

The Saga of the Santa Cruz Tarplant

by Grey Hayes¹

CONSERVATIONISTS ARE CONFIDENT when they swiftly respond to the question of the two greatest threats to California's prairies. The discussions get heated and longer, though, when they try to name the third major threat. And yet, when declining trends in annual wildflowers like the endangered Santa Cruz tarplant are studied, the third greatest threat becomes quite obvious.

The two primary threats to our prairies are undoubtedly those of human development and invasion by exotic weeds. As indicated by the trend in the Santa Cruz tarplant, the next major threat is the cessation of grazing. This article focuses on one population of tarplant that flourished alongside and under cattle, disappeared after their removal, and reappeared years later after extreme human intervention.

The Santa Cruz tarplant *Holocarpha macradenia* (DC.) Greene is an upright annual plant two feet tall at the maximum. The heads, with modest ray flowers, are of a pure yellow. Like many tarplants, it produces a sticky resin with a bouquet somewhere between that of grapefruit peel and that of licorice candy. Historically, the tarplant grew from Contra Costa and Marin counties to Monterey County. Before conquest of the area by Old World peoples and their weeds, the tarplant may have been widely common in coastal grassland. But since our invasion, it has gradually declined in number to such a degree that the State of California has found it prudent to list it as endangered. This year, the federal government, too, is considering so listing it. There are now only eleven natural populations, all in Santa Cruz County. (Researchers have successfully introduced another population near Berkeley.) Tarplant population after tarplant population has declined because of cessation of grazing. The one exception to this is a population that has been subject to intensive mechanical management because, without it, human lives would be at risk from fire. The Watsonville Airport, otherwise known as the "Tarplant Farm," has fire-control policies that mandate a program of mowing and light discing to reduce

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vegetation. Under this management, Santa Cruz tarplant has maintained a healthy population for decades. It must be conceded, though, that most other native plant life has disappeared under this regime.

It was the success of this mechanical treatment, however, that inspired a group of us in Santa Cruz to attempt to revive the "Arana Gulch tarplant." The plant indeed deserves this name, for it has been the subject of genetic analysis by Rexford Palmer, who has shown that this population is distinct from all others, scientifically confirming botanists' suspicions that phenological differences set it apart. The genetic dissimilarity of the Arana Gulch tarplant adds a sense of urgency to preserving its population there.

Arana Gulch would be a special place even without its tarplant. It is a sixty-acre island of protected habitat, surrounded by human development, at the top of the Yacht Harbor on the east boundary of the City of Santa Cruz. In 1994, after years of wrangling, the area became public property as part of Santa Cruz's greenbelt. It had been used as a grazing area since 1795. The remains of the foundation of the barn of the Live Oak Dairy, on one end of the fifteen-acre prairie, serve as a reminder of the more recent history. The dairy closed in the 1950s, but forty cattle roamed and grazed the prairie until 1988. That year, auto-mall tycoons bought the property, removed the cattle, and hired consultants to clear the legal hurdles for development. A botanical survey made the summer of that year revealed 100,000 Santa Cruz tarplants spread across six acres of habitat. Meanwhile, a coalition of neighbors and the city fought off the development, successfully upholding the zoning regulations of the greenbelt ordinance in court. But, after removal of the cattle, the tarplant declined rapidly, disappearing altogether in just two years. Then, for five years, the areas where the tarplant had grown were a sea of the usual criminals, among which the most prominent were Italian rye grass *Lolium multiflorum*, European oats *Avena* spp., and soft chess *Bromus hordeaceus*. Pampas grass and French broom began to encroach on the edges of the prairie.

Celebrations rang out through the community when, in 1994, the city acquired Arana Gulch. Botanists immediately convened to find funding and expertise for emergency operations to revive the tarplant. Aster-family seeds are not notoriously long-lived, but it was hoped that Santa Cruz tarplant seeds had hibernated for five years and could be germinated. Finally, in 1995, the City of Santa Cruz Parks Department took action, guided by the local chapter of the California Native Plant Society and the Department of Fish and Game. We all uttered sighs of relief when, that late spring, a bulldozer rolled onto Arana Gulch's prairie to perform an act of ecological surgery. The driver was guided into the heart of the area of the historical tarplant population. Then, as gingerly as a bulldozer has ever acted, the scraper pushed aside the very surface of the

soil and its accompanying thatch, baring three acres for the first time in seven years. Volunteers followed with hoes and spades and scraped a part of the area more deeply, clearing approximately an inch of soil from a fifty-by-fifty-foot plot.

