

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

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A PROPOSAL FOR A WINDBREAK-WOODLOT IN CALIFORNIA

There is a strong continuing need for windbreaks for a majority of California. There is also an increasing interest and plantings of woodlots for fuel wood (firewood) in California.

There are a number of species that produce considerable volume during a relative short rotation and have the ability to regenerate a new stand by coppicing (stump sprouting). The more important species would be selected species of Eucalyptus, Casuarina and the hybrid poplars.

Fast growth, the ability to resprout and need for firewood especially for home and farm use suggest opportunity to combine firewood production into windbreak planting (Farmstead and Feedlot Windbreaks and Field Windbreaks) and Windbreak Renovation.

There are a few design criteria that would be necessary to provide continuous windbreak protection. Briefly these would be:

1. Plant a two row windbreak at a minimum.
2. Only harvest one row or portion of one row at a time.
3. The two rows would be of the species Eucalyptus, Casuarina or hybrid poplar. Other species could be used but are not considered in this example because of slower growth or other values not suited to windbreaks or firewood production.

To illustrate this proposal, the following is an example of a farmstead windbreak that could also produce firewood for on-farm use.

Length - 660' (0.25 mile)

In row spacing - 6' (plant on offset centers)

Between row spacing - 10' (may be altered to allow for equipment)

Approximate area occupied - .24 ac

Species planted - Eucalyptus globulus - blue gum

Trees per planting - 220 (order 40 extra for culling)

10 year rotation - starting in year 10, cut 22 trees per year, always in row

Tax advantage - IRS rules state that windbreaks can be expensed the year of planting (Soil and Water Conservation measure). The amount allowed is limited to 25% of gross farm income.

Site Index - 85 (Standiford)

Firewood harvested will be home/farm use - no sales

The following table was developed by Reinhart and Standiford, 1983.

SITE INDEX - 85			TREES/ACRE: Initial = 680; Surviving = 519					
Age (years)	Average Diameter (inches)	Basal Area Ft ² /AC	Yield		Mean Annual Incr.		Current Annual Incr.	
			Ft ³ /AC	Cds/AC	Ft ³ /Ac/Yr	Cds/Ac/Yr	Ft ³ /Ac/Yr	Cds/Ac/Yr
2	1.8	9.5	60.2	.7	30.1	.3		
4	4.1	48.8	813.5	9.0	203.4	2.3	376.6	4.2
6	5.5	84.2	1937.9	21.5	323.0	3.6	562.2	6.2
8	6.3	110.6	2990.9	33.2	373.3	4.2	526.5	5.9
10	6.8	130.3	3880.6	43.1	388.1	4.3	444.8	4.9
12	7.2	145.4	4616.3	51.3	384.7	4.3	367.9	4.1
14	7.5	157.2	5225.8	58.1	373.3	4.1	304.7	3.4
16	7.7	166.6	5735.1	63.7	358.4	4.0	254.7	2.8
18	7.8	174.4	6165.3	68.5	342.5	3.8	215.1	2.4
20	8.0	180.9	6532.6	72.6	326.6	3.6	183.7	2.0
25	8.3	193.1	7249.8	80.6	290.0	3.2	143.4	1.6
30	8.4	201.7	7771.1	86.3	259.0	2.9	104.2	1.2
35	8.6	208.1	8166.3	90.7	233.3	2.6	79.0	.9
40	8.7	213.1	8475.8	94.2	211.9	2.4	62.0	.7

Reinhart and Standiford, 1983, also developed a general relationship between site index and soil-site characteristics.

Approximate Site Index

Soil-Site Characteristics

Greater than 93

- Soils - loamy-sandy loam
- deep bottomland
- Agricultural quality--high
- Water table--near surface during most of the year
- Slope - flat

65-93

- Soils - sandy-sandy loam
- Agricultural quality--fair to good under irrigation
- Water table--low; irrigation required
- Slope--medium to flat

Less than 65

- Soils - sandy, adobe
- Agricultural quality--low
- Water table - low; irrigation infeasible
- Slope - steep
- Windy

