

STEWARDSHIP INCENTIVES PLAN

for

SCOTT AND DEANNE DAY  
14651 Hayesmount Mile Road  
Brighton, CO 80601  
(303) 637-0447

Lot 4,  
Hayesmount Acres Subdivision.

(10.5 Acres)

Prepared By:

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January 2, 1996

This management plan has been prepared at our request to guide our Stewardship management activities which we voluntarily apply on our property. We believe that activities recommended in this plan are appropriate to meet our objectives and will benefit the natural resources on our property. We intend to apply the recommended practices and to maintain them for a period of at least ten years, thus helping us to be good stewards of the resources entrusted to us on our property.

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Scott and Deanne Day

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Date

STEWARDSHIP INCENTIVES PLAN

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## OBJECTIVE

To provide wind protection to a new house, visual barriers along the road, wildlife shelter for small animals and a nesting site for ground birds.

## DESCRIPTION

The property is located in Adams County on the west side of Hayesmout Mile Road, about 1 mile south of Bromley Road.

The property contains 10.5 acres. It was formerly a field used for row crops, now being converted to residential use. Most of the property will continue to be used for agriculture, mostly for the growing of hay. The new house is located just west of the geographic center of the property.

Annual precipitation is about 15 inches.

Bedrock is a Cretaceous Age deposit of Pierre shale, 10,000 feet thick.

The soil is Vona loamy sand, an eolian (wind) deposit with a layer of lime at a depth of 40 inches. This soil does not hold staples well and weed barrier needs to be carefully anchored. If disturbed, the soil tends to blow away. Weed barrier, anchored by covering with soil frequently pulls loose and blows away. The porous nature of these soils allows water to drain rapidly, making the use of weed barrier and/or supplemental watering desirable.

## INVENTORY

Currently, there is no woody vegetation on the property.

## WILDLIFE

There is an opportunity to provide nesting sites for ground nesting birds by leaving a 50-foot grass strip along the sides of the windbreak and thickets. At the moment, wildlife use of the site is minimal.

No threatened or endangered species have been observed, but the property is within the winter range of the bald eagle and in an

area used by the interior least tern; although, no self-respecting tern, a water bird, would do anything more than fly over it.

## PLANTING PROJECTS

## South Line (Planting U):

Purpose: A hedgerow planting to block the line-of-site to the road on the southeast.

Description: This is a single-row planting along the property line. It is 467 feet long and 20 feet wide, including 10-foot buffer strips on each side. It occupies 0.2 acres. It consists of 77 Rocky Mountain junipers on a six-foot spacing located 4 feet from the property line.

Costs for this planting are estimated below:

77 Rocky Mountain junipers @ \$0.94 ea.:	\$ 72.38
700 Staples @ \$0.065 ea.:	45.50
1.6 6' rolls Weed Barrier @ \$100.00/roll:	<u>160.00</u>
SUB-TOTAL	\$ 277.88
Sales Tax (3%):	<u>8.34</u>
TOTAL, MATERIALS:	\$ 286.22

You can plant this windbreak yourself for the costs shown above. Should you wish to hire CSFS to plant it, labor charges would work out as follows:

LABOR, PLANTING; 77 trees @ \$2.00 ea.:	\$ 154.00
LABOR, WEED BARRIER; 1.6 rolls @ \$100 ea.:	<u>160.00</u>
LABOR:	\$ 314.00

This practice is eligible for up to \$85 in SIP cost-share money. CSFS will apply a credit to the labor charge if you wish to provide people to work with us in doing the planting.

## East Hedgerow (Planting Q):

Purpose: To provide a visual barrier along the road.

Description: This is a three-row planting. It is 313 feet long and 36 feet wide, including 10-foot buffer strips on each side. It occupies 0.3 acres. The outer (eastern) row consists of 78 American plums on a four-foot spacing and is located four feet west of the utility easement. The inner (second) row is located eight feet from the plum row and consists of 52 Rocky

\$240

Mountain junipers on a six-foot spacing. The inside (western) row is eight feet east of the second row and consists of 39 ponderosa pines on an eight-foot spacing.

