

FOREST STEWARDSHIP PLAN

FOR

Douglas R. Spence
4617 County Rd. #2
Berthoud, CO 80513

A portion of the

NW 1/4 Sec. 6
T3N, R 69W of 6th PM
Boulder County

Prepared By:

Richard C. Gray
Colorado State Forest Service
936 Lefthand Canyon Drive
Boulder, CO 80302
(303) 442-0428

This stewardship plan has been prepared at my request to guide my management activities which I voluntarily apply to my property. I believe that the 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.



LANDOWNER



DATE

STEWARDSHIP PLAN

Dear Mr. Spence:

It was a pleasure meeting with you to discuss the development of a stewardship plan for your property. At our meeting you expressed several concerns and desires for management activities on your property. The following plan will address these concerns and make recommendations to meet your goals.

LANDOWNER OBJECTIVES

During our site visit several objectives were brought forth.

- 1) The establishment and enhancement of wildlife habitat.
- 2) To establish vegetative plantings in a riparian area, and protect that area.
- 3) To control problem weeds on the property.
- 4) To reclaim and establish desirable grasses on dry land pasture.
- 5) The control of undesirable vegetation.

In meeting these objectives several secondary benefits such as aesthetics, soil and water protection and overall stewardship will be achieved.

GENERAL DISCUSSION

Location/site description

The Spence property is located in northeast Boulder County north of the Town of Longmont. The property is located on the Little Thompson River, and encompasses approximately 30 acres.

The property is currently used for a homesite, limited grazing of horses, and wildlife viewing. The house is situated at the east 1/3 of the property. The area around the house takes in approximately 1 acre and has traditional landscaping associated with it. Two thirds (2/3) of the property is in pasture and the remaining 1/3 is in bottomland riparian habitat. There are several key areas which this plan will cover in detail. There are two distinct pasture areas; an upland site to the east of the house, and a bottomland site to the west of the house. The 1 acre house site will be treated as a separate management unit. The bottomland area along the river will also be considered a management unit. Finally, the area in which the horses are kept is a unit. In addition to these management units, two specific areas will be discussed. These areas are the existing windbreak and the old ditch line. There will be several recommendations for each unit. These practices will, in some cases, extend over multiple units, thereby meeting your objectives across the entire property.

Climate

The climate in eastern Boulder County is characterized by cold, dry winters and warm, relatively dry summers. Average precipitation is 13 inches per year with 80% occurring in the winter and spring months. Periods of drought are frequent. Thunderstorm activity is prevalent and sometimes severe. Climatic information effecting vegetation management is as follows.

Data is from Soil survey of Boulder County.

- A) Mean annual air temp. 48-52 degrees
- B) Frost-free season 140-155 days.
- C) Average temperature, January 27 degrees; July 72 degrees.
- D) Length of growing season 140 days.
- E) Average date first killing frost September 28th .
- F) Average date last killing frost May 11th.

Land Use

Historic

Prior to settlement this area was characterized by short and mid-grass prairie. The area along the Little Thompson River most likely had a wider band of cottonwoods along the stream course. As settlement occurred, farming and ranching became prominent. This activity removed much of the native prairie and converted it to crop or pasture land. With the westward settlement came the taming of rivers and utilization of free flowing water. This resulted in a reduction in the forested areas along prairie streams. Past over-use of this area has resulted in soil erosion, loss of wildlife habitat, and poor range condition.

Current

More recently this area has been divided in to lots and developed into house sites and ranchettess. Currently your property is used as a residence, for horse grazing, and wildlife habitat. Management activities commensurate with maintaining a homesite are in place. Grazing activities are under no set prescription, and past over utilization is evident.

Future

The site will continue to be used as a residence. Windbreak establishment and maintenance and wildlife habitat are major objectives. Pasture improvements are to be made, as well as adjustments in grazing. This will be accomplished using Nantural Resources Conservation Service standards. Treatment of the current horse boarding area is planned for. The development and rehabilitation of the ditch are also an objective.

Inventory

Vegetation

There are two distinct ecological areas on your property. These areas consist of pasture and bottomland riparian ecosystems. The pastures appeared to have been seeded at one time. The dominant grass species is brome and wheat grasses. There is some little blue steam and a small amount of buffalograss and blue grama. There is a large component of undesirable weeds and cheatgrass brome. The pasture area has been over utilized in the past, but with the amounts of desirable species present, the area can be brought back to an excellent condition. The riparian area along the river is very diverse in its vegetative make up. The predominant tree species is cottonwood with some willow and black locust present. Understory grasses include little and big bluesteam, brome, wheatgrasses, cheatgrass, a variety of forbs and shrubs, and some noxious weeds such as Canadian, musk, bull and Russian thistle. Some of this thistle is scattered, but for the most part it is growing in 1/2 to 1 acre patches. Other vegetation includes windbreak plantings of Russian Olive, Juniper and Honey Locust. Landscaping material is associated with the homesite. Adjacent to the old ditch there is also a stand of cottonwoods as well as native plum and cherry thickets.

Soil & Water

There are 5 distinct soil types occurring on the property. They include Calkins along the riparian area, Heldt in the pasture area to the west of the house, rock outcrop at the west end of the pasture, Valmont on top of the hill to the east of the house, and terrace escarpment, along the irrigation ditch.

Calkins This is a sandy loam soil located on stream terraces. Slopes range from 1% to 3%. Runoff is slow and the erosion potential is moderate. This soil is in tree suitability group #5.

Heldt This is a clay soil located mainly in the northern portion of Boulder County. Slopes range from 0% to 3%. Runoff is medium to rapid, and the erosion potential is moderate. This soil is in tree suitability group #6.

Valmont This is a cobbly clay loam soil located on high terraces. Slopes can range from 1% to 5%. Runoff is medium and the erosion potential is slight. This soil is in tree suitability group #6.

Rock Outcrop This soil is shallow with numerous exposed rocks. Slopes can be slight to vertical. There is no tree suitability group listed for this soil.

Terrace Escarp This is a shallow soil which occurs in long narrow bands on steep side slopes. Runoff is rapid, and erosion potential is high. This soil is in tree suitability group #6.

The following trees are listed under tree suitability group #5

Cottonless cottonwood	Blue spruce
Popular's	Russian Olive
Golden willow	Weeping Willow
Chokecherry	Buffaloberry

The following trees are listed under tree suitability group #6
There were no species listed do to soil limitations. Some species that have been successful are:

Eastern red cedar	Ponderosa pine
Russian Olive	Honeylocust
Lilac	Caragana

Wildlife

The area along the Little Thompson river is excellent habitat for wildlife. This is evident in the number of species we encountered on our walk. In addition to the normal songbirds, we encountered a herd of approximately 8 mule deer, observed two great horned owls and saw a variety of water fowl. In addition to terrestrial wildlife, several aquatic species were observed in the river.

RECOMMENDATIONS

There are three primary recommendations for your property.

- 1) Establishment of a windbreak planting on the north and west side of the house.
- 2) Wind break improvements on the existing planting along the road.
- 3) Improve the condition of your pasture.
- 4) Control of undesirable weeds
- 5) Enhance wildlife habitat for all species.

