellow starthistle, please contact Christina Veverka at (530) 623-6004 for a free pamphlet detailing the techniques mentioned in this article. For more comprehensive information on the

subject, landowners can order Thomsen et al, *Yellow Starthistle Biology and Control* for \$8.00 from University of California. • publications at (510) 642-2431. •

RCD Seeks Teacher Participation In Education Programs

The RCD is hoping to expand its in-school resource conservation education programs next year. If you are a teacher in a Trinity County school and you are interested in supplementing your science curriculum, we would be interested in assisting you with watershed education during the 1998-1999 school year. Watershed educational components include soil science, forestry, aquatics, and wildlife. Emphasis in these educational units is placed on hands-on discovery learning, and the curriculum will include holistic, ecological approaches to resource use and conservation.

The RCD is still available to coordinate and implement Adopt-A-Watershed curriculum for those who have participated in this service learning curriculum or any interested in having their classes adopt a watershed. Presently, the RCD is also exploring the possibility of implementing other popular educational strategies for watershed education such as *Project Wet* and *Project WILD* and will continue sponsoring students to compete in the California Envirothon and State Speak-off contests. The RCD also sponsors students to attend a Range Camp each June. •

Trail Tracks

Weaverville Basin Trail System Receives Grant

The Weaverville Basin Trail Committee has just been notified that it will be a recipient of a \$1,000 grant from the national Conservation Fund's American Greenways Program in Arlington, VA, sponsored by the DuPont Corporation. The grant will be used to help update, revise and formalize the trail system map; develop a brochure describing the trail system to assist in the promotion of tourism; and to install additional signage for trail identification.

The Weaverville Basin Trail System was one of 42 awards the Conservation Fund will make this year and was selected out of 220 applicants from 31 states. The American Greenways DuPont Awards Program provides grants of up to \$2,500 as seed money to non-profit organizations and government agencies to help develop new, action-oriented projects displaying innovative local efforts toward conservation of habitat and historic sites, outdoor recreation and greenway development.

In addition to receiving the award, the Weaverville Basin Trail System of historic routes that have been preserved, mapped and maintained by community volunteers will be showcased as a national model, according to the Conservation Fund's president, Patrick Noonan. The American Greenways DuPont Award Grants Review Committee consisted of land use and conservation experts from around the country and was directed by the CEO's of DuPont, The Conservation Fund and the National Geographic Society. •

RCD Publishes Report on Grass Valley Creek Restoration Project

The RCD, with the assistance of the Natural Resources Conservation Service, has recently finished its account of the large restoration project undertaken in Grass Valley Creek (GVC) Watershed. The majority of the work on the project spanned from 1992 through 1996, although several aspects of the restoration work—revegetation and monitoring of revegetation work—will continue on a smaller scale into the next millennium.

In the early 1980's GVC was identified as a major source of sediment impacting the Trinity River in the wake of the construction of Trinity and Lewiston Dams (see related article at right). The Trinity River Restoration Program identified several major causes of the degradation of anadromous fish habitat, and GVC was identified as one of them. Because of this Congress OK'd a plan to restore the GVC watershed in the wake of disturbances to the very unstable soils in the watershed due to poor logging practices, particularly the construction of a large network of roads constructed that didn't take into account the unstable nature of the soils.

The restoration work itself was preceded by the construction of large sediment catchment basins a third of the way downstream from the headwaters of GVC and at its



An example of the extreme erosion that takes place in decomposed granite soils.

confluence with the Trinity River. These ensure that even if sediment migrates through the streamcourse it will be less likely deposited into the Trinity River.

Next, the way was cleared for a full-scale restoration effort by the purchase of private land in GVC by the Trinity River Restoration Program.

The project unfolded over three phases. The first phase utilized extensive hand work to construct instream sediment catchment structures, which, unfortunately proved ineffective in this watershed even though such practices had been very effective elsewhere.

The second phase of the project changed its focus from trying to treat the flow of sediment in the streams themselves, to the removal of poorly constructed roads and road crossings that contributed the major portion of sediment entering GVC. Emphasis shifted also from

hand work to the use of heavy equipment.

The final phase, which is to some extent still in progress, has focused on revegetating the barren hillsides and riparian (streamside) areas and monitoring vegetation treatments for success rates over time.