Costs are estimated below:

78 American plums @ \$0.41 ea.:	\$ 31.98
52 Rocky Mountain junipers @ \$0.94 ea.:	48.88
<u>39 ponderosa pines @ \$0.94 ea.:</u>	<u>36.66</u>
169 Sub-total:	\$ 117.52
1400 Staples @ \$0.065 ea.:	91.00
3.1 rolls Weed Barrier @ \$100.00/roll:	<u>310.00</u>
Sub-total:	\$ 518.52
Sales Tax (3%)	<u>15.56</u>
Total, Materials:	\$ 534.08

LABOR, PLANTING; 169 trees @ \$2.00 ea.:	\$ 338.00
LABOR, WEED BARRIER; 3.1 rolls @ \$100 ea.:	<u>310.00</u>
LABOR:	\$ 648.00

Again, you can save money on the labor charge by providing people to help.

This project can qualify for up to \$57 in SIP cost-sharing.

#### Farmstead Windbreak (Planting L):

Purpose: To protect the house and farmstead from wind.

Description: This planting occupies 0.4 acres; it is approximately 410 feet long by 36 feet wide. It too is a three-row planting. The tall row in this design is ponderosa pine, but if supplemental water is available, cottonwood, which grows faster, might be substituted for it. A drip system would be the most conservative with water and the easiest to use. Both ponderosa pines and cottonwoods are resistant to high calcium and high pH.

Costs are estimated below:

102 American plums @ \$0.41 ea.:	\$ 41.82
68 Rocky Mountain junipers @ \$0.94 ea.:	63.92
<u>51 ponderosa pines @ \$0.94 ea.:</u>	<u>47.94</u>
221 Seedlings:	\$ 153.68

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4.1 rolls 6' Weed Barrier @ \$100/roll:	\$ 410.00
1865 staples @ \$0.065 ea.:	<u>121.22</u>
Sub-Total:	\$ 684.90
Sales Tax (3%):	<u>20.55</u>
Total, Materials:	\$ 705.45

LABOR; Planting; 221 trees @ \$2.00 ea.:	\$ 442.00
LABOR; Weed Barrier; 4.1 rolls @ \$100 ea.:	<u>410.00</u>
Total, Labor:	\$ 852.00

\$400

This planting is eligible for up to \$400 in cost-sharing support.

Southwest Plum Thicket (Planting S):

Purpose: To provide wildlife with escape cover to ameliorate the predator-lane effect of windbreaks and to provide a food source for song birds.

Description: The planting contains about 0.1 acres. It is triangular and located in a right-angle corner where plantings L and T meet. It is 93 feet on a side and 135 feet across the hypotenuse.

Costs are detailed below:

252 American plums @ \$0.41 ea.:	\$ 103.32
2.7 rolls weed barrier @ \$100 ea.:	\$ 270.00
1000 staples @ \$0.065 ea.:	<u>65.00</u>
Sub-Total, Seedlings and Materials:	\$ 438.32
Sales Tax (3%):	<u>13.15</u>
TOTAL, Seedlings and Materials:	\$ 451.47
LABOR; Planting; 252 trees @ \$2.00 ea.:	\$ 504.00
LABOR; Weed Barrier; 2.7 roll @ \$100 ea.:	<u>270.00</u>
TOTAL, Labor:	\$ 774.00

\$280

This planting is eligible for up to \$280 in cost-sharing money.

South Pine Thicket (Planting T):

Purpose: To provide escape cover for wildlife to ameliorate the predator-lane effect of the windbreak.

Description: This planting occupies 0.1 acres. It is triangular, being 93 feet on a side and 135 feet across the diagonal. It consists of 68 ponderosa pines

\$280

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(Ponderosa pine is used because of the open branching pattern preferred by doves as nesting sites.).

Costs are detailed below:

68 ponderosa pines @ \$0.94 ea.:	\$ 63.92
2.7 rolls weed barrier @ \$100.00 ea.:	\$ 270.00
1000 staples @ \$0.065 ea.:	<u>65.00</u>
TOTAL, Seedlings and Materials:	\$ 398.92
Sales Tax (3%):	<u>11.97</u>
	\$ 410.89
LABOR; Planting; 68 seedlings @ \$2.00 ea.:	\$ 136.00
LABOR; Weed barrier; 2.7 rolls @ \$100 ea.:	<u>270.00</u>
TOTAL, Labor:	\$ 406.00

This planting is eligible for up to \$280 in cost-sharing money.