Procedures

For recommendation #1:

The primary purpose is to plant a windbreak. This will include a 3 row planting on the north and west side of the house. The east side is well protected by a high hill. The first row (outer most) will be a shrub row. Species to use would be Caragana, Lilac, or Quailbush. Space shrubs at 4 foot intervals. Row two (middle) will be a planting of mid-sized

evergreen trees. Species to use is Eastern Red Cedar, plant 8 feet apart. The third row is a planting of large evergreen trees. Use Ponderosa or Austrian pine, planted in a 10 foot spacing. The area should be site prepped prior to planting and machine planted in the spring. Cover all rows with fabric mulch. Supplemental water will be needed for at least the first three years. This would best be accomplished through a drip irrigation system. If you choose to implement this practice a detailed planting plan will be developed and added to this plan.

For recommendation #2

This recommendation includes the improvement of the existing windbreak. We discussed the removal of the Russian Olives. This planting is far enough from the river that it does not pose serious ecological threats. The windbreak should have any gaps replanted and a third row toward the pasture planted with Ponderosa pine. We discussed lifting the Lilac trees in your backyard and utilizing them elsewhere. These shrubs could be used to fill in and to extend the planting westward. Again any new plantings will need to be mulched and watered. When transplanting the Lilac make sure the soil is moist at lifting; retain as much of the root system as possible, plant the same day as lifting, and make sure to water when planting. The best time to do this is in late winter, prior to the buds opening. If you choose to do this practice, a detailed restoration plan will be prepared and added to this plan.

For recommendation #3 .

This covers the reseeding and improvement of your pasture. West pasture: The best course of action here is to prescribe burn the area in fall. This will stimulate the existing grasses and improve the quality of your pasture. In addition some barren areas should be seeded after the burn. Seed these patches with a mixture of Smooth brome 40%, Pubescent wheat 20%, and Intermediate wheat 40%. Plant from October 15 through April 30. Planting depth should be 1/2 to 3/4 of an inch. The seed should be drilled on a 10 inch spacing. If the seed is broadcast, seed double the rate. Grazing should be deferred for two growing seasons. This pasture should have the external fences repaired, and be split into 3 smaller pastures. Cross fencing can be electric. The pastures should then be grazed on a rotation. The east pasture needs to be fenced. Prescribed burning is the best course of action here, no reseeding is recommended. If you choose to implement these improvements, a burn plan and grazing plan will be developed and added to this plan.

For recommendation #4

This covers the control of your thistle areas. There were a few areas that had 1/4 to 1/2 acre patches of thistle. These areas are in the proposed burn area. Burning will remove the heavy amounts of old dead material and expose the young shoots. After burning, treat the area with a herbicide such as 2,4-D or other registered herbicide for weed control. These patches would be good places to plant wildlife thickets of Plum, Cherry, or Sumac. The planting and covering with mulch will kill a substantial area

of thistle, leaving less area to be treated with herbicide. Also Blue Spruce clumps could be planted here. This practice will be laid out in more detail as the plan develops.

For recommendation #5

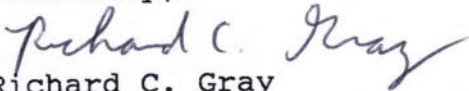
This covers wildlife habitat enhancement. The control of problem weeds and replanting as mentioned above, will benefit wildlife. Pasture improvements, grazing plans, windbreak establishment and restoration and burning will all benefit wildlife. Additional recommendations are to fence out the river bottom from the pasture. Prescribe burn under the existing stand of cottonwoods. Create openings and nesting trees by killing some of the mature trees and planting shrubs and spruce in the openings. Establish a series of nesting boxes and platforms adjacent to the river for waterfowl. If fishery habitat is desired, pools and refills can be created by placing log and rock structures. As the plan develops, specific placement of the above mentioned practices will be identified.

Additional recommendations

After the pasture improvements are made, and grazing started, a rehabilitation plan should be developed for the current horse pen area. Likewise, after restoration of the irrigation ditch, a rehabilitation plan should be developed.

It has been a pleasure working with you in your stewardship endeavors. I have included information on cost share practices which you are eligible for. If I can be of further assistance, please contact me.

Sincerely,


Richard C. Gray
Forester

APPENDIX

STEWARDSHIP INCENTIVES PROGRAM
(SIP)

You are eligible for the following cost share amounts:

Under SIP 4 (Farmstead Windbreak) 65% of the cost of installation up to a maximum of \$450/acre.

Under SIP 4 (Mulch) 65% of the cost of installation up to a maximum of \$775/acre.. Maximum cost share of \$259.

Under SIP 4 (Irrigation) 65% of the cost of installation up to a maximum of \$656/acre.

Under SIP 6 (Fencing) 65% of the cost of installation up to a maximum of \$.75/ foot.

Under SIP 7 (Stream improvement) \$5.00/foot of stream impacted.

Under SIP 8 (Prescribed burning) 65% of the cost of installation up to a maximum of \$30/acre.

Under SIP 8 (Shrub thicket) 65% of the cost of installation up to a maximum of \$280.

Under SIP 8 (Control of competing vegetation) 65% of the cost of installation up to a maximum of \$20/acre.

Under SIP 8 (Wildlife structures) 65% of the cost of installation up to a maximum of \$20/structure.

If you are interested in applying for cost share for this planting season, you will need to sign up at the ASCS Office of Boulder County. They are located at the corner of Hover & Nelson Roads in Longmont, at the Boulder County Fairgrounds. Bring this sheet so required information can be filled out.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLORADO

CO-ECS-5
(180-12-11)
Rev. 4/92

PART I - GRASS SEEDING PLANNED

Producer: _____ Planner: _____ Date: _____

Contract or Agreement # _____ Contract Item No. _____ Field No. _____
Practice Name & No. LAST PLANTING - 512 Ac. _____ Irrigated _____ Dryland ☒
Land Resource Area 49767 Range Site VARIES

Seedbed Preparation: Method _____ Approximate dates _____
Dead Litter Cover: _____ Kind, Pounds residue needed. _____
Clean till, Firm Seedbed, Interseed, Other _____

Seeding operation: Drill ☒ Interseed _____ Broadcast _____ Date OCT 15 - APRIL 30
Drill spacing 10 IN Type GRASS Planting depth 1/2 - 3/4 IN

Fertilizer: Pounds actual available nutrient per acre recommended.
Nitrogen (N2) _____ Phosphorus (P2O5) _____ Potassium (K) _____

BASE ON RELIABLE SOIL TEST ANALYSIS
Weed Control: Chemical, Kind & Amount _____ Mechanical _____
Flash Grazing _____ Dates _____

Mulch: Kind _____ Amount _____ lbs/Ac. How applied _____
How anchored _____ Anchored depth _____

Seed Recommendations

Species	Variety	(1) Required PLS rates per acre (100%)	(2) % of species in mixture
<u>SMOOTH BROME</u>	<u>MANCHAR</u>	<u>6.5</u>	<u>40</u>
<u>PUBESCENT WHEAT</u>	<u>LUNA</u>	<u>9.0</u>	<u>20</u>
<u>INTERMEDIATE WHEAT</u>	<u>AMUR</u>	<u>10.0</u>	<u>40</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(3) PLS seeding rate per species/Ac. (1)x(2)	(4) Planned Acres	(5) Total PLS lbs/ species planned (3)x(4)
<u>9.6</u>	_____	_____
<u>1.8</u>	_____	_____
<u>4.00</u>	_____	_____
<u>4.0</u>	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SCS cost shared programs such as Great Plains, Watershed activities, RC&D measures and any other program requires the use of Certified Seed (Blue Tag) if available.

