

STEWARDSHIP INCENTIVES PLAN

for

COTTONWOOD LAKE
c/o Judy Tietsort
5344 Cole Circle
Arvada, CO 80002
(303) 420-2197

E1/2 W1/2 SE1/4, Sec 30, T1N, R66W, S.P.M.

(36.6 Acres)

Prepared By:

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Colorado State Forest Service
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October 23, 1995

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

Judy Tietsort

Date

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OBJECTIVE

To provide wind protection to Cottonwood Lake, a visual barrier to the south and east, beautification to the entry area and protection from sunlight for campers using the point area.

DESCRIPTION

Cottonwood Lake is located in Weld County on the east side of US-85, 1.2 miles north of the Adams County line. It is owned by Cottonwood Lake Water Ski Association.

The property contains 36.6 acres. Most of it (24.3 acres) is occupied by a lake that resulted from open-pit mining of sand and gravel along the South Platte River. There are 12.3 acres above water.

The only building is a metal shed used for storage.

About two hundred yards of the northeast shoreline are occupied by natural vegetation, mostly sandbar willow and plains cottonwoods with a few cattails. The pit has not yet been back-sloped and most of the green line consists of low weeds (especially, knotweeds) or bare ground.

Annual precipitation is about 15 inches.

Bedrock is a Cretaceous Age deposit of Pierre shale, 10,000 feet thick. The soils, prior to mining, were Altvan loam over most of the property and Dacono clay loam, both overlying sand and gravel deposits of unknown (probably Pleistocene) age.

Mining has destroyed most of the soil profile, mixing layers or removing them. There are likely to be highly-erratic growth responses from seedlings planted in this material. The porous nature of remaining material allows water to drain rapidly, making the use of weed barrier and/or supplemental watering desirable.

INVENTORY

Currently, woody vegetation consists entirely of the cottonwoods and willows described above, augmented with an occasional Russian-olive.

WILDLIFE

The northeast corner of the property is currently used by a variety of songbirds. With power boats using the lake, there will be little opportunity for other wildlife to make use of the area.

No threatened or endangered species have been observed, but the ponds are within the winter range of the bald eagle and in an area used by the interior least tern.

PLANTING PROJECTS

North Line (Planting A):

Purpose: To provide a shelter to the pond during north-west winds.

Description: This is a three-row planting along the property line. It is 275 feet long and 36 feet wide, including 10-foot buffer strips on each side. It occupies 0.2 acres. The outer (northern) row will consist of 68 American plums on a four-foot spacing, located four feet from the fence. The middle row will consist of 45 Rocky Mountain junipers on a six-foot spacing, while the inner (southern) row will consist of 34 ponderosa pines on an 8-foot spacing. Rows will be eight feet apart, with the northern row ten feet south of the property-line fence.

Costs for this planting are estimated below:

68 American plums @ \$0.41 ea.:	\$ 27.88
45 Rocky Mountain junipers @ \$0.94 ea.:	42.30
34 Ponderosa pines @ \$0.94 ea.:	31.96
850 Staples @ \$0.065 ea.:	55.25
2.75 6' rolls Weed Barrier @ \$100.00/roll:	<u>275.00</u>
SUB-TOTAL	\$ 432.39
Sales Tax (3%):	<u>12.97</u>
TOTAL, MATERIALS:	\$ 445.36

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

LABOR, PLANTING; 147 trees @ \$1.50 ea.:	\$ 220.50
LABOR, WEED BARRIER; 2.75 rolls @ \$100 ea.:	<u>275.00</u>
LABOR:	\$ 495.50

CSFS will apply a credit to the labor charge if you wish to provide people to work with us in doing the planting.

Northwest Windbreak (Planting E):

Purpose: To shelter Cottonwood Lake from west and northwest winds and from traffic noise from US-85.

Description: This is a four-row planting designed to make use of extra water available in an abandoned irrigation ditch. It is 1336 feet long and 44 feet wide, including 10-foot buffer strips on each side. It occupies 1.3 acres. The outer (western) row consists of 334 American plums on a four-foot spacing and is located four feet from the fence. The inner (second) row is located eight feet from the plum row and consists of 222 Rocky Mountain junipers on a six-foot spacing. The ditch (third) row is located on the west side of the ditch, within a foot of the waterline and consists of 167 golden willows on an eight-foot spacing. The inside (eastern) row is eight feet east of the ditch and consist of 167 ponderosa pines on an eight-foot spacing.