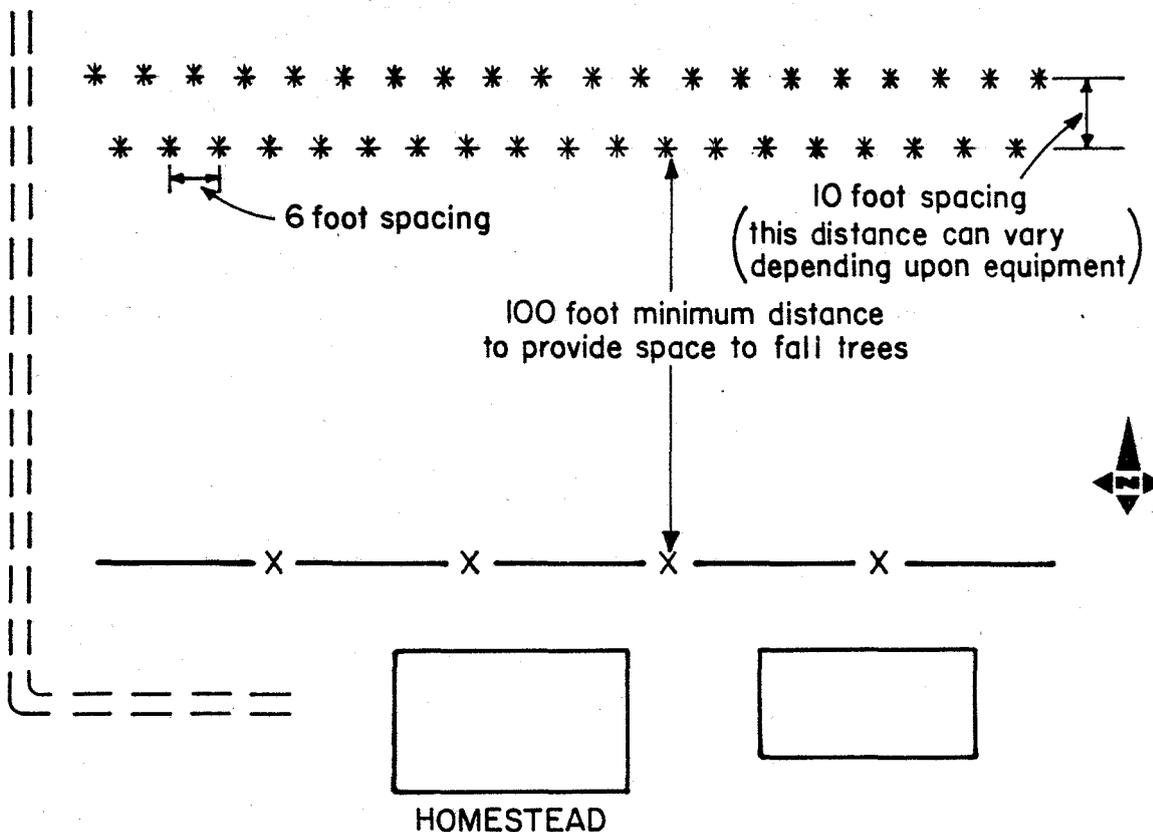
A listing of costs per acre that were developed by the SCS in California was used to develop cost return information for this example. The costs for the example are as follows:

Site Preparation.....	\$ 36.00
Herbicide spray (weed control).....	20.00
Tree Planting 220 trees + 40 extras x .25/tree + .25/tree planting (may not be needed, depends on nursery stock).....	120.00
Replanting mortality loss for 1 year (year 2) 35 trees @ \$1.00/tree discounted to present value (yr. 2 = 31.25).....	31.00
Followup with herbicide for weed control for year 2, 3, 4 @ .20/tree.....	150.00
Irrigation system (Drip) installed by Cooperator @ \$1.25/tree.....	275.00
Irrigation costs (water only 2.0 acre feet @ \$40/ac ft.....)	20.00
	<u>\$675.00</u>

Annual Maintenance

Maintenance of Isolation Strip.....	\$36.00
Disk	
Irrigation Costs.....	<u>40.00</u>
	\$76.00

SAMPLE DIAGRAM



Firewood Yield

22 trees/year - beginning @ age 10

(it is recognized that before the first rotation is completed 22 trees will be 20 years old. These yield figures are based on the age of 10 year harvest.

- ° DBH per tree @ 10 years. 6.8" round to 7.0" (Reinhart and Standiford)
- ° Volume (cubic feet) per tree 7" DBH @ 80' (Calif. Ex Bull. #380) = 9.44
- ° Harvest per year 22 trees x 9.44 = 207.68 cu. ft.
- ° Harvest per year in cords 207.68 - 90 cu. ft./cord = 2.3 cords

Yield figures are estimates only. Little, if any, research results have been gathered or published for irrigated and managed eucalyptus woodlot plantings.

New plantation of selected eucalyptus species are being scheduled for 5 year rotation. If some of the faster growing species are adapted to the planting site, the yields could be greatly increased.

In summary, a two row Eucalyptus globulus windbreak 660' long will provide at 10 years:

- ° Complete wind protection for 800 to 850 feet
- ° A yearly firewood harvest of 2.3 cords per year and not reduce the effectiveness of the wind barrier.
- ° Cost of establishment may be offset through cost-share form ACP, and
- ° The establishment costs can be deducted the year of planting from Federal Income Taxes.

The production of firewood on a continuing basis beginning at year 10 should provide an additional incentive for landowners to install this design of windbreaks.