Remarks _____

FARMSTEAD AND FEEDLOT WINDBREAK PLANTINGS FOR COLORADO

Windbreaks are planted to protect soil, crops, livestock, and homes or other farm buildings from high winds. In winter they control snow drifting, reduce cold winter winds and protect livestock. In summer, windbreaks protect gardens, orchards and other field crops from drying winds as well as reduce soil erosion. Windbreaks also provide cover for pheasants and other wildlife.

To give the best protection windbreaks must be dense enough to reduce wind velocity. They must be located far enough from farm buildings, paths, and driveways to allow snow drifting where it will be beneficial instead of a nuisance. Every windbreak should include one or more rows of evergreens for winter protection and at least one row of tall hardwoods for maximum summer protection. It is particularly important to have low growing shrubs on the windward side to prevent wind from sweeping under the windbreak, drying the ground in summer and carrying snow into the farm yard in winter.

LOCATION AND SIZE: Windbreaks should be located as nearly as possible at right angles to the prevailing winds and if for farmstead protection should be placed 100 to 300 feet from buildings. The windbreak should be long enough to protect the entire farmstead. Farmstead windbreaks should be from 3 to 5 rows wide. Any 3-row planting should consist of plants from 2nd, 3rd, and 4th or 5th rows.

To insure satisfactory survival and rapid growth, it is of utmost importance that the following be observed:

GROUND PREPARATION: To insure survival and rapid growth of the trees, it is important that the planting area be properly prepared. On hard land the area should be clean tilled for at least a year before tree planting to build up a moisture supply. On sod-covered sandy land, strips six feet wide should be plowed and kept clean of weeds. The sod between rows should remain until the windbreak is established. Plantings on cultivated sandy land should be protected with a cover crop between rows during the "blow" season.

WATERING: Dryland plantings should be made as early in the spring as possible to take advantage of early spring moisture. Watering plants during first growing season is beneficial. Contour dikes or terraces parallel to rows in a planting are recommended to impound runoff.

CULTIVATION: CLEAN CULTIVATION IS ABSOLUTELY ESSENTIAL TO OBTAIN MAXIMUM GROWTH AS LONG AS WEED COMPETITION EXISTS.

PROTECTION: Windbreaks must be protected from fire and livestock damage. Trees should also be protected from rabbits with wire baskets, paper or rabbit-repellant paint as long as there is possibility of damage.

PRUNING: Caragana should be cut back to within 6 inches of the ground at beginning of second growing season to force branching. Pruning of other shrubs and trees may be desirable if they become damaged or are of poor form.

MAINTENANCE: Replacements should be made as soon as possible with the same species. This is particularly important the first few years. A good windbreak is one having uniform density and height throughout. Observe frequently for symptoms of insect and disease infestation. If additional information is desired on any phase of windbreaks, consult representatives of the Soil Conservation Service or Colorado State Forest Service.

Species Suitability Guide for Colorado

Common Name	Mature height (ft., approx.)	Growth form	Cold hardiness*	Drought resistance*	Tolerance to alkaline soils*	Windbreak suitability*	Wildlife suitability*	Elevational range (ft.)
Deciduous Shrubs								
Caragana	10	dense	E	E	G	E	E	below 9,500
Cotoneaster	6	dense	E	G	F	E	E	below 9,500
Honeysuckle	10	spreading	E	G	G	E	G	below 8,000
Chokecherry	10	spreading	E	G	G	E	E	below 9,000
Lilac	8	dense	E	G	G	E	G	below 8,500
Native plum	8	open	E	G	G	G	E	below 8,000
Sumac (quailbush)	4	dense	E	E	E	E	E	below 8,000
Sand cherry	4	open	E	G	G	F	G	below 7,500
Nanking cherry	6	spreading	E	G	F	G	G	below 8,000
European sage	5	spreading	F	E	F	P	E	below 6,000
Woods rose	4	dense	E	E	G	E	E	below 10,000
Buffaloberry	10	dense	E	G	E	E	E	below 7,500
Four-wing saltbush	4	open	E	E	E	G	E	below 8,000
Golden currant	5	open	E	F	E	E	E	below 8,000
Serviceberry	6	spreading	E	G	F	E	E	below 9,000
Deciduous Trees								
Ash	35	elliptical	E	E	G	E	F	below 8,500
Siberian elm	40	spreading	E	E	G	F	F	below 8,000
Hybrid cottonwood	60	spreading	E	P	E	F	F	below 7,000
Narrowleaf cottonwood	50	spreading	E	F	E	F	P	below 9,500
Golden willow	35	spreading	E	P	G	F	F	below 8,000
Hackberry	35	spreading	E	G	F	E	G	below 7,000
Honeylocust	35	spreading	E	E	G	F	G	below 7,500
Russian olive	25	spreading	E	E	E	E	E	below 7,500
Lombardy poplar	40	columnar	E	P	P	P	E	below 8,000
Lacebark elm	50	spreading	E	F	E	F	P	below 7,000
Bur oak	50	spreading	E	F	E	F	P	below 5,000
Aspen	35	open	E	P	P	P	E	above 6,000
Evergreens								
Austrian pine	40	open crown	G	E	G	F	F	below 7,500
Colorado blue spruce	60	dense crown	E	G	F	G	G	below 9,500
Douglas-fir	70	dense crown	E	G	F	G	G	6,000 to 9,000
Engelmann spruce	70	dense crown	E	G	F	G	G	above 8,000
Eastern redcedar	18	dense crown	E	E	G	E	E	below 7,500
Lodgepole pine	60	open crown	E	E	G	F	G	above 6,000
Piñon pine	15	dense crown	E	E	E	G	G	below 7,500
Ponderosa pine	40	open crown	E	E	G	E	G	below 9,000
Rocky Mountain juniper	15	dense crown	E	E	E	E	E	below 9,000
Scotch pine	40	open crown	G	G	F	F	F	below 7,000
White fir	60	dense crown	E	G	F	G	G	below 9,000
Bristlecone pine	40	open crown	E	E	G	E	G	below 11,000