## FORESTER'S NOTE, PLANTING COSTS

Machine planting costs are half of hand-planting costs. Some money could be saved this way. Also, machine application of weed barrier is a lot cheaper than laying it by hand, but there are some trade-offs.

Once the site is disturbed by machines, sand soils won't hold a staple. Sand used to cover edges of machine-laid weed barrier just blows away, followed by the weed barrier. On sandy soils, machine-laid weed barrier needs to be covered with gravel (expensive) or heavy wood chips (free from Public Service; you have to lay them yourself). You could hire CSFS to supply the chips and lay them, but savings from using machines is eaten up by laying wood chips.

Also, with funding cut-backs, CSFS' tractor, planter and weed barrier machine have not been replaced as they wore out and maintenance needs have reached the critical level. These machines may not be available this coming year.

Hand-planting costs may not be quite as high as projected, either. If you hire CSFS to do the work, I will keep track of the hours worked and bill you at \$24 per hour, or \$2.00 per tree, whichever is less.

A possible compromise is to hire the planting done by machine (if available) and level the site by hand before laying weed barrier. This will bring planting costs to about \$1.00 per tree. Leveling is fairly simple: it takes a good hoe or McLeod and the

site doesn't have to be all that level. You could probably do 1000 feet of row per day, by yourself.

One draw-back of machine planting is the irregular spacing of the trees: this creates gaps in the planting that have to be filled with trees the following year (Wind blows harder through the gap than it does on the open plain.). Also, while adequate, machines don't do as good a job as a conscientious hand planter and have higher mortality rates and poorer first- and second-year growth as a result. They do loosen the site up better and the survivors often have better growth during the third-to-fifth years. Sandy soils are already pretty loose, so the improved third-to-fifth-year growth is not as great as it is on heavier soils.

You can reduce or eliminate labor costs by doing the work yourself. You can also reduce CSFS' labor charges by working with us as a member of the crew (You need to be available on our schedule.).

The plantings should probably be installed in bight-sized pieces over several years. If you do not use cost-sharing, there are no restrictions on which ones you do or in what order. If you use SIP cost-sharing, you must do the two wildlife thickets first (or at the same time as another planting). That way, you won't put yourself in danger of breaking any rules of the if-you-do-A-you-must-do-B variety. After that, you can install whichever plantings you like in whatever order you like and still be eligible for cost-sharing on all of them.

CSFS usually over-plans planting projects; this plan is no exception. This is partly because we are true believers where trees are concerned and partly so that anything you might want to do is already planned and you won't have to lose cost-sharing or other benefits because you aren't ready to take advantage of it when the opportunity arises.

#### MAINTENANCE

The use of weed barrier just about eliminates the need for maintenance if it can be placed by mid-June (preferably June 1st). The only thing needed is an occasional inspection tour to re-anchor weed barrier that comes loose. Watering will increase survival and growth, but it is not needed in most plantings.

You can expect about 15% loss during the first year a planting is in the ground. One year after planting, surviving seedlings usually look terrible, but recover quickly. Shrub thickets can tolerate about 30% loss without replanting, but windbreaks must be replanted if they suffer even minor losses to keep from losing their effectiveness. By the third year, transplant losses should



no longer be a problem. A seedling is considered established after surviving five years.

Gaps in a windbreak are disastrous - wind blows harder through the gap than it does on the open plain. Gaps wider than 1.5 times the specified spacing should be filled with trees at the next maintenance planting.

There are a number of things that should be done to enhance seedling survival and growth: Grass is a vigorous competitor with tree seedlings. It drinks up water and adds compounds to soil to poison competition. Seedlings grow much better if they don't have to fight it. Weed barrier is a woven plastic cloth. It kills grass. Laid around tree seedlings, it provides needed relief from competition. It is expensive (\$2.00 per tree for widely-spaced trees). It is cheaper if seedlings are placed close together (like plums).