By planting the willows one foot from the ditch and at the edge of a weed barrier strip, rather than centered, one strip of weed barrier and its attendant costs can be eliminated.

334 American plums @ \$0.41 ea.:	\$ 136.94
222 Rocky Mountain junipers @ \$0.94 ea.:	208.68
167 golden willows @ \$0.41 ea.:	68.47
167 ponderosa pines @ \$0.94 ea.:	<u>156.98</u>
Sub-total:	\$ 571.07
Bulk Discount (5%):	<u>28.55</u>
Seedlings:	\$ 542.52
4100 Staples @ \$0.065 ea.:	266.50
13.5 6' rolls Weed Barrier @ \$100.00/roll:	<u>1350.00</u>
Sub-total:	\$2159.02
Sales Tax (3%):	<u>64.77</u>
Total, Materials:	\$2223.79
LABOR, PLANTING; 890 trees @ \$1.50 ea.:	\$1335.00
LABOR, WEED BARRIER; 13.5 rolls @ \$100 ea.:	<u>1350.00</u>
LABOR:	\$2685.00

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

Southwest Line (Planting F):

Purpose: To shelter Cottonwood Lake from west and southwest winds and to protect against traffic noise from US-85. Also, to beautify the entry and approach ways to the lake.

Description: This is a three-row planting with the outside (western) row located beneath overhead wires. It occupies 0.9 acres. It is 870 feet long and 36 feet wide including buffer strips. It consists of a shrub (western) row, such as cottoneaster, American plum or caragana on a 4-foot spacing located twelve feet east of the fence. A Rocky Mountain juniper (middle) row on a six-foot spacing located eight feet east of the plum row, and a row of eastern (Siouxland) cottonwoods on an eight-foot spacing located eight feet east of the juniper row, make up the rest of the planting. Cottonwoods are fast-growing trees, but may need supplemental water for the first two or three years while they are getting established.

232 shrubs @ \$0.41 ea.:	\$ 95.12
155 Rocky Mountain junipers @ \$0.94 ea.:	145.70
116 Cottonwoods @ \$0.41 ea.:	<u>47.56</u>
Total, Seedlings:	\$ 288.38
Bulk Rate Discount (5%):	<u>14.42</u>
Net, Seedlings:	\$ 273.96
2650 Staples @ \$0.065 ea.:	172.25
8.7 rolls 6' Weed Barrier @ \$100 ea.:	<u>870.00</u>
Sub-Total:	\$1316.21
Sales Tax (3%):	<u>39.49</u>
Total, Materials:	\$1355.70
LABOR, Planting; 503 trees @ \$1.50 ea.:	\$ 754.50
LABOR, Weed Barrier; 8.7 rolls	<u>870.00</u>
Total, Labor:	\$1624.50

Gateway Planting (Planting H):

Purpose: To provide a treed entry-way for the property; the primary purpose is ornamental.

Description: This planting occupies 0.2 acres; it is approximately 160 feet long by 42 feet wide, but the width is variable. The entry driveway runs through the middle of it. Envisioned is a planting of five large (6' to 10') ponderosa pines surrounded by a thicket of shrubs such as Nanking-cherry. The entire planting will have a weed barrier mat underneath to conserve

water and a wood chip cover for appearances. The driveway would be lined with wood fences, either rail or worm fence design, depending on availability of money and manpower to build it. The north fence will extend northward along the road side of Planting F as far as desired for appearances.

Costs are estimated below:

5 8' ponderosa pines @ \$60 ea.:	\$ 300.00
400 Nanking-cherries @ \$0.41 ea.:	<u>164.00</u>
Sub-total, Seedlings:	\$ 464.00
4 rolls 6' Weed Barrier @ \$100/roll:	\$ 400.00
1200 staples @ \$0.065 ea.:	<u>78.00</u>
Sub-Total:	\$ 942.00
Sales Tax (3%):	<u>28.26</u>
Total, Materials:	\$ 970.26
Labor:	
Planting; 5 8' trees @ \$40.00 ea.:	\$ 200.00
Planting; 400 seedlings @ \$1.50 ea.:	600.00
Lay Weed Barrier; 4 rolls @ \$100 ea.:	<u>400.00</u>
Total, Labor:	\$1200.00

Wood Chips may be available delivered and free from Public Service Company which often has a lot of limbs and trimmings from storm-damaged trees to get rid of in the spring (You would still have to place them.). United Wood Products in Longmont has light-weight chips for sale and may be able to deliver for a nominal charge (Heavy chips are preferred to prevent blowing in the wind; again, you would have to place them.). CSFS can supply the chips and place them for \$2500.00, or do either for \$1250.00. A three-inch thick layer will require 62 cubic yards of heavy chips, or 25 long-bed pickup trucks full.

