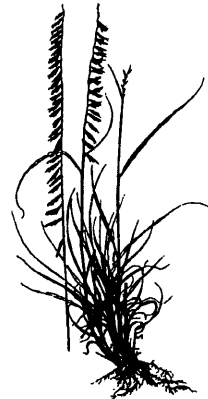
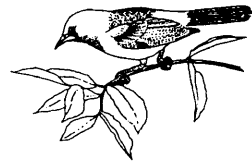


CREATING ATM SCHOOL HABITAT

**A Planning Guide
For Habitat Enhancement on
School Grounds in Texas**

APPENDICES For North Central Texas

**Blackland Prairies, Cross
Timbers, Post Oak Savannah,
and Rolling Plains
Ecological Regions**



Written by:

**Diana M. Foss, Urban Program, Texas Parks and Wildlife
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Illustrations on pages A-13, A-15, A-19, and A-20 by:

Michele G. Foss

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U. S. Fish and Wildlife Service**



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Additional copies of this manual may be obtained from the offices listed on the next page. Training workshops are offered periodically through the year in association with this manual.

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Appendix A: Resource Professionals

The following lists in the Appendices are partial lists. Write in additional resources as you discover them.

AUDUBON SOCIETY OF DALLAS COUNTY

P.O. Box 12713
Dallas, TX 75225
Voice Mail: 972-283-5216

SUSAN BATTARBEE

Texas Agricultural Extension Service Coordinator
North Central Texas Master Naturalist Program
10056 Marsh Lane
Dallas, TX 75229
PH: 214-904-3050
FAX: 214-369-1001
Email: srbatt@ticnet.com

COURTNEY BLEVINS

Texas Forest Service
2121 San Jacinto, Suite 810
Dallas, TX 75201
214-953-1190
FAX: 214-953-1986

BOTANICAL RESEARCH INSTITUTE OF TEXAS

509 Pecan Street
Fort Worth, TX 76102-4060
817-429-3200
FAX: 817-332-4112

ERIC BRITTINGHAM

River Legacy Living Science Center Liason
P.O. Box 150392
Arlington, TX 76015
817-860-1458
FAX: 817-860-1595

FRED BURRELL, JR

Texas Agricultural Extension Service Agent
10056 Marsh Lane, Suite B-101
Dallas, TX 75229
214-904-3050

DALLAS ENVIRONMENTAL EDUCATION CENTER

Paul Sugg, Director
1600 Bowers Rd.
Seagoville, TX 75159
214-287-4010

DALLAS HORTICULTURE CENTER

P.O. Box 152537
Dallas, TX 75315
214-428-7476
FAX: 214-428-5338

DALLAS MUSEUM OF NATURAL HISTORY

3535 Grand Avenue
Dallas, TX 75210
214-421-3466

DALLAS NATURE CENTER

Bryan Hutson, Director
7171 Mountain Creek Parkway
Dallas, TX 75249
972-296-1955
Email: bhutson@gte.net

DALLAS ZOO

621 E. Clarendon
Dallas, TX 75203
214-670-5656

JOHN DAVIS, DR. LOU VERNER

Texas Parks and Wildlife
Urban Fish and Wildlife
P.O. Box 941
Cedar Hill, TX 75106
972-293-3841
FAX: 972-293-3842
Email: jmdavis01@AOL.com
Email: Urbanwild1@AOL.com

DR. GARY DICK, DR. ROBERT DOYLE

Lewisville Lake Aquatic Ecosystem Research Facility
RR3 Box 446
#1 Fish Hatchery Road
Lewisville, TX 75056-9720
972-436-2215
FAX: 972-436-1402

EDUCATION SERVICE CENTER – REGION 10

Marla Stone, Consultant (Ext. 409)
400 E. Spring Valley Rd.
P.O. Box 831300
Richardson, TX 75803-1300
214-231-6301
FAX: 214-231-2977

EDUCATION SERVICE CENTER – REGION 11

Kevin Fisher, Educational Specialist, Science
3001 North Freeway
Forth Worth, TX 76106
817-740-3619
FAX: 817-740-3627
Email: ksffish@tenet.edu

JIM EIDSON

The Nature Conservancy of Texas
1942 S. Lakeshore Dr.
Rockwall, TX 75087
PH/FAX: 903-568-4139
Email: jeidson@tnc.org

FORT WORTH MUSEUM OF SCIENCE AND HISTORY

1501 Montgomery St.
Fort Worth, TX 76107-3079
817-255-9300

FORT WORTH NATURE CENTER AND REFUGE

Wayne Clark, Rob Denkhaus, Suzanne Tuttle
9601 Fossil Ridge
Fort Worth, TX 76135
817-237-1111
FAX: 817-237-0653

Resource Professionals (continued)

FORT WORTH ZOO
1989 Colonial Parkway
Fort Worth, TX 76110
817-871-7050

CARL FRANKLIN, RICHARD REAMS
Herpetologists, Dallas Zoo (see above)
214-670-7573

NATIVE PLANT SOCIETY OF TEXAS
Local chapters in most larger cities
Box 891
Georgetown, TX 78627

RIVER LEGACY FOUNDATION
703 NW Green Oaks Blvd.
Arlington, TX 76006
817-860-6752
FAX: 817-860-1595

LARRY SCHAAPVELD
Texas Forest Service, Tarrant Co.
4200 S. Frwy, Suite 2200
Fort Worth, TX 76115-1499
817-926-8203
CELL PH: 817-229-2620

LINDA ANN SMITH
Landscape Architect
10311 County Road #168
Kaufman, TX 75142
972-962-6045
PAGE: 214-814-2338