CSFS will be glad to help with maintenance if you ask, but it is your responsibility. The above price estimates do not include things like re-anchoring weed barrier after a storm, or watering seedlings should drought threaten the planting during the first summer (Although, this can be arranged.).

The plantings are designed as a "mix-and-match" group. No one planting is critical to the effectiveness of any other. Thus, you are able to pick and choose in any combination without loss to other plantings.

There are some things, like bulk-purchasing, that can be done to reduce cost. Also, by doing some of the work yourself, costs can be further reduced.

Yes, this is expensive; but I have noticed that people whose plantings fail because they took short-cuts to save money, forget all about the savings as soon as the tree dies and blame the nursery or the contractor (anybody but themselves) for its failure. Nobody counts the cost when they look at a planting that has been in the ground twenty years; they're just glad they planted it.

With these plantings you can have a beautiful and functional home and landscape. I hope CSFS can be a part of your program.

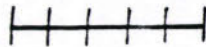
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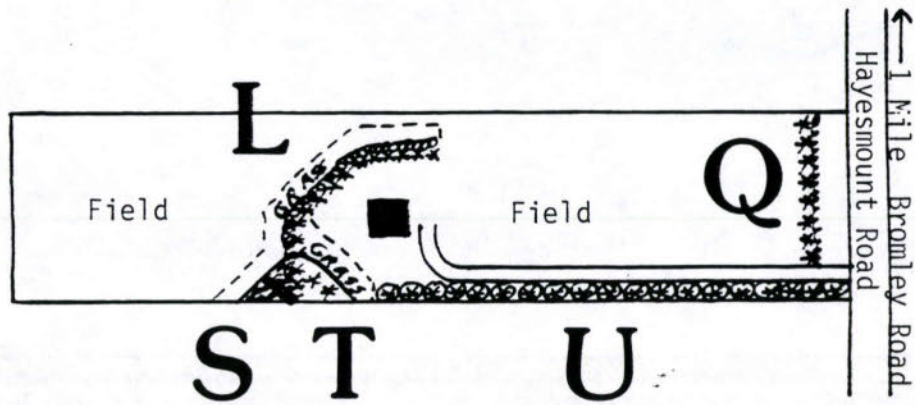
Douglas J. Stevenson  
Assistant District Forester









# Scott & Deanne Day

330 Feet



5 Chains



-  Property Line
-  Road
-  House
-  Windbreak
-  Visual Barrier (Hedgerow)
-  Juniper Hedgerow
-  Plum Thicket
-  Pine Thicket

Drawn By: *Douglas Stevenson*

January 2, 1996

PONDEROSA PINE (Pinus ponderosa Laws.)<sup>1</sup>

## BOTANICAL FEATURES

**Needles** in 3's, or 2's on the same tree, 5" to 11" long, dark gray-green to yellow-green, flexible, persistent until the 3rd season. Crushed needles have a turpentine odor similar to that of most other pines.

**Cones** 3" to 6" long, ovoid to ellipsoidal, sessile, solitary or clustered; usually leaving a few basal scales attached to the twig, when shed; apophysis dark reddish brown to dull brownish yellow, transversely ridges and more or less diamond-shaped; umbo dorsal, with a slender, often deciduous prickle; seeds  $\frac{1}{4}$ " long, ovoid, slightly compressed toward the apex, brownish purple; wings moderately wide, about 1" long; about 12,000 (6,900-23,000) seeds to the pound.

**Twigs** stout, exhaling a turpentine odor when bruised; buds usually covered with droplets of resin.

**Bark** brown to black and deeply furrowed on vigorous or young trees (bull pines); yellowish brown to cinnamon-red and broken into large flat, superficially scaly plates separated by deep irregular fissures on slow-growing and old trunks.

## GENERAL DESCRIPTION

This is the most important pine in western North America, and in the United States is found in commercial quantities in every state west of the Great Plains. At present it furnishes more timber than any other American pine and in terms of total annual production of lumber by species is second only to Douglas-fir.

