CHAPTER 1

PROBLEM SPECIES

INTRODUCTION

The vegetational cover of an area will often greatly change when man's activities disturb the natural flora. In a park designed for public recreation, human activity can not reasonably be restricted, creating difficult and often expensive management problems as a result of interference with natural botanic growth and distribution. The Vegetation Management section of this paper concerns plant species listed by Neil Havlick of the EBRPD as problems on District parklands, and techniques for their management.

Defining a plant species as a problem depends upon many factors. Several of the varieties studied are non-native and, therefore, not representative of the "natural" vegetation of the area. Some native species are invading habitats where they were not previously found. A few species, being hazardous to park users, are incompatible with the intended park use. These and other factors may require action to control growth of the target species.

In 1976 the District adopted Vegetation Management Principles and Policies, a plan by John Nicoles (Land Management Specialist for the EBRPD) giving guidelines for management of District vegetation, in terms of both general philosophies and specific policies. Those policies include:

1) Indigenous species (defined as those plants occurring naturally on similar sites on the major topographic feature being considered) are to be preserved or reestablished when vegetation management programs are carried out.
2) Non-indigenous species should not be removed solely because they are non-native, but if removal is undertaken for other reasons they should be replaced by indigenous species.
3) Grassland should be favored as the vegetation type "where appropriate," because of its natural occurrence on that site, suitability for active recreation, and relatively low fire hazard.

Often there is more than one effective control technique for a plant species. The authors have attempted to make a choice of the most reasonable control scheme for each species, considering the monetary, personnel, public relations, legal, and ecological constraints of the EBRPD. Procedures for, and the effects of, some control techniques are also evaluated.

WEEDS AND GRASSES

Yvonne Harris

Weeds are simply "unwanted plants." However, "unwanted" implies human judgment and thus the connotation varies. A plant which may be a weed in one area, may not be necessarily so in another. Therefore, there are no species of "weeds," i.e., none that are actually always unwanted. For example, some crop plants become

weeds in alternate crops in the practice of crop rotation. Any plant species may become a weed in particular situations. A few species are nearly always obnoxious to man in environmental management, but none are entirely so. Some plants are considered weeds because they are poisonous to livestock or because they otherwise affect the quantity and quality of animal products. Others, such as poison ivy, are directly noxious to man. Weeds may also harbor insect pests, harmful rodents and plant diseases.

In some ways, though, weeds are beneficial. They reduce soil erosion on abandoned lands, add organic matter to the soil, provide food and cover for wildlife, yield useful drugs or delicacies, and beautify the landscape. Weeds are a factor in the management of all land and water resources, their impact falling heaviest on agriculture.

Thistles, especially artichoke thistle, yellow starthistle, and to a lesser extent, purple starthistle, have come to pose specific problems to regular park use in certain portions of the District. Though mustard, milk thistle, and other weedy grasses are prevalent in various parks throughout the district, they have not as yet been deemed problem species, as have the artichoke thistle and the yellow starthistle. Therefore it is these two problem species which are of major concern and consideration.

Vegetation management consists of fostering beneficial vegetation and suppressing undesirable vegetation, maintaining environmental conditions favorable to the preferred vegetation and least favorable to the weed plant. However, this cannot easily be done since there will be some unwanted species that share the same environmental requirements established for the desired crop. Thus in many cases, it is clearly a question of competition.

The East Bay Regional Park District (EBRPD) Master Plan and the Vegetation Management Policy clearly intend to favor native vegetation and "scenic, near-natural landscape conditions" (p. 1).[5] The Master Plan also refers to taking appropriate action in "protecting . . . from the adverse effects of man's activities (such as introducing exotic plants); replanting of native plant communities and the control of exotic plant communities" (p. 14).[4] Along with these, Vegetation Management policies include minimizing buildups of vegetation which would constitute undue fire hazards or maintenance problems, to provide animal habitat, and to support recreational use of the land. It was stated in the vegetation management pamphlet that the currently published study is limited in scope, focusing on trees and brush, and does not address all situations, specifically, weed infestations. Thus policies in weed-thistle-control are not firmly established and are just proposals, none of which have been accepted as yet.

Artichoke Thistle

The artichoke thistle (*Cynara cardunculus*) was imported from southern Europe where it was used as a food; however, it is a different species from the artichoke that is commonly used as food in America. It was introduced into the area near Benicia about fifty years ago.[8] Relatively little published information is available on this alien species regarding taxonomy or rates of growth, since the plant poses more of a problem in Argentine pampas. The extent of its North American infestation is concentrated on the West Coast.[3] It is commonly known as cardoon.

The thistle stems freely with branches 45 to 60 centimeters in height, but can grow much larger. Stems and undersides of the leaves are whitish in color, upper sides are green. There are long spines on the lobes and teeth of the leaves and on the head or floral part of the plant.

Because of the thistle's spiny nature and its habit of spreading into areas used for grain crop growth and/or grazing, forage has been made useless; livestock will not go into thickly infested areas. Ranchers, farmers, and horse owners expressly want to prevent the spread of thistles since they interfere with desirable forage and grains, in addition to being irritating to livestock. They are, of course, a nuisance to park users who find the thistles unpleasant in grassy recreation areas and a hindrance on hiking trails.