*E=excellent

G=good

F=fair

P=poor

Plants ^{1,2}	Overall wildlife value	Nesting	Songbirds		Gamebirds		Fur & game mammals	
			Food	Cover	Food	Cover	Food	Cover
Conifers (Excellent winter cover, food, and nesting sites)								
Eastern redcedar	Excellent	•	W	SW	W	SW	B	SW
Rocky Mtn. juniper	Excellent	•	W	SW	W	SW	B	SW
Arborvitae	Good -Excel	•		SW		SW	B	SW
Spruce	Good	•		SW		SW		SW
Pine	Good - Excel	••	S	SW	S	SW	B	SW
Fir	Fair	•		SW		SW		SW
Deciduous trees (Nesting and foraging sites, food, canopy and habitat structure)								
Oaks	Excellent	•	W	S	W	S	WB	S
Osageorange	Excellent	••		S		S		S
Hackberry	Excellent	••	SW	S	W	S	B	S
Pecan	Fair		W	S	W	S	W	S
Black walnut	Fair		W	S		S	W	S
Mulberry	Fair	•	S	S	S	S	S	S
Ash	Good	•	W	S	W	S	B	S
Maple	Good	•	S	S	S	S	B	S
Siberian elm	Excellent	••	S	S		S		S
Cottonwood/poplar	Fair	•		S		S	B	S
Black cherry	Excellent	•	S	S	S	S	SB	S
Flowering crabapples	Excellent	••	W	S	W	S	WB	S
Hickory	Fair		W	S	W	S	W	S
Hawthorn	Good	••	W	S	W	S	B	S
Serviceberry	Good	•	S	S	S	S	B	S
Tall shrubs (Nesting sites, food, cover near ground)								
Russian olive	Good	•	W	S	W	S	W	S
Autumn olive	• Excellent	•	W	SW	W	SW	W	SW
Honeysuckles	Excellent	••	W	SW	W	SW	WB	SW
Viburnums	Excellent	•	W	SW	W	SW	WB	SW
Shrub dogwoods	Excellent	•	S	SW	S	SW	B	S
Buffaloberry	Good		W	SW	W	SW		SW
Staghorn & smooth sumacs	Good		W	S	W	S	B	S
Short shrubs (Nesting sites, food, cover near ground)								
Fragrant sumac	Excellent	•	W	SW	W	SW	B	SW
American plum	Excellent	••	S	SW	S	SW	S	SW
Common chokecherry	Excellent	••	S	SW	S	SW	SB	SW
Chickasaw plum	Excellent	•	S	SW	S	SW	S	SW
Sargent crabapple	Excellent	•	W	S	W	S	WB	S
Cotoneaster	Good		S	S	S	S	S	S
Amur maple	Excellent	•	S	S	S	S	B	S
Coralberry & snowberries	Good - Excel		W	SW	W	SW	B	SW

¹Bold letters or two dots indicate an especially good wildlife feature.

²Several plants in this list have a variety of species or cultivars, and some may have features that differ from those indicated. Also, there may be good plant selections for your area that are not included.

Table 2. Examples of windbreak plants that benefit wildlife and their primary wildlife values, which occur mostly during summer and fall (S), fall and winter (W), or include browse (B).

in 10 years. Such material has its greatest value as cover for small rodents and as a source of food for ground-feeding, insectivorous birds.

Blue spruce produces a moderate volume of litter and down material. Mature and old-growth stands are fairly rich in both. The amount and size of material depend on the successional stage, or extent of disturbances, such as wind, fire, logging, insects, and diseases.

The amounts of litter and down material in pole-size blue spruce stands depend on how the stand developed. Stands which developed as a result of fire have very little such material, while those that developed from blowdown or insect attacks have large amounts of material.

Litter and down material in blue spruce decompose relatively quickly. Most litter and debris are in an advanced state of decay after 25 to 50 years on the ground. Conditions which would lengthen the period of time for advanced decay to occur would include charring of logs in a fire or the material being supported off the ground.

Litter and down material are special components high in associated wildlife values. Breeding and feeding requirements for a wide array of bird and small mammal species are met by these important elements.

WILDLIFE SPECIES USING THE HIGH ELEVATION RIPARIAN ECOSYSTEM

A list of species which potentially occur in the High Elevation Riparian Ecosystem is presented in Appendix A. Of those species known to occur in this ecosystem, the following have narrow ranges of ecological tolerance and should be included when developing a list of indicator species: beaver, bald eagle, goshawk, MacGillivray's warbler, mountain bluebird, sharp-shinned hawk, warbling vireo, willow flycatcher, Wilson's warbler, and yellow warbler. When developing a list of indicator species to be used in management for species richness, one should also include a species which uses early successional stages such as deer or elk.

COTTONWOOD RIPARIAN ECOSYSTEM

The Cottonwood Riparian Ecosystem has an extensive elevational range in Colorado, extending from 3,500 feet above sea level on the plains well up into the higher mountains. In the upward extension of its range, it may overlap the range of the High Elevation Riparian Ecosystem. Local site characteristics largely determine which of these ecosystems prevails where their elevational ranges overlap.

Species of cottonwood trees in this ecosystem are members of the Deciduous Forest Formation and are divided between the Northern Floodplain Forest Region at lower elevations and the Temperate Mesophytic Deciduous Forest Region at higher elevations.

Annual precipitation in this highly diverse ecosystem ranges from 15 inches at lower elevations to 35 inches in the mountains. Average annual temperature ranges from about 55 F at lower elevations to about 35 F in the higher mountains.

DESCRIPTION

Two plant series, Plains Cottonwood and Narrowleaf Cottonwood, make up the Cottonwood Riparian Ecosystem in Colorado. Because of their similarities, these cottonwoods are described collectively below.

The plains cottonwood is the dominant overstory species on the plains and narrowleaf cottonwood is its counterpart in the mountains, with a mixture of the 2 species occurring in the foothills. In the Rio Grande drainage and on the Western Slope, the plains cottonwood is replaced by the Rio Grande Cottonwood and Fremont Cottonwood, respectively. Willows of various species usually make up the dominant midstory species.



Fig. 2-13. The Plains Cottonwood Series of the Cottonwood Riparian Ecosystem.

Riparian areas in the mountains occupy relatively narrow, alluvial valley floors and floodplains that are underlain by sedimentary materials. Soils, predominantly Alfisols and Mollisols, are moist or wet for a portion of the year, and the water table in depressions is often at or near the surface most of the year.

The Narrowleaf Cottonwood Series, being riparian and occurring in Colorado over a wide elevational range, is associated with most of the other forested ecosystems. At higher elevations, some of the plants associated with narrowleaf cottonwoods are willow, water birch, thinleaf alder, black hawthorn, chokecherry, red-osier dogwood, Rocky Mountain maple, Greene's mountain-ash, reedgrass, brome, wheatgrasses, and sedges. At elevations within the lower Montane and Foothills zones, associated species are plains cottonwood, aspen, ponderosa pine, Rocky Mountain juniper, blue spruce, water birch, thinleaf alder, Douglas fir, Rocky Mountain maple, coyote willow, hawthorn, skunkbush, whitestem gooseberry, rabbitbrush, clematis, fireweed, asters, clover, Canada and Kentucky bluegrasses, timothy, redtop, smooth brome, sedge, and Baltic rush.