DR. KEN STEIGMAN
The Heard Natural Science Museum and Wildlife Sanctuary
One Nature Place
McKinney, TX 75069-8840
972-562-5566 (Ext. 229)

TEXAS SOCIETY FOR ECOLOGICAL RESTORATION
Susan Battarbee, President
214-358-0647

USDA – NATURAL RESOURCES CONSERVATION SERVICE
Virgil Helm, District Conservationist
320 Westway Place, Suite 511
Arlington, TX 76018
817-467-3867

U.S. FISH AND WILDLIFE SERVICE – FISHERIES
Don Wilhelm, Fish and Wildlife Biologist
711 Stadium Dr., #252
Arlington, TX 76011
817-277-1100

U.S. FISH AND WILDLIFE SERVICE- ECOLOGICAL SERVICE OFFICE
Tom Cloud
711 Stadium Dr., East Ste. 25L
Arlington, TX 76011
817-885-7830

Appendix B: Teacher Training Resources

Project WILD and Aquatic WILD
Texas Parks and Wildlife Department
4200 Smith School Road, Austin, TX 78744
(800) 792-1112, www.tpwd.state.tx.us

School Habitat Workshops
Texas Parks and Wildlife Department, (972) 293-3841

Adopt-A-Pond and Texas Amphibian Watch
Texas Parks and Wildlife Department
(972) 293-3841 locally
(800) 792-1112 statewide

Adopt-A-Wetland Program
Texas A&M University – Corpus Christi Campus
6300 Ocean Drive, NRC 3208,
Corpus Christi, TX 78412, (512) 980-3221

Texas Master Naturalist Program
North Central Texas chapter (972) 293-3841

Texas Master Naturalist Program, Statewide
113 Nagle Hall
Texas A&M University System
College Station, TX 77843-2258

Master Composting and Junior Composting Programs,
Texas Natural Resource Conservation Commission,
(800) 64-TEXAS, or (713) 767-3500

ADDITIONAL RESOURCES:

Appendix C: Resources for Materials/ Supplies

This is only a partial list of plant vendors. Other nurseries may carry native species seasonally. Write in additional sources as you discover them.

NATIVE PLANTS AND SEED SOURCES:

Bluestem Nursery
4101 Curry Rd.
Arlington TX 76017
817-478-6262

Dallas Nature Center Nursery
7171 Mountain Creek Parkway
Dallas TX 75249
214-296-1955

Dr. Gary Dick
Aquatic Plant Specialist
Aquatic Plant Sales
Lewisville TX
972-315-7887

Green Mama's Nursery
5324 Davis Blvd
North Richland Hills TX 76180

Fort Worth Nature Center
Route 10 Box 53
Fort Worth TX 76135
Limited Supply

Greenhouse Gardens
4402 W. University Dr.
McKinney TX 75070
972-562-5895

Harpool Farm and Garden
420 East McKinney
Denton TX 76201
817-387-0541

Into the Garden, Inc.
3214 Camp Bowie Blvd
Forth Worth TX 76107
817-336-4686



Jenco Wholesale Nurseries Corp Ofc
1445 MacArthur Dr
Carrollton TX 75006
972-446-1820

Kings Creek Gardens
813 Strauss Rd
Cedar Hill, TX 75104
972-291-7650

Bruce Miller Nursery
1000 E. Beltline
Richardson TX 75081
972-238-0204

Native American Seed
Mail Order Station
127 North 16th St
Junction TX 76849

Redenta's Garden
2001 Skillman
Dallas TX 75206
214-823-9421

Rohde's Nursery
3536 Leon Rd
Garland TX 75041
972-864-1934

Southwest Landscape Nursery Co.
2220 Sandy Lake Rd
Carrollton TX 75006
972-245-4557

Texas Blooms Organic Garden
7216 Wabash
Dallas TX 75214
214-328-1499

Thompson-Hills Nursery
11745 State Hwy 64 W
Tyler TX 75704-9477
903-597-9951

Weston Gardens in Bloom
8101 Anglin Dr
Fort Worth TX 76140
817-572-0549

NOTE: When trying to locate mulch, compost, rocks, and other such materials, be sure to contact possible free sources first. Quite often, cities, utility companies, and tree trimming services have to trim trees. They frequently run the limbs through chipper/shredders and give away the mulch to school projects. In addition, many cities are beginning to operate composting programs and will offer the finished product to the public. Rocks and gravel may be a different story. These materials may have to be purchased from local sand and gravel companies.

Appendix D: Reference Books

Also refer to books listed inside the Reference Boxes located at the end of various chapters.

STUDENT REFERENCES

FIELD GUIDES:

Peterson First Field Guides to:
Butterflies and Moths
Caterpillars
And others....

Texas Monthly Field Guide Series -

Butterflies of Texas by Raymond Neck
Reptiles and Amphibians of Texas by
Garrett and Barker
Snakes of Texas by Alan Tennant

National Geographic Field Guide to Birds of North America

Mammals of Texas by W. B. Davis and D. J. Schmidly,
University of Texas Press

Wildflowers of Texas by Geyata Ajilvsgi, Shearer Publishing

A Guide to Freshwater Ecology by Christine Kolbe and
Mark Luedke, Texas Natural Resource Conservation
Commission,
P. O. Box 13087, Austin, TX 78711-2087

Forest Trees of Texas, How to Know Them, Bulletin 20,
Texas Forest Service

Poisonous Snakes of Texas by Andrew Price, Texas Parks &
Wildlife Press

OTHER BOOKS:

Birding for the Amateur Naturalist by Laura O'Biso Socha,
Acorn Naturalists, (800) 422-8886.

Growing Wild, Inviting Wildlife Into Your Yard, (good for
young children) by Constance Perenyi, Beyond Words
Publishing, 13950 NW Pumpkin Ridge Road, Hillsboro,
OR, 97123.