There are two possible wooden fence designs, depending on how rustic you want the project to look. The post-and-rail fence (two rails, eight feet between posts) will require 200 rails and 52 posts for the two fences along the drive. These are available for \$3.00 each (\$756), but will require shaping and drilling. This is relatively easy if you have the tools; it would probably cost another \$200 to have them shaped. You can probably hire this fence installed for about \$750. Total cost: about \$1700. Figure about \$2.00 per foot for extending this type of fence along the county road northward from the gate.

The worm fence is the rustic style fence seen in photographs of New England. It is what people usually

think of when they say "rail fence." In this style, poles are stacked one on top of another in a sloping zigzag fashion that sheds water to reduce the rate of decay. There are no posts, except at the ends. This would require 282 rails and 8 end-posts at a cost of \$3.00 each (\$870). Only the end-posts need shaping (\$6.40). The New England fences were made of rails split from American chestnut or oak. The more-or-less square rails stayed put pretty well. In Colorado, we use round poles that roll when somebody leans against the fence. To keep this from happening, the poles can be spiked together or an additional pole can be leaned against the top rail juncture and spiked or wired in place (Some people do both.). This would require an additional 50 poles (\$150). Spikes would cost another \$60. Assuming you decide on spikes (no extra poles), this fence would cost about \$1875, including labor. Extending this style fence northward would cost about \$2.50 per foot.

Because this is an important visual planting and we would like the trees to grow as fast as possible, a drip system for watering would be advisable. Such a system would cost about \$2.00 to \$2.50 per tree, not counting the cost of the pump and main line from the lake. Total cost here would be about \$800 to \$1000 plus pump and main line.

South Visual Barrier (Planting L):

Purpose: To block the view of an industrial area along the south side of the property.

Description: The planting contains about 0.8 acres. It is of variable-width windbreak design. The southern-most row along the fence is Siberian elm. This is a fast-growing tree and will quickly provide needed height. It is also vulnerable to extreme freezes that occur in this area during the late fall; in case this should happen, the second row is hybrid cottonwood; this will probably be the Siouxland cross, a hybrid of eastern cottonwood and some other (European black poplar?) variety of cottonwood. Both these species are deciduous and will not block visibility during the winter; a row of ponderosa pine will solve this problem. The remaining area should be filled with Rocky Mountain juniper and American plum, leaving space for an access road to the east side of the lake.

STEWARDSHIP INCENTIVES PLAN

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Costs are detailed below:

100 Siberian elms @ \$0.41 ea.:	\$ 41.00
100 hybrid cottonwoods @ \$0.41 ea.:	41.00
62 ponderosa pines @ \$0.94 ea.:	58.28
166 Rocky Mountain junipers @ \$0.94 ea.:	156.04
125 American plums @ \$0.41 ea.:	<u>51.25</u>
Sub-Total, Seedlings:	\$ 347.57
12 rolls weed barrier @ \$100 ea.:	\$1200.00
3700 staples @ \$0.065 ea.:	<u>240.50</u>
Sub-Total, Seedlings and Materials:	\$1788.07
Sales Tax (3%):	<u>53.64</u>
TOTAL, Seedlings and Materials:	\$1841.71
Labor:	
Planting; 553 Seedlings @ \$1.50 ea.:	\$ 829.50
Weed Barrier; 12 rolls @ \$100 ea.:	<u>1200.00</u>
TOTAL, Labor:	\$2029.50

East Visual Barrier (Planting I):

Purpose: To screen the lake from the road running along the east side of the fence.

Description: This planting is 1060 feet long and occupies 1.7 acres. It runs north-south along the east fence. It consists of an outside (east) row of 132 Siberian elm, a second row of 132 ponderosa pines, two rows of Rocky Mountain junipers, a row of 265 Caraganas and a row of 265 American plums. It is designed, like the South Visual Barrier (Planting L), with the tallest species along the fence form a sight-blocking wall.