Fig. 2-14. The Narrowleaf Cottonwood Series of the Cottonwood Riparian Ecosystem.

At lower elevations, plants associated with plains cottonwood are narrowleaf and lanceleaf cottonwood; peachleaf, coyote, bluestem, and Bebb willow; raspberry; currant; skunkbush; rabbitbrush; chokecherry; plum; true mountainmahogany; clematis; poison ivy; clover; Kentucky bluegrass; timothy; and smooth brome.

SILVICAL CHARACTERISTICS

Cottonwoods reproduce from seeds. However, viability is greatly reduced if seeds are not kept moist, especially in warm weather. Seedlings grow best with a season-long moisture supply and are highly intolerant of herbaceous competition and shade. Under favorable conditions, seedlings grow 6 to 12 feet annually.

Vegetative reproduction is vigorous (i.e., sprouting from roots and stumps of young trees), but declines with tree age. Cottonwoods will also reproduce by stem cuttings from 1-year-old stock. Cuttings should be made during the dormant season, treated with fungicide, and held in cool, moist storage for spring planting.

Cottonwoods are relatively short-lived trees, attaining maximum height and diameter in about 40 to 50 years. They are highly susceptible to drought and fluctuations in water tables because of their shallow root systems. They usually grow in pure stands which thin themselves naturally and rapidly. Stands are nearly always even-aged and will not regenerate until the overstory is broken to allow full sunlight to reach the forest floor.

Loss of vigor from lack of moisture increases the likelihood of disease and insect attacks. Leaf beetles, grasshoppers, and wood borers are the chief insect pests. Leafspots, cankers, and leaf rust are the most damaging diseases.

STRUCTURAL STAGES AND ASSOCIATED WILDLIFE VALUES

The Cottonwood Riparian Ecosystem is important to many species of wildlife. The 5 structural stages and their importance to wildlife are described below.

GRASS-FORB STAGE (1).—The grass-forb stage in both cottonwood series is normally very short-lived. It usually occurs for less than 1 growing season following disturbance because the site's productivity results in rapid regeneration of woody plants.

SHRUB-SEEDLING STAGE (2).—In stands of cottonwood, suckering occurs in the second year after the stand is opened. The number of suckers is variable and depends on root health (vigor) and openness of the stand. Sucker growth is very rapid, easily reaching 10 feet within 2 seasons. Young cottonwood trees can reach 2 to 4 inches d.b.h. within 2 to 3 years.

At this stage, seedlings are valuable as browse for big and small game, food and building material for beaver, and as cover for small game and rodents.

SAPLING-POLE STAGE (3a, 3b, and 3c).—Sapling-pole cottonwood stands exist in this stage for about 10 years and may reach 2 to 8 inches d.b.h. and 20 to 40 feet in height. On poorer sites, cottonwoods may never reach the 8-inch d.b.h. size and will be shorter than 20 feet with crooked and twisted boles. Very lit-

tle of the Cottonwood Series in Colorado is presently in the sapling-pole stage. High mortality is characteristic of young cottonwood stands regardless of origin because trees that fall below the general canopy level stop growing and die within 1 or 2 years.

The value of the sapling-pole structural stage of cottonwood is primarily for providing structural diversity when found interspersed with other structural stages. It provides breeding, feeding, and resting habitat for insectivorous birds such as the warbling vireo and Wilson's warbler. Sapling and pole-size cottonwoods also provide desirable food and construction material for beaver. Although the value for big game forage no longer exists with this stage, it does become important as hiding cover for deer and elk.

MATURE STAGE (4a, 4b, and 4c).—Cottonwoods reach maturity in 50 to 60 years and remain vigorous for 80 to 90 years. Willows associated with cottonwoods reach maturity much sooner, 20 to 40 years, and degenerate quickly thereafter. Snags in mature cottonwoods and willows are common and provide excellent habitat for primary and secondary cavity-nesting birds, as well as some small mammals.

Cottonwoods, on average or better sites, may have a closed canopy at maturity, with stands having canopy closures greater than 80% being most common. Stands with natural canopy closures of less than 70% are probably on marginal sites or are in the advanced stages of deterioration. In either case, such cottonwood stands could be eliminated if not regenerated by some type of disturbance.

OLD-GROWTH STAGE (5).—Old-growth cottonwood stands are common in Colorado. Such stands have many diseased trees and snags. Because cottonwood is so intolerant of shade, no suckering occurs until stand deterioration is advanced. Deterioration of old-growth stands may continue for up to 100 years. Such stands are most important for the snags and decadent trees that they provide for cavity-nesting birds and mammals.

SPECIAL HABITAT COMPONENTS

Snags, litter, and down material are special habitat components which can be affected by management.

SNAGS.—Cottonwood mortality is generally caused by disease, suppression, or deterioration of various age classes of trees. While mortality is randomly scattered during stand development, groups of snags occur in old-growth cottonwood stands. The frequent occurrence of snags and cavities makes them especially valuable for cavity-nesting birds and mammals. The length of time snags will remain standing depends upon the site; snags on hydric sites are shorter lived than those on mesic sites.

LITTER AND DOWN MATERIAL.—Cottonwood leaves produce rich litter during all stages of development. Down material is nearly absent in young,

thrifty stands, but is abundant in older, decadent stands. Litter and down material has value as cover for small rodents and as a source of food for insectivorous birds that feed on the ground.

WILDLIFE SPECIES USING THE COTTONWOOD RIPARIAN ECOSYSTEM

Wildlife Species which potentially occur in the Cottonwood Riparian Ecosystem are shown in Appendix A.

Of those species occurring in the Cottonwood Riparian Ecosystem, 18 have narrow ranges of ecological tolerance and should be included when developing a list of indicator species: beaver, fox squirrel, bald eagle, Bewick's wren, bushtit, goshawk, gray catbird, great blue heron, Lewis' woodpecker, MacGillivray's warbler, plain titmouse, red-headed woodpecker, sharp-shinned hawk, warbling vireo, willow flycatcher, Wilson's warbler, yellow-bellied sapsucker, and yellow warbler. When developing a list of indicator species to be used in management for species richness, one should also include a species which uses early successional stages such as deer.

ACKNOWLEDGEMENTS

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no. 3.106

Weed management for small rural acreage owners

K. George Beck¹

Quick Facts

Weed management is developing a control plan to implement over time.

Prevention, eradication and control are three general management strategies.

Prevention is the first line of defense to keep weeds from occurring or increasing in an area.

Eradication is the removal of weeds from an area so they will not recur unless reintroduced.

Control reduces a weed population in an area to a level where you can make a living off of or enjoy using the land.

A weed management system integrates two or more control methods into a plan of operation.

Weed management is developing a control plan to implement over time. It is different from simple weed control, which reacts to weeds after they occur. There are three general weed management strategies: prevention, eradication and control.