Ponderosa pine is a large tree 150 to 180 feet high and 3 to 4 ft in diameter (On the best sites, 300-year-old dominant trees average about 175 ft high and 48 in. d.b.h.) (max. 262 by 8.6 ft). Even though this species commonly forms open parklike forests, the boles are ordinarily symmetrical and clear for one-half or more of their length; short conical or flat-topped crowns are characteristic of old trees. Four-year-old trees may have tap-roots four to five feet long. Moderately deep wide-spreading laterals develop as the trees get older. Ponderosa pine is not exacting in its soil requirements, but trees on thin, dry soils are usually dwarfed. Its occurrence on dry sites with the nut pines and certain of the junipers is indicative of its great resistance to drought. This species attains its greatest development, however, on the relatively moist but well-drained western

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<sup>1</sup>Harlow, William M. and Harrar, Ellwood S., Textbook of Dendrology, Fifth Edition, McGraw-Hill, 1968.

slopes of the Siskiyou and Sierra Nevada Mountains of southern Oregon and California, respectively.

Ponderosa pine occurs in pure and mixed coniferous stands. Excellent pure forests are found in the Black Hills of South Dakota, the Blue Mountains of Oregon, the Columbian Plateau northeast of the Sierra Nevada, and in northern Arizona and New Mexico. It is also commonly the most abundant tree in mixed coniferous stands; east of the summit of the Cascade Range in Washington and Oregon it occurs with western larch, Douglas-fir, and occasionally lodgepole pine; in the central Rocky Mountains with Douglas-fir; and in California with Jeffrey and sugar pines, incense-cedar, Douglas-fir, and white fir. On the Fort Lewis plains in western Washington, near Puget Sound, ponderosa pine is occasionally found in association with Douglas-fir and Oregon white oak.

Small quantities of seed are produced annually, but large crops are released only at intervals of three to five years. Under forest conditions germination as high as 50 percent may be anticipated, but in the nursery this figure can be increased to 80 percent. Seedlings can exist under the canopy of the parent trees, even though they grow quite slowly, and in such conditions often attain a height of only 3 to 4 ft during the first 15 to 20 years. Reproduction is best in clearings made by fire or logging. The seedlings will grow on sterile sites and have been planted extensively in the Nebraska sand hills and elsewhere. Ponderosa pine is classed as intolerant.

The rapidity of growth has a marked effect on the general appearance of the trees of this species. Young, vigorous specimens commonly develop dense crowns of dark foliage, and bark which is dark brown to nearly black, more or less corky, and deeply furrowed. In contrast, the foliage of old-growth or slow-growing trees is yellow-green, and the bark yellow-brown to cinnamon-red and plated. Those of the first type are generally called "bull" or "blackjack pines," and to some woodsmen ponderosa pine and bull pine are different trees. Fast-growth bull pines 150 years of age found near Cle Elum, Washington, measured 30 to 40 in. in diameter, while more typical ponderosa pines occurring in the same vicinity were only 10 to 14 inches in diameter at the same age. The growth of this species varies considerably with locality. In California, trees 120 years of age averaged 23 in. d.b.h., while in Arizona trees of the same age were only 16 in., and in the black hills 10½ in. Trees over 500 years of age are seldom encountered (Keen considers that this pine may reach an age of 800 years, while Mills reported a tree in southwestern Colorado with 1047 rings.). Severe damage is caused by bark beetles, and ponderosa pine is also attacked by more than 100 other kinds of insects. Fires kill seedlings and cause considerable damage even to large trees. Severe fires in the past have completely destroyed hundreds of thousands of acres of ponderosa

pine forest. Other destructive agents include mistletoe and fungi.

The common name ponderosa pine is identical with the species name. Previously called western yellow pine, logs of this tree were also sold under such names as Arizona white pine, California white pine, and western soft pine, since the wood resembles that of the white pines rather than that of the hard, moderately heavy wood of the southern yellow pines. Finally, the name ponderosa pine was adopted by the U. S. Forest Service, and it is now accepted by the industry.

#### RANGE

Western North America. Altitudinal distribution: 5,000 to 8,000 ft in Arizona, 3,300 to 6,000 ft in Montana and South Dakota, 2,000 to 7,000 ft in northern Idaho, sea level to 6,200 ft in British Columbia and Washington, sea level (Columbia River Valley) to 7,000 ft in Oregon, 300 to 7,000 ft in northern California, 4,000 to 9,000 ft in southern California; for the most part a tree of relatively low elevations.