Artichoke thistle infestations occur in several parks in the district.[6] Areas of occurrence are in Briones, where it is found in scattered clumps throughout the western slopes of the park. There are small clusters in several places in Las Trampas where the thistle can be found at a stage requiring immediate attention. Two years of cutting artichoke thistle away from areas near the paved road to Rocky Ridge, without the aid of herbicides, has not provided adequate control. Perhaps the greatest area of concern is in Wildcat Canyon, where the thistle is out of control in the Belbum Canyon section of the park. It makes up roughly 70% to 90% of total vegetation cover in the area. It also heavily infests the west-facing slopes in the middle of the park, other parts of the north half of the park and adjacent private property. In the Diablo Foothills the thistle problem has been somewhat controlled on the former Ford property by use of herbicide application (2,4-D), but the city of Walnut Creek property to the west has a serious uncontrolled population.[6] Other parks have occasional occurrences of thistles, but no presently apparent problems.

The objections to thistles in the parks is based on the fact that some varieties, of which the artichoke and yellow starthistle are included, are particularly noxious, persistent, and once established, increase their range extensively enough to take over large acreages of grassland.

Several methods of control have been suggested and attempted for the EBRPD thistle problems: cutting, proper grazing management, and herbicide use. None has been completely satisfactory so far. A commercial proposal to collect artichoke thistles in Wildcat Canyon was rejected last year because the cutting and transporting of flower heads was felt by the County Farm Advisor to pose a hazard by spreading seed inside and outside of the park.[6]

Proper grazing management alone cannot stop the spread of thistle once a nucleus thistle population is established. Therefore methods of control and eradication must be employed, whether it be by physical removal, physical manipulation, or chemical herbicides.

In areas where the artichoke thistle population is small, there has been limited success with chopping out the thistles. But in areas where the problem patches exceed the number of grounds personnel expendable to deal with the infestations, manual removal would prove overly time consuming and expensive.

Herbicides, specifically Tordon (Picloram), have been experimentally used to fight the artichoke thistle encroachment. Tests were successful, however, application must often be extended over a period of three or more years in heavily infested areas. Costs for a program of artichoke thistle eradication for

an estimated acreage in Contra Costa County of approximately 7,000 acres, were $222,700 for an 8 year program. 2,4-D is also successful on thistles, but a much larger quantity is required compared to Tordon, making it proportionally more expensive to use. And of course in the use of chemical control mechanisms, environmental effects must also be taken into consideration. Restrictions imposed on Tordon use are due to its being a potent herbicide which can damage plantings and crops if it spreads away from a target area. Though it is not toxic to grasses or animals, movement of livestock and protection of water surfaces from contamination is necessary before its application.

Burning, as a method of control, has a greater potential for success, during a wet fall season. This method therefore was appropriately excused during the past drought years, but may again be considered if the normal cycle of seasonal precipitation returns.

Yellow Starthistle

The yellow starthistle (*Centaurea solstitialis*) naturalized from Europe and is the most widely distributed of starthistles. Usually it is found in the Sacramento Valley, the north Coast Range, the Bay region and south. There are about 350 species in the genus Centaurea, mostly natives of the Old World, and all herbaceous in form.[8] Another name for the thistle is "Barnabys thistle."

The yellow starthistle is an annual plant which usually grows to a height of 30 to 75 centimeters. It has rigid, spreading stems that are branched from the base. Stems are somewhat whitened with a loose, cottony wool, as are the leaves. Flowering heads are solitary (around 2 1/2 cm. long) at the ends of branches. The bracts of the head are armed with long, rigid spines. The flowers are a bright yellow with numerous slender, white soft bristles at the tip of the seed. The seed is spread by many different agents. Like the artichoke thistle, the yellow starthistle is a nuisance on grazing land.

In the EBRPD rampant infestations of yellow starthistle occur in Briones over the valley floors throughout the park. There are presently no other areas of immediate concern for this species, but its occurrence in Briones and its characteristic pattern of expansion, indicates that it may become a problem within the district.

The objections to this thistle are the same as those against the artichoke thistle, but with an additional threat. The starthistles contain alkaloids which, if consumed in large quantity, are toxic to horses.

Methods of control for this thistle are more numerous than those for the artichoke thistle; mowing, grazing, herbicides, burning and combinations of these methods have been used successfully on similar weed species. Currently alternatives to mowing infested areas are being tested at Briones.

Cattle eat the young starthistle sprouts, which would seem beneficial in that it reduces the number of plants before they reach the seeding stage. However, the starthistle resprouts and matures after the cattle are removed. Thus a logical solution would be to let the cattle remain. Yet this course of action could possibly lead to overgrazing of the area, creating the appropriate conditions of disturbance required for thistle colonization. Therefore, burning may also be a disadvantage in that it, too, leaves exposed ground, thus an invitation to thistle invasion.