Prevention

Prevention, the first line of defense, keeps weeds from occurring or increasing in an area. Preventive techniques may include planting high quality, weed-free crops or grass seed. Legislative items, such as clean seed acts and weed management laws, also can help stop weed problems before they occur and deter weed spread. An important preventive measure related to control is to keep weeds from going to seed. This is particularly important for annuals and biennials, because that is their only means to reproduce. Perennials reproduce from seed and vegetatively, from their root system. (Annual weeds live for one growing season, biennials for two and perennials more than two.) However, preventing

seed set is extremely important to keep perennials from starting new infestations some distance from existing ones.

Eradication

Eradication is the removal of weeds from an area so they will not recur unless reintroduced. If eradication creates an open environment, a weed problem may be cured simply to create another one. If eradication is necessary and desirable, it usually is necessary to revegetate the ground to prevent another weed infestation. Eradication is desirable for small patches, e.g. 10 to 100 feet in diameter, but not always for larger ones.

Control

Control, most often practiced, reduces a weed population in an area to a level where you can make a living off of or enjoy using the land. Adequate control also may prevent future infestations. There are four control methods: cultural, mechanical, biological and chemical.

Cultural control methods are implemented by the land manager to favor desirable plant growth. Fertilization, irrigation and planting at optimum densities are methods that offer the most competition from crop plants to weeds and least competition among crop plants. Weeds may respond to fertilization and/or irrigation but generally do not respond as well as crops because weeds evolved under limited environmental conditions.

Mechanical control methods physically disrupt weed growth. Mechanical weed control is the oldest and most often method used worldwide. Tillage, hoeing, hand-pulling, mowing and burning are examples of mechanical weed control. To mulch or smother often is considered mechanical even though it simply excludes light rather than physically disrupts weed growth.

Biological control methods use an organism to disrupt weed growth. Often the organism is an insect or plant pathogen and a natural enemy of

¹K. George Beck, Colorado State University Cooperative Extension weed science specialist and assistant professor, plant pathology and weed science (1/90)

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quart/A (0.5 + 1.0 pound ai/A) to musk thistle rosettes. Spring treatment should occur before musk thistle bolts (shoot elongation) or it may recover and develop seed. Apply Telar or Ally at 1 ounce (0.75 ounce ai/A) or 0.5 ounce/A (0.3 ounce ai/A), respectively. Telar is labeled for non-crop use only, but Ally is registered for pasture and rangeland use. Add a good agricultural surfactant at 0.25 percent v/v. Apply in spring when musk thistle is in the rosette-to early-flower growth stages. If treating in early flower, do not allow the pink portion of the developing flower to exceed the size of a dime. Research at Colorado State University indicates little to no seed is formed when Telar or Ally are applied during these growth stages.

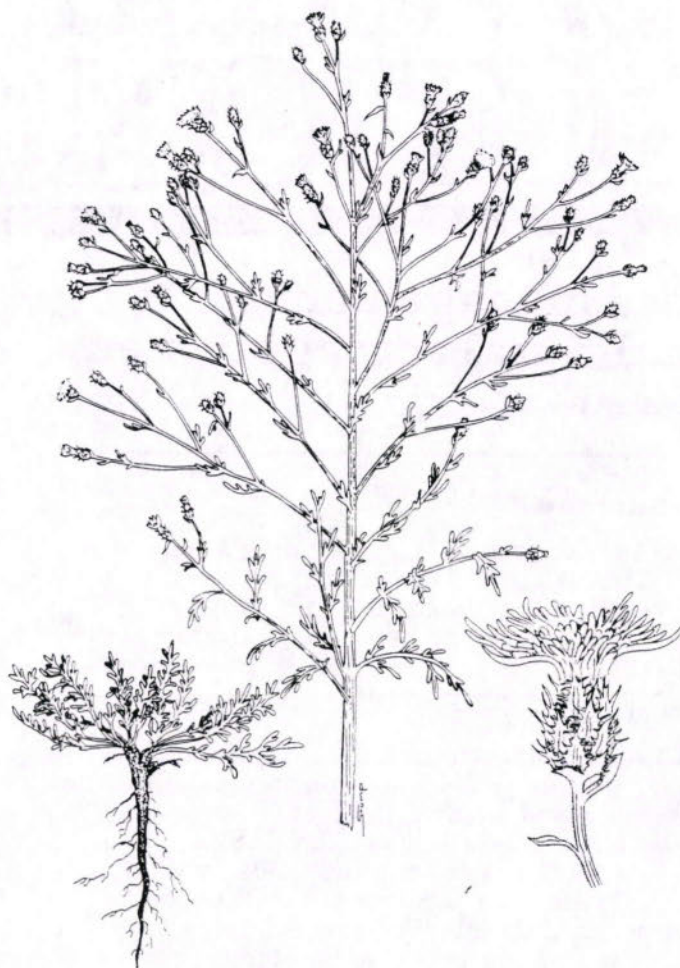
The musk thistle seed head weevil (*Rhynchylus conicus*) is widespread in Colorado. Larvae of this insect destroy developing seeds but are not 100 percent effective by themselves. Musk thistle has flowers in various growth stages at once and the weevil's life cycle usually is finished before all flowers develop. Apparently, the weevil normally impacts seed production by about 50 percent. Herbicides can be combined with weevils if the insects are allowed to complete their life cycles. Telar or Ally applied at early flower in spring or Tordon or Banvel + 2, 4-D in fall should allow this.

Diffuse Knapweed

Diffuse knapweed is a biennial and grows similar to musk thistle. The key to management is to prevent it from going to seed. Diffuse knapweed invades over-grazed pastures, forms dense stands and is toxic to horses. After a herbicide treatment, reseed a poor-conditioned pasture so grasses can be present to compete with surviving diffuse knapweed.

Spring- or fall-applied herbicides are effective. Research conducted at Colorado State University indicates Tordon at 0.5 to 1 quart/A (0.25 to 0.5 pound ai/A) or Banvel + 2, 4-D at 0.5 + 1.0 quart/A (0.5 + 1.0 ai/A) applied in spring from rosette to early-bolt growth stages are effective.

Biological control will be available in the future. In 1989, the Colorado Department of Agri-



Diffuse Knapweed

culture received a gall fly (*Urophora affinis*) from USDA/APHIS. The females lay eggs in developing flowers and the larvae incite gall formation as they feed on heads, which reduces seed formation. The gall fly should be ready for redistribution in the future. The gall fly overwinters inside the seed head as larvae and the normal procedure for redistribution is to cut last year's 'dead stand' that contain larvae and tie the 'bouquet' to a fence post near knapweed stands. Adults will emerge in spring and repeat the life cycle. A research program in Montana is underway that might make other insects available.

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no. 7.417

How to plant trees and shrubs

James R. Feucht¹

Quick Facts

Plants from a nursery are available as bare root, balled-and-burlapped or container-grown.

Bare root plants are available only in spring.

Keep newly purchased plants moist and in the shade until planting.

Soil preparation with organic matter is important, especially if soil is a heavy clay.

Holes should be dug 2-4 inches shallower than the root ball, but much wider.

Mix 1/3 organic matter to existing soil for backfill.

Remove all containers, wires and ropes from ball before backfilling holes.