Costs are detailed below:

132 Siberian elms @ \$0.41 ea.:	\$ 54.12
132 ponderosa pines @ \$0.94 ea.:	124.08
352 Rocky Mountain junipers @ \$0.94 ea.:	330.88
265 Caraganas @ \$0.41 ea.:	108.65
265 American plums @ \$0.41 ea.:	<u>108.65</u>
Sub-Total, Seedlings:	\$ 726.38
Bulk-rate Discount (10%):	<u>-72.64</u>
Sub-Total, Seedlings:	\$ 653.74
21 rolls weed barrier @ \$100.00 ea.:	\$2100.00
6500 staples @ \$0.065 ea.:	<u>422.50</u>
TOTAL, Seedlings and Materials:	\$3176.24
Labor:	
Planting; 1146 Seedlings @ \$1.50 ea.:	\$1719.00
Lay 21 rolls weed barrier @ \$100 ea.:	<u>2100.00</u>
TOTAL, Labor:	\$3819.00

Northwest Waterline (Planting J):

Purpose: To provide a fast-growing wind barrier at the waterline to shelter water skiers from winds.

Description: This planting is 2340 feet long and occupies 1.9 acres. It should be located one foot from the water line. Seedlings are fast-growing water-loving species that can grow as much as five feet per year, once established. It is a single-row planting. Because it is so close to the water, with roots below the water-table in some cases, no weed barrier is being used.

Costs are detailed below:

100 hybrid cottonwoods @ \$0.41 ea.:	\$ 41.00
100 golden willows @ \$0.41 ea.:	<u>41.00</u>
Sub-total, Seedlings:	\$ 82.00
Sales Tax (3%):	<u>2.46</u>
Total, Seedlings:	\$ 84.46

This planting is ideally suited to volunteer laborers. It is assumed that this is how it will be installed. Installation must wait until grading is completed.

Southeast Waterline (Planting K):

Purpose: To provide a fast-growing wind barrier at the waterline to shelter water skiers from winds.

Description: This planting is 1770 feet long and occupies 1.8 acres and is almost a duplicate of the Northwest Waterline Planting. It should be located one foot from the water line. Seedlings are fast-growing water-loving species that can grow as much as five feet per year, once established. It is a single-row planting. It, too, is close to the water, with roots below the water-table in some cases, no weed barrier is being used.

Costs are detailed below:

100 hybrid cottonwoods @ \$0.41 ea.:	\$ 41.00
100 golden willows @ \$0.41 ea.:	<u>41.00</u>
Sub-total, Seedlings:	\$ 82.00
Sales Tax (3%):	<u>2.46</u>
Total, Seedlings:	\$ 84.46

This planting is also ideally suited to volunteer laborers. It is assumed that this is how it will be installed. Installation must wait until grading is completed.

West Point Campsite (Planting M):

Purpose: To provide shade and beautification to campers using the point area.

Description: The point occupies 1.0 acres. Allowing space for driveways, picnic tables, camping and docking facilities, it is assumed that about one-third of the area will actually be available for planting trees. It is desirable to have fast-growing trees that will develop spreading crowns and become good shade trees. Cottonwoods would fill this bill quite well.

There are two ways to go about this: 1) the "instant tree" is a large live cottonwood or willow limb or small trunk, three-to-six inches in diameter and up to 30 feet long. A hole about four feet deep is dug, being at least as deep as the water-table. The limb or trunk is placed in the hole and soil packed firmly around it. It is also guyed with steel stakes and ropes to prevent blowing over and is fenced off to keep people from damaging it. The ones that take root will provide a tree up to 25 feet tall the first season. The draw-back with this is the original trunk decays, leaving a tree with a hollow, possibly weakened, stem.

2) Cottonwood and golden willow seedlings, once established will grow four or five feet a year. In as little as five years the seedling will achieve the same height as the "instant tree" and will not have the decay problem later.

I recommend using seedlings (one bundle of fifty seedlings) and putting a chicken-wire fence around each one to protect it from people using the area. Weed barrier should not be needed because of the high water table.

These trees will be subject to intense "people pressure," the abuse people inflict on city trees. They will live hard and die young. Protective fences will reduce the mistreatment and prolong their lives.

Cost estimates are not being given for this planting because of the wide variation in costs. The greatest cost will be fencing and, possibly, staking. Also,

this is another project that can be handled better by volunteers than by CSFS.