Physical removal of the starthistle is not feasible because its spread is much too quick to be dealt with manually. The mowing practices currently undertaken in areas of recreational use in Briones have not stopped thistles from reaching maturity. Though thistles are cut down before the seeding stage, infestations recur nonetheless. It has been proposed that with proper timing, grass growth could get ahead of thistles and shade out the thistles.[6] Another possible means of control is discing and seeding. Fall discing and re-seeding with either lana vetch or rye grass could be successful against yellow starthistle during a normal rainfall season. This may be possible in the upcoming year.

Burning and perhaps discing and reseeding can control yellow starthistle without the use of chemical herbicide application, which would involve widespread spraying and thus more danger of contamination of water sources and spread with susceptible species of desired vegetation. However, weather conditions would have to be favorable and accurately predicted for these non-chemical methods to work.

Pampasgrass

Bunchgrasses are densely tufted with leaves mostly at the base and erect or somewhat spreading culms or stems. Most bunchgrasses are adapted to dry soils. Certain individual bunchgrasses may live extremely long, up to 100 years.[2]

Bunchgrasses usually produce an abundance of seed, and it is the seed that maintains the species in a given area and allows it to spread to other areas. Tufted grasses commonly develop a strong, fibrous root system that deeply penetrates the soil. It is through this intricate network that the growing plant receives its water and minerals. This system also serves as an erosion deterrent, holding soil particles firmly in place.

Such dense grass cover, including pampasgrass, greatly reduces the erosional effects of wind and water while providing a pleasing landscape, unless it spreads into areas of preferred alternatives.

Pampasgrass (*Cortaderia selloana*) is a robust perennial bunchgrass, which forms large clumps and mounds of foliage 1 to 2 meters high. It was introduced from South America where it is a native in Brazil, Argentina, and Chile. It is widely planted as an ornamental in California, some forms producing a little seed and becoming naturalized, especially along the coast.[1] There are ten species in the genus *Cortaderia*, a hygrophilus-woodland associated grass.

Pampasgrass has long tapering culms up to 4 meters tall, flat blades to 1.5 meters in length, a midrib raised on the undersurface and strongly scabrous on the margin. The panicle, flowering structures, are plume-like silky-white to purplish, and can be as much as 90 cm. long.[2] The attractive panicles, which give the plant its majestic appearance, are produced in the late summer or fall.

Infestation of pampasgrass in the EBRPD is not as widespread as that of thistles, and it actually is not a major problem of vegetation management. There are no specific areas where its occurrence interferes substantially with normal park use. However, objections are made against commercial and amateur removal, which like the artichoke thistle, could spread unwanted seed inside and outside of the park. Rampant spread would of course be detrimental to regular park use and management due to the size and

hardiness of the plant. It could easily compete with and shade out shorter desired grasses if it became well established.

Control of pampasgrass also would not be as easy nor as economical as thistle control, due to the sturdiness of this perennial whose propagating mechanisms are imbedded in the soil as well as above the ground in the seeds. Methods of digging and killing roots would have to be employed along with destroying top coverage, thus entailing increased labor and expense.

Summary

Presently certain areas of various parks are being studied and documented for rates of expansion of problem weed species. In Wildcat Canyon artichoke thistle problem areas are being photographed and measured, densities calculated, and overall scope of nuisance determined.[7] Data obtained in the studied area will be referred to in following years for estimated rates of growth and expansion, and perhaps an acceptable control program. In Briones test plots are set up to measure effectiveness of various non-chemical methods of controlling yellow starthistle. Besides the regular annual mowing, areas of mowing and burning are also being used. One area has been set aside where no means of control is being used.[7] Detailed study and data were not previously considered essential in overall vegetation management planning, but due to current infestations and questions of control and eradication, the forthcoming information from the new research and experiments should be beneficial and add substantial knowledge to vegetation management policies.

Sound grazing management is the main area of concern where livestock are used. Physical removal of small thistle invasions should be immediate before there is too much of a chance of widespread infestation. Herbicide use should be looked at more objectively and weighed more heavily regarding effectiveness and subsequent environmental dangers. But perhaps most important is the issue that each problem area should be re-evaluated annually, testing effectiveness of attempted methods of control and alternatives. Experimental burning, chemical treatment, and other methods should be carried on for several years consecutively, since a true evaluation of effectiveness cannot be made if one method is used one year and another is used the next year.

Other areas with similar environmental conditions and vegetation management practices and policies should be examined to see whether the species are a problem in that area.

Can the problem species be prevented from spreading to uninfested areas by better planning (for example, replacing disturbed areas before unwanted vegetation has a chance to get established? Why were areas disturbed in the first place? Accident? Poor Management?)

A point to consider would be the issue of no control at all. Just how much of a problem would the plant be if park management priorities continue to push weed control to the bottom of the list? Could the plant serve some useful purpose if allowed to take its successional course? In the case of the annual starthistle, which is the primary invader of disturbed lands, it can lead the way for more

favorable, desired perennial grasses. However, the succession process, being gradual, would not be efficient for current, immediately needed solutions. Another point to examine would be alternative uses for the weeds - yellow starthistle is a good honey-plant.

Continued evaluations and research, along with assessing methods used in other areas and counties may yield a satisfactory solution, given the funds and time and cooperation of the public users as well as park administrators.

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