Burlap need not be removed, but should be loosened at the top and all ropes around and near the trunk cut.

Backfill should not be tamped; allow water to settle soil.

Mulching with wood chips after planting reduces need for frequent watering.

Pruning of newly planted trees and shrubs should be kept to a minimum.

Trees and shrubs should be considered a permanent part of a home landscape. If properly selected and planted correctly in an appropriate location, they will improve the appearance and increase a home's value as well as provide shade, protection from weather, privacy and year-round enjoyment.

Since trees and shrubs represent an important part of a home investment, it is essential that

care be taken in their planting. Inadequate soil preparation and improper planting procedures are frequent causes of failure of a plant to thrive after transplanting.

When To Plant

The idea time to plant is in early spring as soon as the ground can be worked. Avoid disturbing any plant that has recently broken bud and is producing new, soft growth.

Balled-and-burlapped plants and those established in containers can be planted safely after new growth has expanded and become hardened. This usually occurs mid- to late June.

Fall planting is more risky than spring, especially for evergreens. If fall planting **must** be done, do so prior to mid-October. Fall-planted material should be mulched with about five inches of wood chips or similar material to prevent early freezing of soil. This allows more time for root growth to take place prior to the severe cold of winter.

Care Before Planting

Plants purchased from a nursery may be bare-root, balled-and-burlapped, or container-grown.² Bare-root plants are available only in smaller sizes of deciduous trees and shrubs. In Colorado such plants usually are sold for early spring planting. When purchased, the roots are wrapped in a moist, loose material such as shredded wood or sphagnum. Make sure that the material around the roots is kept moist, but not soggy, until planting. Keep the package away from direct sunlight or other sources of heat.

¹James R. Feucht, Colorado State University Cooperative Extension specialist, landscape plants (4/87)

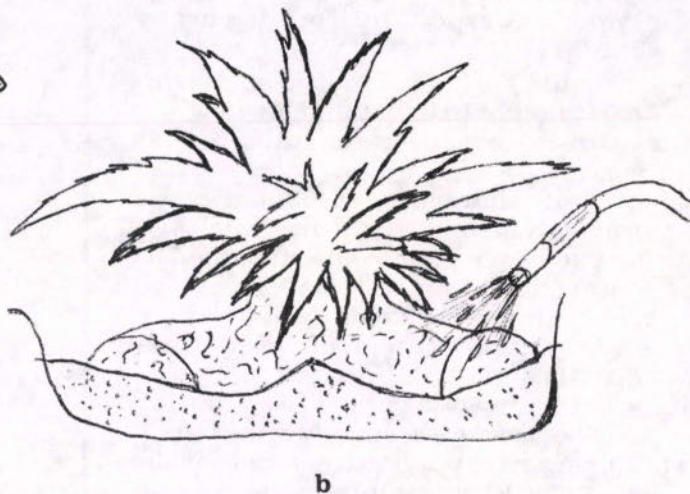
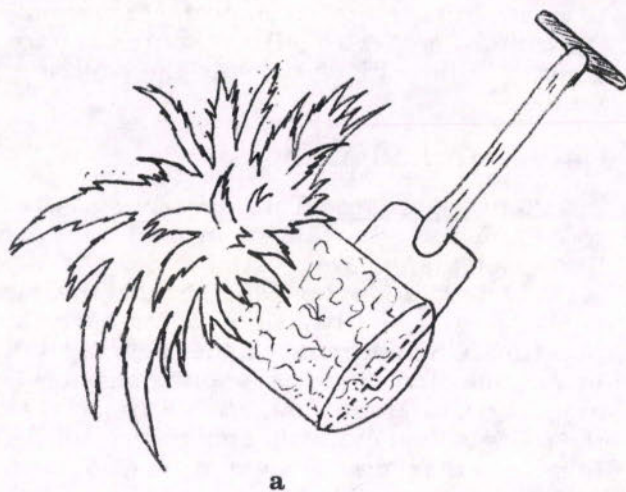
²Machine-dug (spade-dug) trees also are available through some nurseries, arborists and landscape contractors. For more information, refer to Service in Action sheet 7.213, Care and maintenance of large transplanted trees.

Figure 3: Temporary watering basin or dam.



Place soil ring around hole edge to create watering saucer and protect tree from mower damage. A temporary mulch of wood chips 5 inches deep may be used in the raised saucer. Art by Carey Orwig (Kansas State).

Figure 4: (a) Container-grown stock that is root-bound at the bottom of the ball should be split one-half way up the ball with a sharp spade; (b) Spread split halves on a mound of good soil and water immediately. Art by J. Feucht.



Mulching

Apply a loose mulch such as wood chips over the planted area to a depth of 5 inches. This eliminates the need for cultivating and reduces frequency of watering.

The best mulches for trees and shrubs are wood chips, bark chunks or similar materials. To reduce weed growth, a landscape fabric can be put down before chips are applied. **Do not use solid polyethylene sheet plastics.** Plastic films exclude air exchange to roots. This can kill your plants.

Fertilizing

Newly planted trees and shrubs should not be fertilized until after one growing season. Never put fertilizers such as dry pellets or fertilizer "spikes" containing nitrogen in the backfill since root injury may result. (See Service in Action sheet no. 7.226, *Care of young transplanted trees.*)

Protection of Young Trees

Young trees, particularly thin-barked types such as soft maple, honeylocust and crabapples may be sun-scalded during the first year or two after transplanting. This injury, usually on the southwest sides of trees, is caused by sudden

temperature changes and water loss in late winter. Wrapping the trunk and large branches prior to winter will reduce this problem. Remove wrap in spring to prevent harboring of insects and diseases beneath wrap.

Use commercial crepe-type tree wrap. Start at the bottom, overlapping wrap as it is applied upward to the second branch. Secure the top end with a staple or small tack. Do not use twine or tape to hold wrap in place because this may result in girdling of the tree.

Pruning

Newly planted trees and shrubs should be given only minimal pruning. Removal of too much top affects the production of food energy (carbohydrates) and can result in poor root development. After planting, prune out broken branches and those with weak or narrow crotches. With trees, leave some of the lower limbs and sprouts from the trunk even though they will be removed later. The reason for this is that these limbs provide the closest source of food energy for root development. See Service in Action sheets 7.003, 7.205, 7.206 and 7.207 for more information on pruning. Additional tips on the care of young transplanted trees may be found in sheet 7.226.

Figure 1: Holes for bare-root plants.