Habitats, Making Homes for Animals and Plants, by Pamela
Hickman, Acorn Naturalists, (800) 422-8886.

Additional Resources:

TEACHER REFERENCES

Texas Wildscapes Gardening for Wildlife by Noreen
Damude and Kelly Conrad Bender, Texas Parks and
Wildlife Press

Native Texas Plants, Landscaping Region by Region
by Sally Wasowski, Gulf Publishing Company

How to Grow Native Plants of Texas and the Southwest
by Jill Nokes, Gulf Publishing Company

Creative Propagation, A Grower's Guide
by Peter Thompson, Timber Press, Portland, Oregon,

Texas Trees, A Friendly Guide by Paul Cox and Patty Leslie,
Corona Publishing Company, San Antonio

Attracting Birds to Southern Gardens by Thomas Pope, Neil
Odenwald, and Charles Fryling, Jr., Taylor Publishing
Company, Dallas

Building Birdhouses and Feeders by Ortho Books, Chevron
Chemical Company, San Ramon, California

Worms Eat My Garbage, by Mary Appelhof, Flower Press,
Kalamazoo, Michigan.

Teaching Kids About Birds (and other booklets), Bird
Watcher's Digest, Pardson Corporation, 1-800-879-2473.

Green Teacher magazine, \$27. per year, P. O. Box 1432,
Lewiston, NY 14092.

Education Goes Outdoors, Addison-Wesley Publishing Co.,
Acorn Naturalists, (800) 422-8886.

Educator's Activity Book About Bats, Bat Conservation
International, (800) 538-BATS.

Beyond the Classroom, Exploration of Schoolground &
Backyard, Acorn Naturalists, (800) 422-8886.

Bottle Biology, Kendall/Hunt Publishing Co., 4050
Westmark Dr., Dubuque, IA 52002. Also available from
Acorn Naturalists,
(800) 422-8886.

Texas Prairies - Relationships, for Grades 4-7,
The Botanical Research Institute of Texas, 509 Pecan St.,
Ft. Worth, TX 76102-4060, (817) 332-4441.

Shinners & Mahler's Illustrated Flora of North Central
Texas, Botanical Research Institute of Texas, 509 Pecan St.,
Ft. Worth, TX 76102-4060, (817) 332-4441.

Appendix E: Ecological Regions

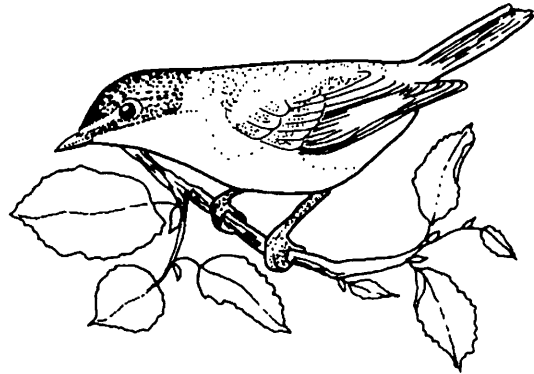
by Noreen Damude, Texas Parks and Wildlife

BLACKLAND PRAIRIES

Taking their name from the fertile, dark clay soil, the Blackland Prairies constitute a true prairie ecosystem and have some of the richest, naturally fertile soils in the world. Characterized by gently rolling to nearly level topography, the land is carved by rapid surface drainage. Pecan, cedar elm, various oaks, soapberry, honey locust, hackberry, and Osage orange dot the landscape, with some mesquite invading from the south. A true tall-grass prairie, the dominant grass is little bluestem. Other important grasses include big bluestem, Indiangrass, eastern gammagrass, switchgrass, and sideoats grama. While elevations from 300 to more than 800 feet match those of the Post Oak Savannah, the annual rainfall varies from 30 to 40 inches west to east, and the average annual temperatures range from approximately 66 to 70 degrees Fahrenheit. Described as “black velvet” when freshly plowed and moistened by a good rain, true blackland soils are deep, dark, calcareous deposits renowned for their high productivity. Scientists believe the richness of the prairie soils is derived from the abundant invertebrate fauna and fungal flora found in the soils themselves. Like many of the prairie communities comprising the Great Plains of North America, the Blackland Prairies harbor few rare plants or animals. The Blackland Prairies are today almost entirely brought under the plow, with only 5,000 acres of the original 12 million remaining. For this reason, many authorities believe that the Blackland Prairies represent some of the rarest landscapes in Texas.

CROSS TIMBERS AND PRAIRIES

The Cross Timbers and Prairies region covers about 17 million acres of alternating bands of wooded habitat, crossing throughout a mostly prairie region – thus the term Cross Timbers. Elevations range from about 600 to almost 1,700 feet, while rainfall varies from about 25 inches in the west to 35 inches in the east. Average annual temperatures are about 67 degrees Fahrenheit. The Cross Timbers share many of the same species with the Post Oak Savannah. Grassland species, such as



little bluestem, Indiangrass, and big bluestem are common to both, but there are a few notable differences in floral composition. Yaupon, sassafras, and dogwood, which form dense understory thickets in the Post Oak Savannah, are almost nonexistent in the Eastern Cross Timbers. Texas mulberry, American elm, and Osage orange become more common. In the understory are rusty blackhaw viburnum, American beautyberry, Arkansas yucca, and smooth sumac. In the Western Cross Timbers, which is drier still, live oak becomes more important, replacing the post oaks as you proceed westward. The decrease in moisture discourages trees from growing close together except along streams, resulting in more expansive pockets of prairies separating isolated stands of trees. Here flameleaf sumac, redbud, Mexican plum, rusty blackhaw viburnum, and eastern red cedar are more prevalent. Fragrant sumac appears for the first time, a common shrub in the Western Cross Timbers, the Edwards Plateau, and further west. Wildlife consists of a mixture of eastern forest and prairie species.