FORESTER'S COMMENTS

This project should probably be installed in bight-sized pieces over several years. I suggest the Northwest Windbreak (Planting E), Gateway (Planting H) and West Point Campsite (Planting M) for 1996. The North Line (Planting A) can also be planted if there are no plans to do any grading in the area. The remaining plantings could be done in 1997 if the grading work has been completed by that time.

These plantings collectively total 4060 trees. This is a major project. Planting this many seedlings and laying this much weed barrier would keep two people busy for two full months. Volunteers can cut this cost considerably, but only if they show up day after day for the heavy, boring work. This is not something that can be done in one or two weekends. It will be necessary to work during the week as well as Saturdays and Sundays. Most volunteers just haven't got the time or the ambition for this type of project.

Oss willow will grow well where it gets plenty of water (Plantings J, K and M). It can be rooted from cuttings, so is easy to plant. On dry sites, or in competition with grass, it does poorly or won't grow at all. If its water-supply is interrupted for any reason (like along an irrigation ditch) it dies back to conserve water, then promptly regrows when water is again available. Its habit is that of a large bush, not a tree. Oss willows with unsteady water supplies soon become big bushes with masses of dead limbs sticking out of them. There is concern that they will become ecological problems along streams as Russian-olives are now doing. For these reasons, the Colorado State Forest Service recommends against the use of oss willow.

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 with volunteers (like building fences and laying wood chips) and using CSFS only for planting and weed barrier, costs can be further reduced.

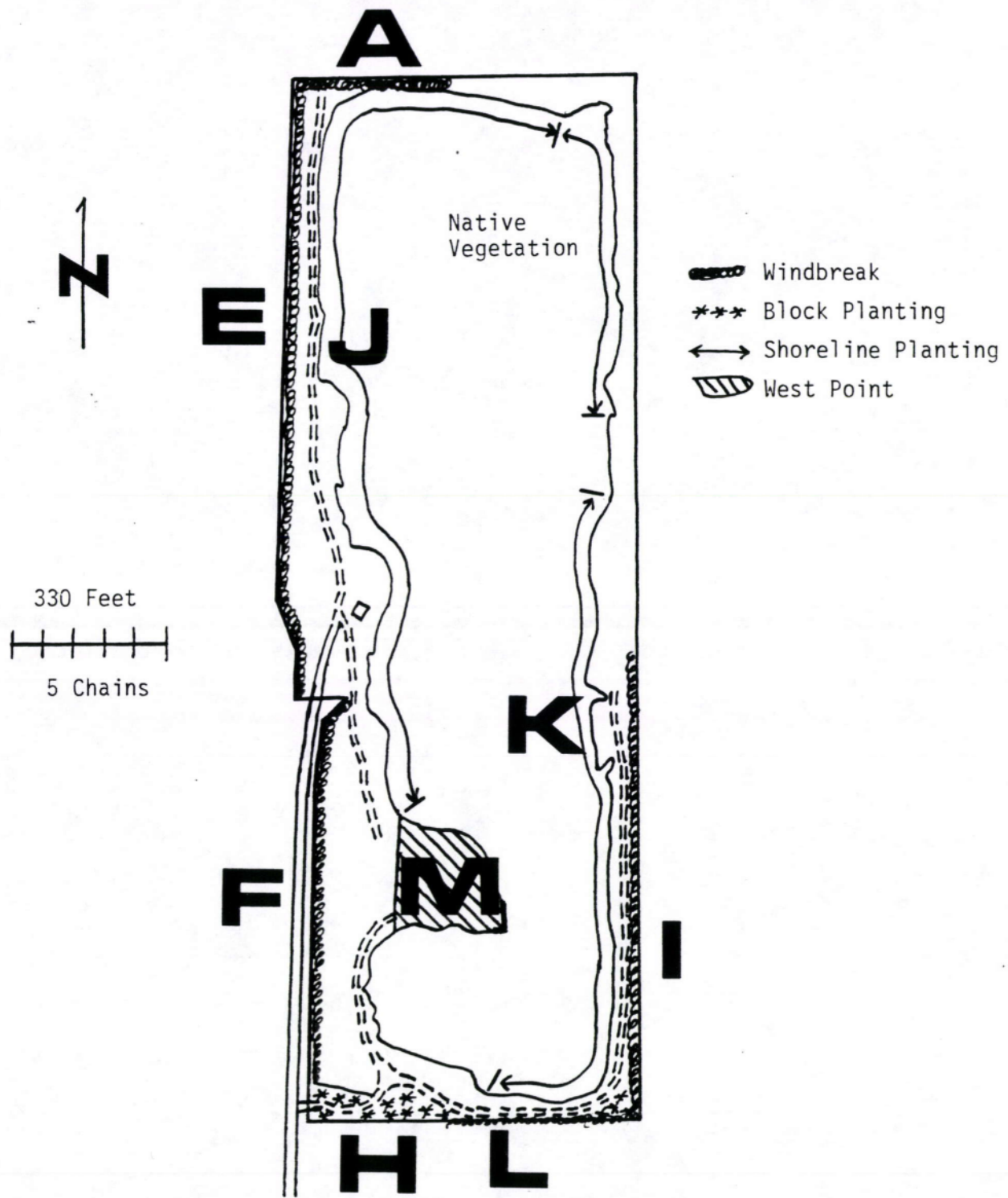
Yes, this is expensive; but I have noticed that people whose plantings fail because they took short-cuts to save money, forget all about the savings as soon as the tree dies and blame the nursery or the contractor (anybody but themselves) for its failure. Nobody counts the cost when they look at a planting 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 water-skiing lake. I hope CSFS can be a part of your program.