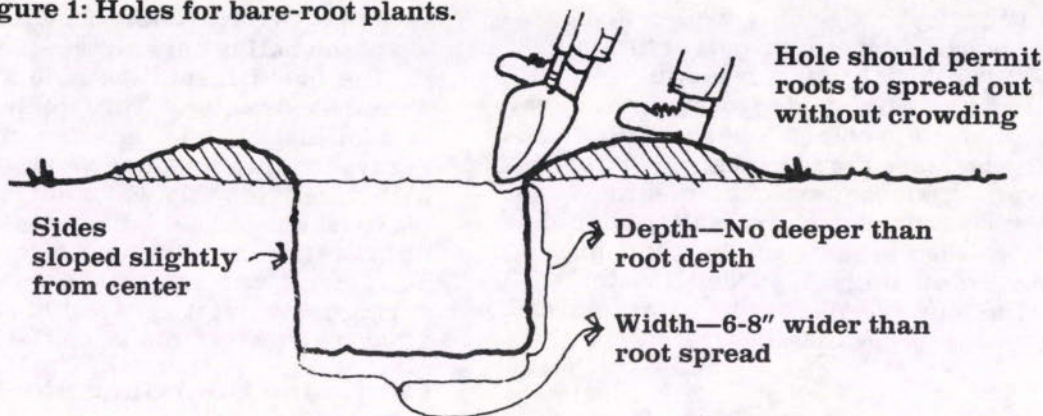
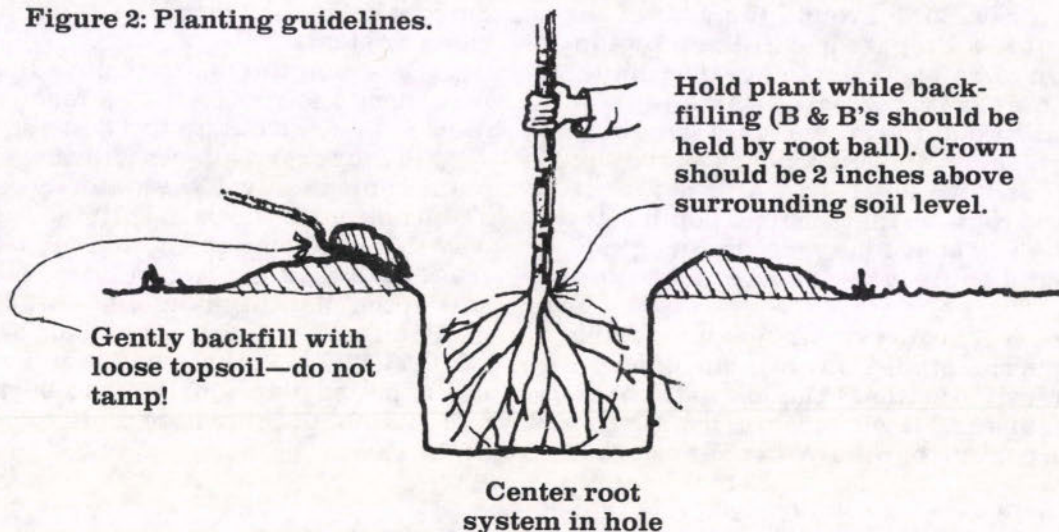


Figure 2: Planting guidelines.



Balled-and-burlapped and container-grown plants should be protected during transport from the nursery. Tops, particularly of evergreens, protruding from car windows or trunks should be covered with paper or burlap to reduce foliage damage and water loss caused by rapid air movement during transport. Once home, plants should be placed in a shaded location or in the garage until planting time. If planting must be delayed, keep soil ball or container watered, but **avoid getting soil too wet**, particularly just prior to planting time.

Preparing Soil For Planting

Few plants thrive in clay, heavy or poorly drained soils. These soils are usually not suitable for most plants because they are low in oxygen required for root growth.

Improving the drainage and aeration of a heavy soil often is difficult and may require extensive preparation. Ideally, soils with poor drainage should be tiled using perforated pipe or open-jointed 4-inch agriculture tile prior to final property grading. In most cases, however, this procedure is not performed by the building contractor. To install in established properties is often too expensive.

An alternate solution is to incorporate organic matter into the soil as deeply as possible and adjust planting depth. Use only well-rotted barnyard manure, coarse sphagnum peat or thoroughly decomposed compost. Avoid fine textured organic matter, such as sewage sludge or mountain peat, since these materials do not "open up" clay soils but actually decrease pore spaces.

For every 1,000 square feet of area to be planted, 2 or 3 yards of organic matter should be thoroughly worked into the soil by hand spading followed by rototilling. A garden tractor with plow attachments may be used for large areas. This equipment is available for rent in most localities.

Bare Root Plants

Holes for bare root plants should be large enough to permit the roots to be spread out without crowding or curving around the wall of the hole (see Figure 1). Prepare backfill soil by thoroughly mixing one part coarse organic matter (not "hot" manure) with two parts of existing soil. Hold the plant so that the crown (area where the roots and top meet) is at least 2 inches **above** surrounding soil or lawn level. This allows for settling of soil and roots so that the final depth is the same as or slightly above the surrounding grade. Add backfill and apply water slowly (see Figure 2).

With extra soil form a small, temporary dike just beyond the rim of the hole. Fill the dike with water and allow it to settle. **Do not tamp the backfill.** Check moisture level weekly by digging down near the edge of the dike. Water as needed. In

irrigated lawns, remove dike after 6-8 weeks. In non-irrigated plantings, allow dike to remain until second growing season. Plants with heavy tops may need to be staked for one or two growing seasons. Use strips of soft cloth or straps 2-3 inches wide to **loosely** tie trees to stakes. **Avoid** use of pieces of hose with wire through them. While this is a common method to guy trees, it usually causes girdling of trunks (see Service in Action 7.226 *Care of young transplanted trees* for details).

Balled-and-Burlapped and Container-Grown Stock

If the soil is a heavy clay, the planting hole should be made 2-4 inches **shallower** than the soil ball. If the soil is sandy, the hole should be **no deeper** than the root ball. Dig the hole much wider however, and slope the sides slightly away from the center. Place the plant in the center of the hole on undisturbed soil (see Figure 2). Remove containers made of metal, tar paper or plastic (bottom of can does not need to be removed). Slit or tear containers made of papier-mache, peat or wood slats (baskets). Always remove wire or plastic netting if these materials are used to hold the soil ball.

If the plant is wrapped in burlap, leave the burlap in place except for the top portion. **Make sure that twine around the trunk and across the top of the ball is cut and removed.**

Put backfill into the hole and water slowly. With the extra soil, form a temporary water basin or dam just beyond the edge of the backfill (see Figure 3). In about one week, fill the reservoir with water. Reapply water **only** when the soil begins to feel dry at 4-6 inches deep. Avoid frequent, light waterings. Because of differing water requirements and potential damage to tree trunks during mowing, it generally is best to keep lawn areas well away from trees.

Pot-Bound Container Stock

Shrubs and trees often are grown in containers long enough that roots become pot-bound resulting in the development of roots that encircle the root ball, which over the years may girdle the trunk or stems.

When containers are removed prior to planting, check the root ball. If a mass of encircling roots is present, cut up and down the ball 1/2-inch deep in four or five places with a sharp knife then plant immediately. If the majority of the roots are at the bottom of the ball, split the root ball **all the way through** from the bottom about half way to the top. Spread the two halves over a mound of soil in the planting hole. Backfill and water immediately (see Figure 4, a and b).

CAUTION: This method **should not** be used on newly potted plants, balled-and-burlapped plants or container plants where roots are not pot-bound at the base.