### Vona Soil Series<sup>2</sup>

The Vona series consists of deep, well drained to somewhat excessively drained soils that formed in eolian or alluvial deposits. Vona soils are on plains and high terraces. Slopes are 0 to 9 percent.

Vona soils are similar to the Olney and Terry soils and are near the Ascalon, Bresser, Julesburg, Osgood, Otero, and Valent soils. Olney, Ascalon, and Bresser soils are more than 18 percent clay in the B<sub>2t</sub> horizon. Terry soils have sandstone between 20 and 40 inches. Julesburg soils have a dark colored surface layer. Osgood soils have an A horizon that is coarser than loamy fine sand and is more than 20 inches thick. Otero and Valent soils lack a B horizon.

Typical pedon of Vona loamy sand, 0 to 3 percent slopes, 180 feet north and 1,400 feet east of southwest corner sec. 25, T. 5 N., R. 61 W.

- A<sub>1</sub> - 0 to 6 inches; grayish brown (10YR 5/2) loamy sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable; neutral; clear smooth boundary.

**Vona loamy sand.** This is a deep, somewhat excessively drained soil on plains and high terraces at elevations of 4,600 to 5,200 feet. It formed in eolian or alluvial deposits. Included ... are small areas of soils that have a loamy substratum and some areas of soils that are noncalcareous at a depth of 60 inches.

Typically the surface layer of this Vona soil is grayish brown. The upper 6 inches is loamy sand and the lower 6 inches is fine sandy loam. The subsoil is brown and light yellowish brown fine sandy loam about 16 inches thick. The substratum to a depth of 60 inches is sandy loam.

Permeability is moderately rapid. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Surface runoff is slow, and the erosion hazard is low.

In irrigated areas this soil is suited to the crops commonly grown in the area. Perennial grasses and alfalfa or close grown crops should be grown at least 50 percent of the time. Contour ditches and corrugations can be used in irrigating close grown

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<sup>2</sup>Crabb, James A. et al.; Soil Survey of Weld County, Colorado, Southern Part, USDA - Soil Conservation Service, Denver, 1980.

crops and pasture. Furrows, contour furrows, and cross slope furrows are suitable for row crops. Sprinkler irrigation is also desirable. Keeping tillage to a minimum and utilizing crop residue help to control erosion. Maintaining fertility is important. Crops respond to applications of phosphorous and nitrogen.

In nonirrigated areas this soil is suited to winter wheat, barley, and sorghum. Most of the acreage is planted to winter wheat. The predicted average yield is 20 bushels per acre. The soil is summer fallowed in alternate years to allow moisture accumulation. Generally precipitation is too low for beneficial use of fertilizer.

Stubble mulch farming, stripcropping, and minimum tillage are needed to control soil blowing and water erosion. Terracing also may be needed to control water erosion.

The potential native vegetation on this range site is dominated by sand bluestem, sand reedgrass and blue grama. Needleand-thread, switchgrass, sideoats grama, and western wheatgrass are also prominent. Potential production ranges from 2,200 pounds per acre in favorable years to 1,800 pounds in unfavorable years. As range condition deteriorates, the sand bluestem, sand reedgrass and switchgrass decrease and blue grama, sand dropseed and sand sage increase. Annual weeds and grasses invade the site as range condition becomes poorer.

Management of vegetation on this soil should be based on taking half and leaving half of the total annual production. Seeding is desirable if the range is in poor condition. Sand bluestem, sand reedgrass, switchgrass, sideoats grama, blue grama, pubescent wheatgrass, and crested wheatgrass are suitable for seeding. The grass selected should meet the seasonal requirements of livestock. It should be drilled into a clean, firm sorghum stubble or a prepared seedbed. Seeding early in spring has proven most successful.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand and low available water capacity are the principle hazards in establishing trees and shrubs. The soil is so loose that trees should be planted in shallow furrows and vegetation maintained between the rows. Supplemental irrigation is needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. The shrubs best suited are skunkbush sumac, lilac, and Siberian peashrub (caragana).

