ELEMENT STEWARDSHIP ABSTRACT
for

Foeniculum vulgare

Sweet Fennel

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The Nature Conservancy
Element Stewardship Abstract
For *Foeniculum vulgare*

I. IDENTIFIERS

Common Name: SWEET FENNEL Global Rank: G?

General Description:
Foeniculum vulgare is a perennial herb, 1 to 2 m tall with strong anise-like odor.

Diagnostic Characteristics:
In California, fennel can be distinguished from other members of the Umbelliferae by its strong anise-like odor. Seedlings have strap-shaped cotyledons that are several times longer than wide. The first and subsequent leaves are pinnately compound into filiform divisions, as are the adult leaves.

II. STEWARDSHIP SUMMARY

Information on controlling and/or eradicating Foeniculum vulgare infestations is limited. Among mechanical means, deep cultivation could be successful. Mattocking is promising on smaller infestations. Herbicides proven successful in controlling fennel include picloram and 2,4-D.

Foeniculum vulgare is usually found in areas so disturbed as to be of low ecological quality. However, restoration may be desirable. All removal methods reported here are somewhat disruptive; nonherbicide methods are recommended, but only if the effected area is small. In any case, revegetation should be considered as part of the treatment program.

III. NATURAL HISTORY

Range:
Foeniculum vulgare is native to southern Europe and the Mediterranean region (Parsons 1973). It has been used for medicinal and culinary purposes at least since Roman times (Garland 1979). It has become naturalized in temperate areas around the world, especially in limey soil near the sea (Garland 1979). It escaped cultivation in the early history of the United States and is now a weed of waste places, roadsides, riverbanks, and other nonagricultural situations (Parsons 1973). Little is known about its introduction to California, where it has become quite abundant. It is especially well established in the central and southern areas of the state (Robbins et al. 1941).

Habitat:
Foeniculum vulgare seems to tolerate sandy dry soil better than fertile loam, and it seems to prefer acid rather than alkaline soil. Germination occurs within about two weeks at a temperature of 18 C. It can tolerate a range of annual precipitation from 0.3 to 2.6 m and soil pH from 4.8 to 8.3 (Simon et al. 1984).

Reproduction:
Foeniculum vulgare has the capacity to reproduce from both its crown and its seeds. "The seeds germinate at almost any time of the year, but plants generally do not flower until 18 months to 2 years. Once a plant is established, flowering stems are produced from the perennial crown each spring. Flowering commences in May and may continue into September. Seeds are produced during the summer and autumn, and the flowering stems die back during winter to be replaced by new growth in late winter. Some stems stay alive towards the base and produce new leaves from nodes along the stems during the winter. New leaves are also produced in winter at the base of the plant" (Parsons 1973).

Dispersal of the seeds by water is of considerable importance and accounts for the occurrence of Foeniculum vulgare along watercourses. Other means of dispersal include vehicles, machinery, wool, animal skins, clothing, mud, and agricultural produce (Parsons 1973).

Reproduction by root division is common knowledge among gardeners interested in increasing their supply of Foeniculum vulgare. This adaptation allows the species to become well established and invade new areas. Occasionally, pieces of fennel crown or root are dragged by cultivation equipment or spread by earthmoving machinery into uninfested areas (Parsons 1973). More commonly, water systems will spread fennel root systems during times of high water.

Impacts:
Fennel is not usually found in grazed pastures and will establish itself only in neglected situations such as roadsides, vacant blocks, headlands, etc. Once firmly established it excludes almost all other vegetation, and because of its strong smell, it is not grazed by animals" (Parsons 1973). Where established, Foeniculum vulgare is persistent and difficult to eradicate. It appears to establish in areas of heavy disturbance, where it will quickly occupy available space. It does not appear to be aggressive in invading lightly disturbed or undisturbed natural areas. Management practices that open up and disrupt the soil are likely to encourage fennel growth and establishment.

IV. CONDITION

V. MANAGEMENT/MONITORING

Preserve Selection & Design Considerations:

Where established, Foeniculum vulgare is persistent and difficult to eradicate. Since recovery potential is not known, the presence of extensive patches should be carefully considered in future land acquisition decisions.

Management Requirements:
This species requires active management to control and/or eliminate it. Researched methods of control are listed below.

The following are methods of control that have been practiced in the past. Literature in this field is scanty at best. Most publications on Foeniculum vulgare address how to suppress weeds that invade it in agricultural situations (without damaging it). Many publications are from countries that cultivate it (India, Egypt, Russia) and are not written in English. Any additional information will be appreciated.

Manual/Mechanical control: Parsons (1973) suggests that deep cultivation is effective in killing Foeniculum vulgare, but he goes on to say that it is seldom practical because of the kinds of situations in which the plant occurs. Mattocking, though more labor intensive, has proven successful and is more practical than deep cultivation for small infestations. Since highly disturbed ground is conducive to reinfestation, immediate revegetation is needed to prevent the re-establishment of fennel.

Chemical control: "Fennel is susceptible to sprays containing 2,4-D (80% a.i.), which should be applied by spot spraying at a dilution of one part in 400 parts of water. Application should be done when the plants are actively growing but before the flowering stage. Care should be taken to wet the plants thoroughly, particularly the crowns" (Parsons 1973).

Other published chemical treatments of control include a combination of picloram applied at flowering (Patterson 1967).

Biological control: No biological controls are known.

VI. RESEARCH

Management Research Needs:
1. Is digging Foeniculum vulgare out by hand a feasible method for eradicating large areas?
2. What chemicals will destroy Foeniculum vulgare? Any organics?
3. Would mowing several times during the summer be effective for eradication?

VII. ADDITIONAL TOPICS

VIII. INFORMATION SOURCES

Bibliography:

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IX. DOCUMENT PREPARATION & MAINTENANCE

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