POST OAK SAVANNAH

Lying immediately west of the East Texas Piney Woods, the Post Oak Savannah emerges almost imperceptibly, marked by subtle changes in soils and vegetation. Occupying approximately 8,500,000 acres, the area’s topography is gently rolling to hilly with elevations ranging from 300 to

800 feet. Rainfall averages from 35 to 45 inches per year from west to east. Annual average temperatures range from 65 to 70 degrees Fahrenheit. Soils of the Post Oak Savannah are interesting and complex. They are usually acidic, with sands and sandy loams occurring on the uplands, clay to clay loams on the bottomlands, with a dense clay pan underlying all soil types. Because of this peculiarity, the Post Oak Savannah is sometimes referred to as the “Clay Pan Savannah.” Clay pan soils are nearly impervious to water and underlie the surface layers of soil at depths of only a few feet. As a consequence, the moisture available for plant growth is limited, making the habitat surprising arid at times. One curious exception to the clay pan soils occurs in Bastrop County – home of the renowned Lost Pines. The Carrizo sands, a sandy inclusion of moist soils, harbor a unique community of loblolly pine, post oak, and blackjack oak, and is also home to sphagnum bogs with ferns and carnivorous pitcher plants.

The Post Oak Savannah is punctuated by scattered oaks – mainly post oaks, of course – and blackjack oaks. Black hickory may also be locally abundant. Widespread trees of lesser importance include cedar elm, sugarberry, eastern red cedar, and common persimmon. Other important species in the region are Southern red oak, sassafras, flowering dogwood, yaupon, and winged elm. Some authorities believe that this region was once predominantly a tall-grass prairie, but that trees, mostly oaks, and brushy shrubs proliferated with the suppression of fires and the conversion of the land to farming and grazing. When fires were frequent, the land was not as it appears today. Historically, wide vistas of tall grasses – little bluestem, Indiangrass, switchgrass – and a myriad of wildflowers, broken only by the occasional motte of venerable “giants,” lent a park-like atmosphere to the landscape. Peat bogs, like the ones found in the Piney Woods, are also found here, mingled amongst stands of flowering dogwood, sassafras, bumelia, and yaupon.

Early European settlers were especially attracted to the Post Oak Savannah because it was clearly transitional between woodland and prairies. Today, the Post Oak Savannah is used largely for improved pasture, with vast acreage seeded to introduced grasses such as Bahia grass or Bermuda grass.

Mostly prairie animals with some woodland species abound in the Post Oak Savannah region. The distinctive sandy inclusion of the Lost Pines area also harbors one of the last refuges for the endangered Houston Toad.

ROLLING PLAINS

Marking the southern end of the Great Plains of the central United States, the red Rolling Plains represents the “last gasp” of a great continental prairie ecosystem. As its name suggests, topography of the Rolling Plains is gently rolling to moderately rough, with elevations ranging from 800 to 3,000 feet. Rainfall averages between 30 inches in the east to 22 inches in the west. The annual temperatures range from 60 to 64 degrees Fahrenheit. Most of the soils are neutral to slightly basic. The land is a varied and beautiful assortment of reds, from burnt sienna to the palest of pinks. East of the Cap Rock, on heavier clay soils, the native prairies of the Rolling Plains once consisted of midgrass and tallgrass communities nurtured by the intense summer rains and hot summer days. Pristine pockets of prairie are a rarity today, however. Much of what was once a sweeping expanse of sideoats grama, little bluestem, and blue grama has been tilled for grain fields or cotton. In many areas, overgrazing has allowed honey mesquite and shinnery oak to spread into the prairies, along with snakeweed and prickly pear. Trees occurring along waterways and canyons of the Caprock include plains cottonwood, Mohr oak, netleaf hackberry, one-seed juniper, and Rocky Mountain juniper.

The gently rolling hills and broad flats of the Rolling Plains are the birthplace of many great Texas rivers, including the Canadian, the Colorado, the Concho, and the Red River, which originate in the breaks of the Cap Rock Escarpment and in the western reaches of the region. These rivers and their tributaries harbor their own unique inhabitants, such as the Concho water snake and the Brazos water snake, which live only in a few restricted areas of the Colorado and Brazos river systems, respectively. Sand bars in the upper reaches of these rivers provide nesting habitat for the uncommon interior least tern and the snowy plover. Juniper woodlands, on the steep breaks of the canyons, are home to the Palo Duro mouse, a close

relative of the pinyon mouse of the Rocky Mountains. Burrowing at the base of mesquite trees as they forage by night for seeds and greens, the Texas kangaroo rat is restricted to certain clay-loam soils of the Rolling Plains. This unique desert-adapted rodent still has scientists guessing as to its origins.