Monitoring of sediment flow over the past several years indicates that the project has been successful. The GVC Restoration Project report documents all phases of the project, including historical precursors to the restoration work, and it offers numerous prescriptions for treating erosional problems in unstable soils like those in the GVC watershed. Copies of the report are available from the RCD for \$15.00 (B&W) or \$25.00 (color). •

GRASS VALLEY CREEK WATERSHED RESTORATION PROJECT: RESTORATION IN DECOMPOSED GRANITE SOILS



*A Report Prepared by
Trinity County Resource Conservation District
and
Natural Resources Conservation Service
Weaverville Field Office
in Cooperation with
The Trinity River Restoration Program
February 1998*

Sediment Risers: *Purpose and Function*

If you have ever driven back from Redding on 299 and, after passing over Buckhorn Summit, noticed strange pipe-like structures sticking up to the right of the highway, you will have glimpsed the exciting world of sediment risers.

OK, maybe not exciting, but certainly functional.

Sediment risers have been used extensively in the Grass Valley Creek watershed, through which highway 299 passes, to minimize the impact of sediment on Grass Valley Creek and ultimately the Trinity River itself (into which Grass Valley Creek drains).

Sediment risers function by ponding water around the riser



Without a sediment riser a culvert can easily get plugged with accumulated sediment.



Water is meant to pond around the sediment riser and deposit accumulated sediment around the riser.

The sediment-free water then enters the riser through small vertical openings and flows out through the attached culvert.

to settle out sand-sized particles carried by the stream. As the water level rises around the riser, the sediment collects at the base of the riser and the top layer of water, relatively free of sediment, flows through vertical openings in the riser and into a culvert (culverts are pipes that allow streams to cross roads by passing underneath them). Sediment risers are coupled to the inlet of a culvert and create a ninety-degree “elbow” bend in the culvert. They are usually installed in smaller, seasonal or “ephemeral” creeks (also known as “draws”) tributary to Grass Valley Creek. Sediment basins around the risers may occasionally have to be dredged to keep the sediment from building up and entering the openings in the riser. During large storms, when flow is high, the water level may rise to the top of the riser and flow directly into the opening, which is usually 1-1/2 times the diameter of the culvert. Since sand-sized sediment is heavier than water, it settles out around the base of the riser before the water enters the slotted opening or the top of the riser.

In the Grass Valley Creek watershed, where the soils are highly erodible (and therefore highly productive of sediment) culverts can quickly become plugged with sediment and other debris, causing the stream to flow across the road surface, often washing away the road crossing and depositing even more

sediment in the stream or creek.

The soils in Grass Valley Creek watershed are highly erosive because they consist in large part of decomposed granite (DG). DG is highly subject to weathering, breaking up into sand-sized particles that are easily transported by water down hillslopes and draws to end up in tributaries and Grass Valley Creek.

Large amounts of sand-sized sediment can seriously affect salmon spawning and rearing habitat. Salmon need coarse, cobble-sized rocks in streambeds for their eggs. The larger rocks shelter the eggs and small fry from predators but allow oxygenated water to flow freely around the rocks. Sand on the bottom of creek- and riverbeds starves the salmon eggs of oxygen, suffocating them.

Sediment risers have proven very effective in stemming the flow of sediment into Grass Valley Creek as well as tributaries to the South Fork, reducing impact on Trinity River basin salmon habitat. ●

Caltrans Requests RCD Aid in Revegetation Project

Brian Crane of Caltrans recently approached the RCD with a request to help revegetate portions of Weaver Creek between Weaverville and Douglas City repaired in the aftermath of the January 1997 storms. The purpose of this revegetation project is to improve the visual appearance of the repaired sections of streambank. High flows that winter eroded many sections of streambank along the creek, in some places even washing out portions of Highway 299 (you probably recall with not much relish the detours and long delays while you traveled between Douglas City and Weaverville that winter). Caltrans stabilized eroding streambanks and protected them against further erosion by lining them with rock riprap. Riprap is placed in sections of streams that receive the most flow energy during storms.

The riprap has effectively protected the streambanks but is not very aesthetic--appealing to the eye. Caltrans contracted with the RCD to plant trees and shrubs in or around the riprap to soften its appearance. RCD Revegetation Manager Christina Veverka looked at the sites and devised several ways to improve the appearance of the protected banks when viewed from scenic Highway 299.

Part of the vegetation strategy to beautify the highway will include planting cottonwoods and alders in 82 plastic pipes installed within the riprap when it was placed on site. These trees

were chosen because they are water tolerant (they will be in direct contact with water), they are quick growing, and grow to be very tall. Not only will they lend a more aesthetic appearance to these sites, their full canopies will provide much-needed shade to the creek to keep water temperatures cool. Salmon and steelhead need cool water temperatures for spawning and rearing.