Respectfully Submitted By:

Douglas J. Stevenson
Assistant District Forester

Cottonwood Lake



Drawn By: *Douglas J. Stevens*

October 23, 1995

PLAINS COTTONWOOD (Populus deltoides var. occidentalis Rydb.)

William M. Harlow, Ph.D., SUNY College of Forestry
Ellwood S. Harrar, Ph.D., Duke School of Forestry

Textbook of Dendrology

BOTANICAL FEATURES

Leaves 3" to 6" long, 4" to 5" wide; shape deltoid to ovate-deltoid; margin crenate-serrate, the teeth glandular; apex acuminate to acute; base truncate to cordate; surfaces lustrous green, glabrous above, somewhat paler and glabrous below; petiole flattened, 1½" to 3" long, glandular.

Fruit ¼" to ½" long, ovoid, 3- or 4-valved; seeds about 350,000 (200,000-590,000) to the pound.

Twigs stout, angular, yellowish brown, glabrous; terminal buds about ¾" long, narrowly ellipsoidal to conical, lustrous brown, resinous, covered by 6 or 7 imbricated scales; lateral buds somewhat smaller, divergent.

Bark light greenish yellow on young stems, eventually becoming ash-gray and dividing into thick, flattened or rounded ridges separated by deep fissures.

GENERAL DESCRIPTION

This species, the most important of the eastern poplars, is a medium-sized to large tree 80 to 100 ft high and 3 to 4 ft in diameter (max. 175 by 12 ft). Open-grown trees have a spreading crown supported by a massive trunk which is often divided near the ground and terminates below in an extensive superficial root system; in the forest, the bole is long, clear, and cylindrical, and the crown much smaller.

Not common in the Northeast and Appalachian regions, eastern cottonwood, together with its varieties or closely related species, covers a wide range from the Rocky Mountains to the southern Atlantic Coast. It is especially common on moist alluvial soils through the plains and prairie states, where a winding belt of green cottonwood crowns usually indicates the presence of a stream or water course. Although not found naturally on dry soils, this species was planted extensively around homesteads by the early settlers and when once established has proved to be relatively drought resistant.

On the best alluvial soils in the Mississippi Valley growth is exceedingly fast, and young trees commonly grow 5 ft or more in

height and 1 in. in diameter yearly. Cottonwood is very intolerant and occurs in pure stands or open mixtures with such species as black willow, sycamore, American elm, and some of the bottom-land oaks. In the South, cottonwood may seed in on old fields in mixture with sweetgum, by which it is eventually replaced.

Like other poplars, eastern cottonwood liberates large quantities of silky-haired seeds which may travel by air or on the surface of water for many miles. Although germination is high (60 to 90 percent), vitality is transient, and this probably accounts for the distribution of the species along water courses where in late spring moist silt is available for the sprouting seeds. Propagation by cuttings is good, and young trees produced in this way make rapid growth; two-year-old trees sometimes attain heights of 30 ft and diameters of nearly 5 in. Cottonwood is a short-lived species; trees over 70 years old rapidly deteriorate, and the maximum life span is probably not greater than two centuries.

RANGE

Plains cottonwood: the Great Plains.

1440
3 143560

18.1
900 | 14490.
5490
900