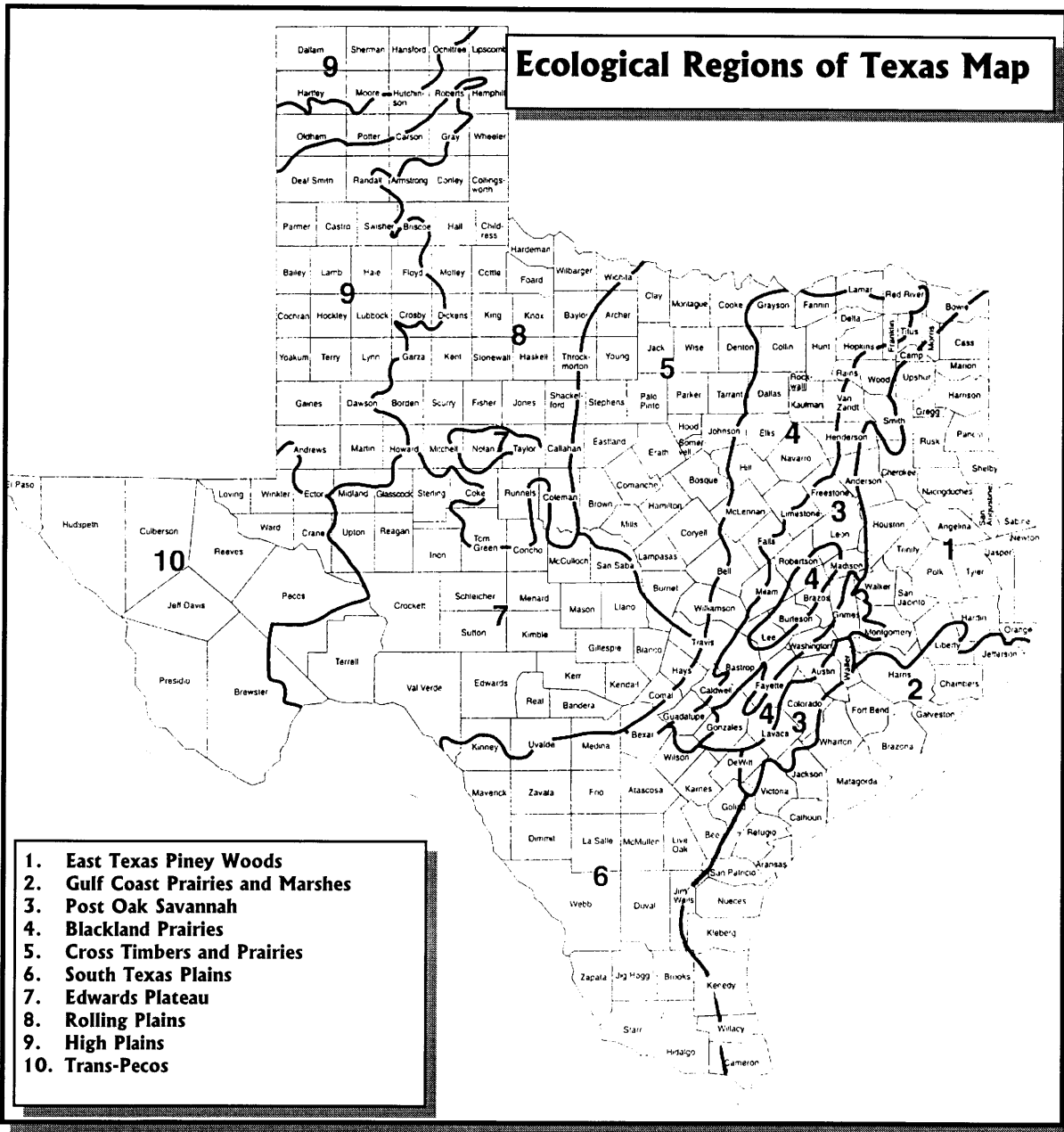
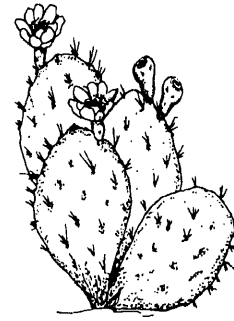


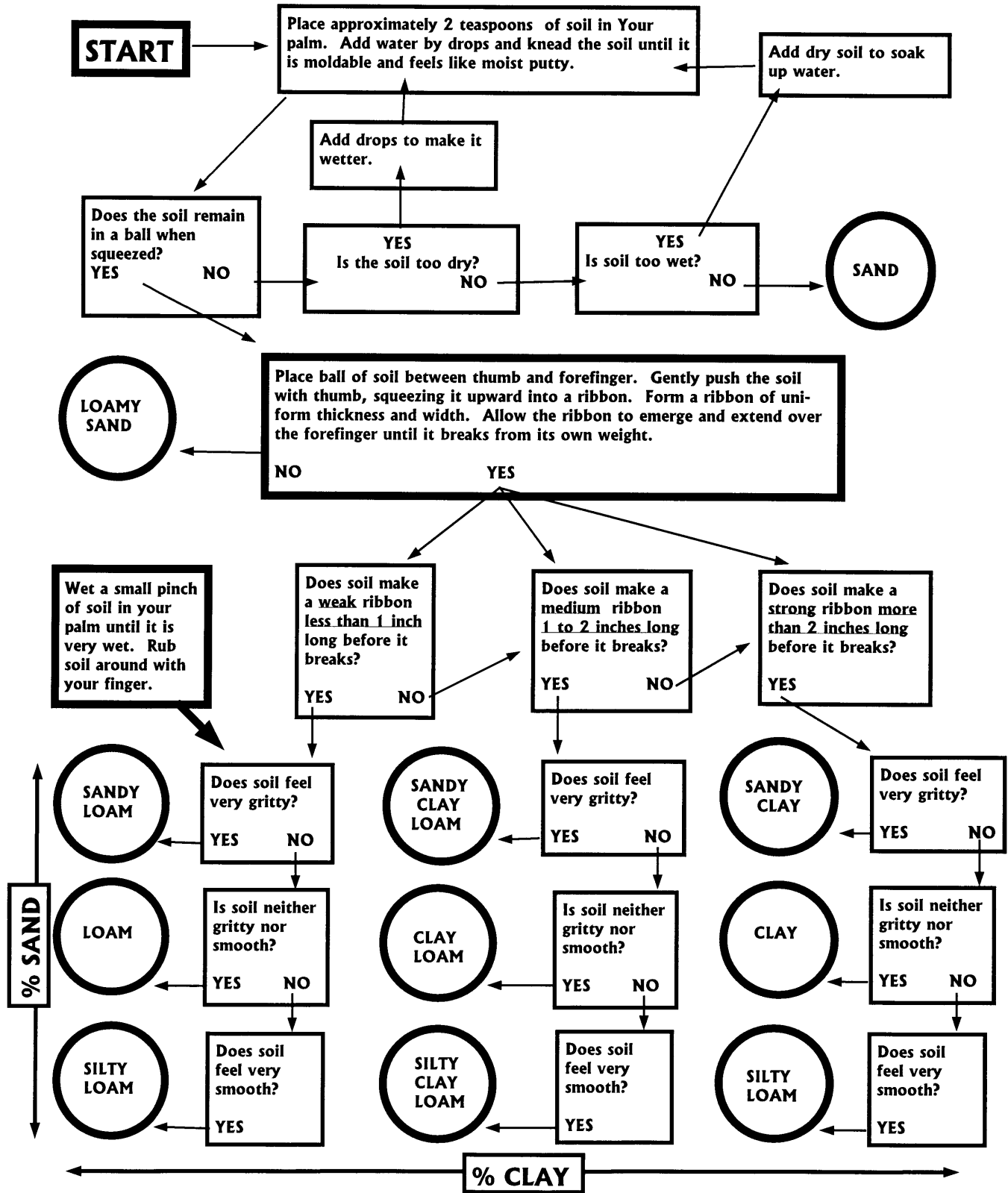
Figure (29). Map of the Ecoregions of Texas. (Source: Map adapted from F. W. Gould, G. O. Hoffman, and C. A. Rechenthin, *Vegetational Areas of Texas*, Texas A&M University leaflet 494.