Wildlife is an important secondary use of this soil. The cropland areas provide favorable habitat for ring-necked pheasant and mourning dove. Most nongame species can be attracted by establishing areas for nesting and escape cover. For pheasants, undisturbed nesting cover is essential and should be included in

plans for habitat development, especially in areas of intensive agriculture. Rangeland wildlife, for example, the pronghorn antelope, can be attracted by developing livestock watering facilities, managing livestock grazing, and reseeding where needed.

This soil has good potential for urban and recreational development. Once established, the lawns, shrubs, and trees grow well. The chief limiting soil feature is the rapid permeability of the substratum, which causes a hazard of ground water contamination from sewage lagoons. In places recreational development is limited by the susceptibility to soil blowing. Capability subclass IIIe irrigated, IVe nonirrigated; Sandy Plains range site.

A3 - 6 to 12 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; slightly hard, very friable; neutral; clear smooth boundary.

B21t - 12 to 16 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable; few thin clay films on faces of peds; neutral; clear smooth boundary.

B22t - 16 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to weak medium subangular blocky; hard, friable; few thin clay films on faces of peds; neutral; gradual smooth boundary.

B3 - 22 to 28 inches; light yellowish brown (10 YR 6/4) fine sandy loam, yellowish brown (10YR 5/4) moist; weak coarse subangular blocky structure; slightly hard, very friable; calcareous; mildly alkaline; clear smooth boundary.

Cca - 28 to 60 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable; some visible lime in fine filaments or threads; calcareous; moderately alkaline.

Thickness of the solum ranges from 18 to 37 inches. Coarse fragments make up 0 to 10 percent of the solum. Depth to free carbonates ranges from 12 to 24 inches.

The A horizon has value of 5 or 6 dry and 3 to 5 moist and chroma of 2 or 3. It is loamy sand or sandy loam. The B2t horizon is commonly fine sandy loam that is 10 to 18 percent clay. The C horizon ranges from coarse loamy sand to sandy loam. Management of vegetation on this soil should be based on taking



half and leaving half of the total annual production. Seeding is desirable if the range is in poor condition. Sand bluestem, sand reedgrass, indiangrass, switchgrass, sideoats grama, little bluestem and blue grama are suitable for seeding. Because this soil is susceptible to soil blowing, it should be seeded using an interseeder or the seed should be drilled into a firm, clean sorghum stubble. Seeding early in spring has proven most successful. Brush management can also help in improving deteriorated range.

Windbreaks and environmental plantings are generally not suited to this soil. On site investigation is needed to determine if plantings are feasible.

Wildlife is an important secondary use of this soil. Rangeland wildlife, for example, the pronghorn antelope, can be attracted by developing livestock watering facilities, managing livestock grazing, and reseeding where needed.

This soil has fair potential for urban development. The chief limiting soil features are the rapid permeability and the susceptibility to soil blowing. Septic tank absorption fields function properly, but in places the sandy substratum does not properly filter the leachate. Sewage lagoons must be sealed. Once established, lawns, shrubs, and trees grow well. Capability class VIe irrigated, VIe nonirrigated; Deep Sand range site.

#### Capability Unit VIIe-1 (Nonirrigated)

This unit consists of deep and moderately deep, well-drained soils of the Allens Park, Fern Cliff, Goldvale, and Piñata series. These soils have a stony coarse loamy sand, loamy sand, or gravelly sandy loam surface layer. The subsoil or underlying layer is gravelly sandy loam, sandy loam, gravelly sandy clay loam, sandy clay loam, or sandy clay. Slopes are 5 to 60 percent. Permeability is slow to moderately rapid, and the erosion hazard is high. Available water capacity is low to high. The effective rooting depth is 20 to 60 inches or more.

These soils are used mainly as woodland. They are also used as a habitat for wildlife. Proper management of both the timber and understory helps reduce possible erosion. Wooded areas should be protected from fire and insects and from plant diseases. Thinning of timber improves the quality and quantity of trees.

A few areas of the woodland are used for grazing of the understory vegetation. No more than half of the current year's growth of vegetation should be grazed. Where grazing is properly managed, such grasses as Arizona fescue, mountain muhly, and pine dropseed increase. Seeding of grasses is not practical because of the slope, rock outcrop, and the amount of trees and stones.