A year later, 7,000 tarplants sprang forth across the entire cleared area. This pleasant surprise was foreshadowed by the appearance of a patch of artist's popcornflower *Plagiobothrys chorisianus*, a coastal-prairie species that is fast following the tarplant to extinction. The popcornflower had not appeared in any previous survey of the gulch. Also, lupines and owl's clovers burst forth with a carpet of native annual sedges and rushes. The more deeply disturbed, manually hoed area contained some of these other species at reduced density, suggesting that a more shallow disturbance was preferable.

Even so, with a few hours of bulldozer activity, the area was transformed. Three acres of what could have been dismissed as "non-native grassland" (and developed without mitigation per CEQA rules) were quickly changed into coastal-prairie grassland (a sensitive and regulated habitat) with a robust population of the state-listed Santa Cruz tarplant.

Late in the summer of 1996, after the thousands of yellow, resinous tarplant blossoms had gone to seed, an accidental fire destroyed the vegetation of half the scraped area. The fire was a blessing because city parks' staff was unable to perform management. The following year, in the spring of 1997, 35,000 tarplants resplendently blossomed with increased populations of lupine, owl's clover, and popcornflower. The wildflower field was neatly defined by the area bulldozed two years before, the more dense populations lying in the area of the "arson" fire.

Slowly having come to recognizing the need for continued experimentation in management of disturbance for the benefit of the tarplant, the city parks department, in the summer of 1997, orchestrated a prescribed burn across three acres that included previously untreated historic tarplant patches and overlapped somewhat the first year's bulldozer treatment. As one might expect, conducting a prescribed burn in such an urban reserve is controversial. So, firefighters burned very small strips at one time, following the flames closely with firehoses and creating a cool fire that in many areas left thatch and weed seeds intact. At this writing, there is little sign of the fire and the grass is well over knee high. Santa Cruzans wait with trepidation the blooming of the tarplant for this year's survey.

The lessons illustrated by this tale are many. In most remaining coastal-prairie habitat, the needs of the tarplant and a host of other annual wildflowers are not being met. These species have evolved with disturbance from large mammals and without non-native weeds. When these facts are ignored, we lose

species. The San Francisco popcornflower, artist's popcornflower, Sonoma spineflower, Pt. Reyes meadowfoam, Scotts Valley polygonum, Santa Cruz clover, and many other rare wildflowers are the first of what will become a long list of species disappearing because our coastal prairies are not being managed. Insects like Opler's long-horned moth *Adela oplerella*, blister beetle *Lyta molesta*, Bay checkerspot *Euphydryas editha bayensis*, and Ohlone tiger beetle *Cicendella Ohlone* will also disappear. To date, livestock grazing has been the cheapest, most reliable, and most successful method of prairie management.

My own preliminary research focussing on the relationship between annual native wildflowers and grazing in Santa Cruz County and at Pt. Reyes is very revealing. I found, by comparing areas grazed by cattle with adjacent areas from which cattle have been excluded, that where cattle graze, the diversity of the native annual wildflowers increases. The size and number of colonies of wildflowers also increase in grazed areas. I found twenty-three species of native annual wildflowers at five sites, seventeen of which existed only on the grazed side of the fence. In the only other Californian study of this kind, Davis and Sherman (*Madroño* 39:271-80) discovered a marked decrease in Sonoma spineflower in cattle exclosures at Pt. Reyes.

This scientific analysis is important to help bolster the observations of many who are concerned with the preservation of biodiversity, but it is showing us little that history could not teach us. At the turn of the century, in the heyday of Santa Cruz County's north-coast dairies, newspapers contain accounts of tourists travelling the coast road north out of town to view the spectacular fields of wildflowers. The cattle were removed in the 1980s after State Parks acquired those prairies. The result of the subsequent lack of management was the replacement of those wildflowers with thistles (mostly *Carduus pycnocephalus*), hemlock *Conium maculatum*, and radish *Raphanus raphanistrum*. Soon, velvet grass *Holcus lanatus* and tall fescue *Festuca arundinacea* will blanket the more-protected moist meadows, snuffing out even the remaining perennial wildflowers. The worst thing we can do for our coastal-prairie wildflowers is nothing at all.