Appendix G: Common Wildlife Foods

	Frogs	Salamanders	Turtles	River Otter	Bats	Raccoons	Woodpeckers	Snakes	Shrews	Owls	Beaver	Foxes	Hawks	Wood Duck	Bluebirds	Quail	Rabbit	Squirrel	Deer	Turkey		
	X		X			X	X							X	X	X				X	Spiders	
						X	X							X				X	X	X	Acorns	
						X								X				X	X	X	Nuts	
																		X	X		Mushrooms	
						X	X					X		X	X	X	X	X	X	X	Seeds	
			X			X	X					X		X	X	X	X	X	X	X	Fruit	
						X														X	Tubers, Roots	
			X			X					X					X	X		X	X	Greens	
	X	X	X		X	X	X	X	X	X		X	X	X	X	X					X	Insects
	X	X				X	X							X	X	X					X	Snails
											X						X		X	X	Leaves, Twigs	
																			X		Lichens	
																			X		Ferns	
																	X	X	X		Buds	
						X								X		X	X	X	X	X	Grain	
											X						X				Bark	
			X	X		X	X	X		X			X	X							Fish	
	X			X		X		X	X				X	X							Frogs & Salamanders	
	X			X				X		X			X								Snakes	
	X		X	X		X							X	X						X	Crayfish	
				X		X	X	X		X			X								Birds	
				X		X	X	X	X			X	X								Small Mammals	
			X									X		X							Aquatic Plants	
			X								X										Carrion	
	X		X			X	X	X				X									Earthworms	
		X				X	X														Eggs	
			X	X		X								X							Mussels	

Appendix H: “Key to Soil Texture by Feel” Chart

Fig. (31). This key was adapted from a flow chart by Steve Thiem, 1979, source unknown.



Appendix I: Cost Estimate Worksheet, Page 1

PROJECT DESCRIPTION – ITEM	AMOUNT NEEDED	COST PER ITEM	TOTAL COST
POND AREA:			
Backhoe rental with operator			
Pond Liner			
PVC Water Pipe to extend Water Line			
PVC Pipe Fittings			
15 gal. plants			
5 gal. plants			
1 gal. plants			
DECK/ STUDY PLATFORM:			
Boards -			
Boards -			
Boards -			
Nails -			
Concrete -			
PATHWAYS:			
Material -			
Edging -			
Lawn Roller Rental?			

Cost Estimate Worksheet, Page 2

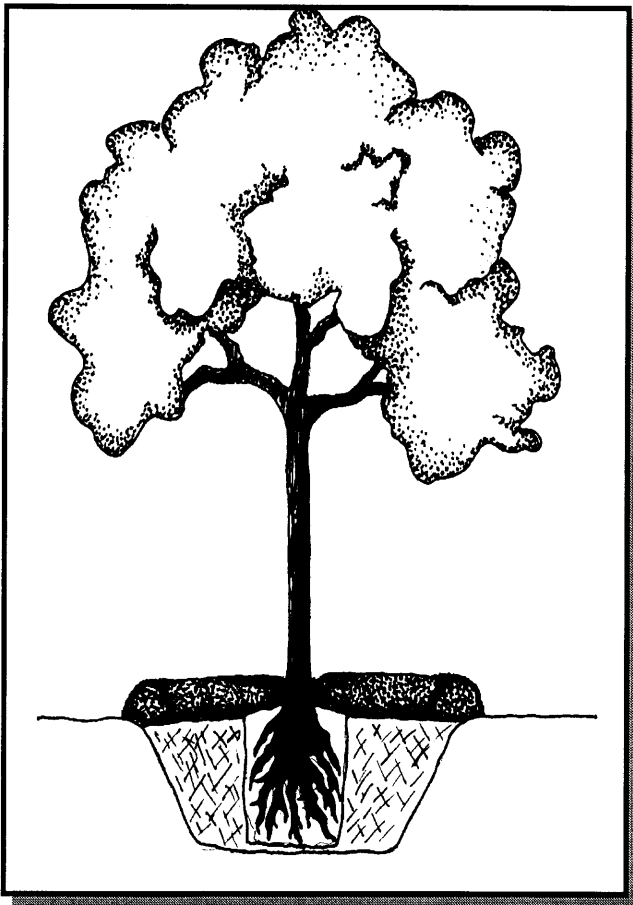
PROJECT DESCRIPTION – ITEM	AMOUNT NEEDED	COST PER ITEM	TOTAL COST
WILDFLOWER / PRAIRIE AREA:			
Tiller Rental			
Herbicide			
Wildflower/ Prairie Seed			
OTHER:			
15 gal. plants			
5 gal. plants			
1 gal. plants			
Plants – other			
Mulch			
Tools –			
Wheelbarrow			
6' X 8' Tool Storage Building			
Chain Link Fencing			
Chain Link Double Gate			
Chain Link Single Gate			