Christina also proposed planting in the fillslopes above the riprap (closer to the highway) to provide a "visual shield" of vegetation along the highway. She suggested the use of native blackberry bushes because they will grow to spread over the riprap. These portions above the riprap are far from the creek and because they get a lot of direct sunlight, plants placed here need to be drought tolerant. Native blackberries once abounded in Trinity County, but they have been all but run out by imported species of blackberry, particularly Himalayan blackberry (you can tell the difference between native and non-native species of blackberry by examining both the leaves and the thorns: natives have leaves in threes while exotics have groups of five joined leaves. Also, natives have smaller thorns than exotics).

In addition to shrubs, Christina also proposed planting tall trees, like ponderosa pine, along the highway to further act as a visual barrier between the road and the riprap.

Planting will take place between late November and early December this year and the project will take about a week to complete. Also, maintenance (primarily watering) will have to be performed for about two years until the plants are well established. ●

RCD Receives Fish and Game Grant

The RCD was recently given the go ahead from the California Department of Fish and Game on a grant proposal submitted in December of 1997. The RCD had requested funding from Fish and Game to conduct an inventory of road networks on Forest Service and private lands in the Upper South Fork, Happy Camp, and Plummer Creek watersheds, which would be used to complete watershed analyses and prioritize watershed restoration activities within the watersheds.

Road inventories are conducted in order to determine the amount of sediment produced or potentially produced in specific sections of a road, particularly where the road crosses a stream. Past road inventories have repeatedly revealed that undersized culverts (pipes that allow water to flow underneath road surfaces) are a major cause of sediment deposition. Historically, culverts that met "50-year" storm requirements were inadequate in handling flow from large storms. High flows can clog culverts with debris and wash out road crossings because they were not designed for the size of storms that actually occur with some regularity in these watersheds. A road inventory identifies those locations mostly likely to fail during large storms and the resultant high flows associated with them. Road inventories also identify other portions on roads where poor drainage can lead to erosion and subsequent deposition of sediment into creeks or the South Fork of the Trinity River. ●

Employee Feature



Scott Brennan-Smith

Scott Brennan-Smith is the RCD's Education Specialist, whose job it is to inform both members of the public and school-age children about responsible land use and the science that lies behind it. Until recently most of the in-school education the RCD undertook was implemented by the AmeriCorps Watershed Project, and Scott's work focused mostly on publications (this newsletter and various technical publications). "I've really liked working with desktop publishing software, as well as the process of crafting publications. It's the 'maker' part of me: I like looking at a tangible product. But now I'm ready for a change, and if this change takes me into the schools to do conservation education directly with students, I would welcome that. I'd like to see a program that gives a balanced view of resource use and environmental protection. I think the best approach is to appreciate that people need to utilize natural resources but to protect them as well, to

maintain healthy ecosystems for plants, animals, and people to thrive in."

Scott's work and educational background are extremely varied. He holds a Bachelor's degree in Visual Art and a Master's degree in Education, as well as a California teaching credential. He has taught many subjects, both in universities and public schools, and currently, besides his work with the RCD, he teaches and performs music part time in various Trinity County schools through the Artists in the Schools program.

"I have lived a varied life because I've had so many interests. It took me years to figure out how I was going to combine interests in art, writing, music, teaching, and the outdoors. I'm still struggling with it to some degree, but I think the link that combines all that I do is *creativity*. 'Creativity' is a term that is overused nowadays, but it's true for me. Along the way I started to see art or writing or whatever I was doing not as just a product, but as a way of being. Mostly, creativity, is a way of processing information, ideas, and emotions so that I can understand and use them. Thus, writing a technical report can be as creative to me as writing a song or painting an image--all of which I do regularly. Creativity is also an important aspect of my teaching, for it's not enough to expose people

to ideas and information, they also have to *do* something with them, and this doing is the way they learn it. It's creativity in the service of growth, not just a trophy to hang on a wall to say "I painted that." That kind of creativity is less interesting to me.

Most recently, Scott has seen music as his main creative focus. Scott performs regularly around Weaverville, always hoping that when people come to listen that they listen *past* him to the stories he tells in his songs about the lives of ordinary people wrestling with their common human lot and its attendant dilemmas. "There's something that binds us all together, even though it's hard



to define. I think, sometimes, that a heroic approach to ordinary life emerges in the music I listen to, and it's something I want to pass on to people through performing music. I make demands on students and audiences to listen closely and to think, but I also want them to enjoy themselves. The two are not separate, something that's been forgotten, I think, by mainstream television, movies, and the recording industry with their constant emphasis on "entertainment value": novelty and shock. Life is hard but it's also good. Simple things people have known for generations are the most important things. I'm still learning that." •