Appendix K: Tips on Planting Trees and Shrubs

from The Houston Area Urban Forestry Council

Trees do wonderful things. They create shade around buildings which decreases summer electric bills. Their cool, green leaves create a peaceful setting, clean and cool the air, buffer wind and noise, protect water quality, prevent soil erosion, screen unsightly areas, and provide food and cover for wildlife. For all the benefits trees provide, it is worth the extra effort to give them a good start.

PROPERLY PLANTED TREE



PLANTING TIME:

Generally, mid-November to late February is the best time to plant trees. Planting in late fall or winter will allow roots to become established before moisture demanding summer sets in. Most shade and ornamental trees sold in the nursery trade are either balled and burlapped or container grown.

6 STEPS TO PLANTING A TREE:

1. PLANTING A CONTAINER GROWN TREE

– Do not remove tree from container until you are ready to place into planting hole. Fine roots dry out rapidly when exposed to air.

2. HOLE SIZE - Loosen the soil in your planting site to a depth of 12 inches using a shovel or tiller. Dig a hole 2 to 3 times wider than the root ball and slightly shallower. The tree should be planted slightly above the original soil level. (This is especially important in heavy clay soils to aid in drainage.) When the hole is ready, gently remove the tree while lightly pressing against the sides of the container. If necessary, cut the container vertically to dislodge the root ball.

3. PLACING THE TREE IN HOLE - Set tree gently into hold, lifting by the root ball. When removing a tree from its container, take care to avoid breaking the root ball. Tree should be centered and level. Hold tree in place while backfilling around the root ball. Tamp soil lightly to eliminate air pockets. Large dirt clods should be broken apart before backfilling.

Figure (32). Properly Planted Tree. Dig the hole at least 2 to 3 times wider than the root ball. Slope sides of the planting hole. Gently place root ball into hole. Backfill with original soil. Build a ring of 3 to 4 inches of mulch around the tree with an indented saucer over root ball. Illustration by Michele G. Foss.

4. MULCHING - Remove any grass or weeds within a 3 foot minimum diameter circle around the tree. Create a slightly indented watering saucer. Cover with 3 – 4 inches of mulch composed of bark, woodchips, compost, or pine needles. Do not use fresh grass clippings. Do not place bark directly against tree bark.

5. WATERING - Adequate water is essential at planting time. Place water hose at base of tree and allow water to slowly trickle until the soil is saturated.

6. CARE OF NEWLY PLANTED TREE -

After watering, add mulch to compensate for any settling. If your tree needs additional support, use two or three six-foot stakes pounded into the ground outside the root ball. Attach the tree to the stakes with wide nylon webbing. The tree should have enough freedom to sway in the wind to develop strength. The stakes should be removed after the first growing season.

PLANTS TO AVOID IN A SCHOOL HABITAT

Non-Natives:	Natives:
Chinese tallow	Trumpet creeper
Purple loosestrife	Mexican hat
Kudzu	Datura
Exotic Privet	Ruellia (katie's ok)
Ligustrum	
Bermuda grass	
Paperbark tree (Melaleuca)	
Torpedograss	
Johnson grass	

The plants listed above should be avoided due to their invasive growth habits or poisonous properties.

For a list of **FEDERALLY PROHIBITED PLANTS** - [Http://www.aphis.usda.gov](http://www.aphis.usda.gov)

TREE PLANTING TIPS

- Loosen the soil far beyond the drip line of the tree.
- Brace the tree only if it will not remain upright in a moderate wind.
- Brace with broad, belt-like material that will not injure the bark. Remove after one growing season.
- Cover root ball with mulch, but keep trunk exposed.
- Keep soil moist, but not water-logged.
- Remove dead, diseased and damaged branches.
- If planting a balled and burlapped tree, check with your local resource professionals for advice on proper methods for your area.

MISTAKES TO AVOID

- Do not plant too deep.
- Do not wrap trees.
- Do not amend the soil, unless the soil is very unhealthy.
- Do not brace the tree so tightly that the tree cannot sway.
- Do not leave the bracing material on for more than one growing season.
- Remind students to remove the container before placing the plant in the ground.



Appendix L: Sample Butterfly & Hummingbird Garden

- GARDEN CHECKLIST:**
- For Hummingbirds**
- _____ Open space for flying
 - _____ Tubular, nectar-rich flowers
 - _____ Twig perches nearby
 - _____ Source of small insects, such as gnats
- For Butterflies:**
- _____ Open spaces in full sun for fluttering
 - _____ Away from strong winds or provide windbreak
 - _____ Masses of color (pink, purple, yellow, orange)
 - _____ Fragrant, nectar-rich flowers
 - _____ Larval food plants
 - _____ Puddling area

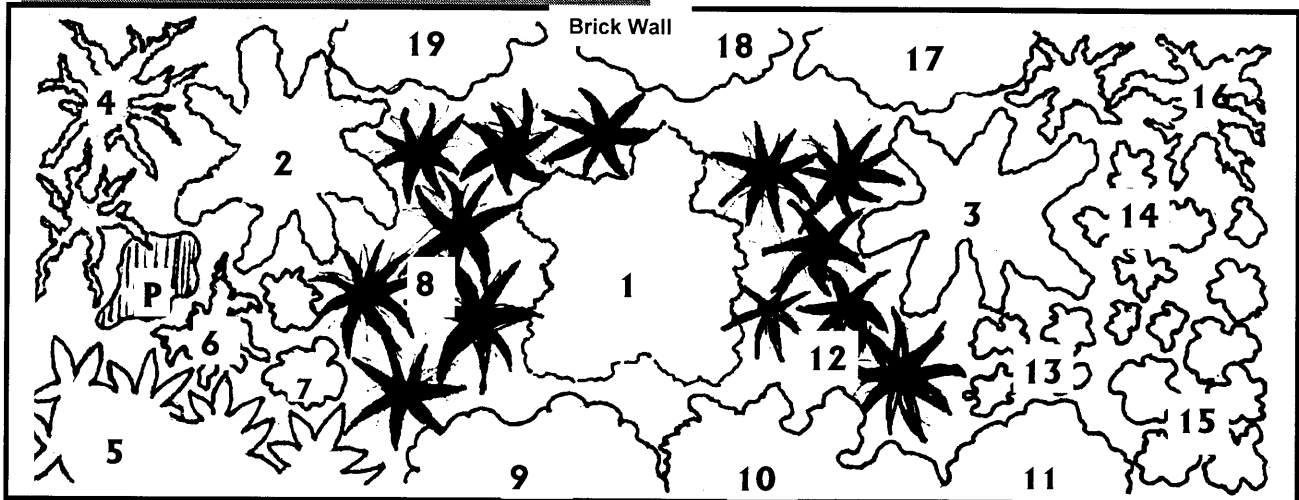


Figure (33). Sample design for a simple 10 foot by 28 foot butterfly and hummingbird garden. The garden is located in full sun against a brick wall. The design includes nectar sources for hummingbirds and butterflies, as well as a few larval host plants for caterpillars. Larger shrubs and vines could be planted nearby. The map scale is 1 inch equals 4 feet. Illustration by Michele G. Foss.

MAP KEY:

- | | | |
|------------|-------------------------|-----------------------------------|
| 1 | Hummingbird Bush | (<i>Hamelia patens</i>) |
| 2, 3 | Butterfly Bush | (<i>Buddleia sp.</i>) |
| 4 | Mexican Bush Sage | (<i>Salvia leucantha</i>) |
| 5 | Purple Coneflower | (<i>Echinacea purpurea</i>) |
| 6 | Mealy Blue Sage | (<i>Salvia farinacea</i>) |
| 7 | Dill | (<i>Anethum graveolens</i>) |
| 8, 12 | Milkweed | (<i>Asclepias sp.</i>) |
| 9 | Purple Asters + Winecup | |
| 10 | New Gold Lantana | (<i>Lantana sp.</i>) |
| 11 | Prairie Verbena | (<i>Verbena bipinnatifida</i>) |
| 13 | Fennel | (<i>Foeniculum vulgare</i>) |
| 14 | Gulf coast penstemon | (<i>Penstemon tenuis</i>) |
| 15 | Pentas | (<i>Pentas lanceolata</i>) |
| 16 | Scarlet sage | (<i>Salvia coccinea</i>) |
| 17, 18, 19 | Maximilian Sunflower | (<i>Helianthus maximiliani</i>) |
| P | Puddling area | |

REFERENCE MATERIALS

The Hummingbird Book by Donald and Lillian Stokes, Little, Brown and Company publishers.

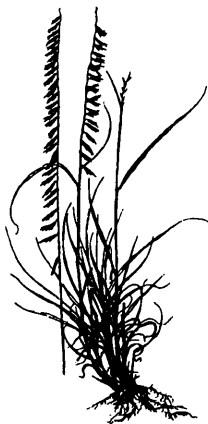
The Butterfly Book by Donald and Lillian Stokes, Little, Brown and Company publishers.

How to Attract Hummingbirds & Butterflies, Ortho Books, Chevron Chemical Company, Consumer Products Division, Box 5047, San Ramon, CA 94583.

Butterfly Gardening for the South by Geyata Ajilvsgi, Taylor Publishing Company.

Appendix M: Establishing a Prairie and Wildflower Area

Your school habitat will likely attract more birds and insects than any other wildlife. Both of these wildlife groups can provide many opportunities for observation. Insects not only attract birds to your habitat, but also offer life cycle observations that can be conducted outdoors or moved into the classroom. Herbaceous vegetation in the form of forbs (i.e., wildflowers) and grasses is more likely to attract insect species, including butterflies, than any other type of vegetation.



Schools often want to plant wildflowers for their aesthetics, and it is often seen as an inexpensive and easy project to do with children. Wildflowers alone do not constitute a habitat type. Mixed with native grasses, these areas will resemble the native prairie (see Appendix E) that once covered much of the Houston area. To maximize your ability to attract insects, it is necessary to provide a mix of forbs and grasses that will provide both food and cover for a wide variety of species. This bit of habitat may also provide food and cover for some bird species.

The establishment, maintenance and sustainability of these areas can be one of the most difficult phases of your school habitat projects. The area may also draw the most comments, both positive and negative.



The establishment of a prairie/wildflower area is divided into 3 phases:

1. Site preparation
2. Planting
3. Maintenance

1. SITE PREPARATION

Site preparation may be the most important aspect of this project. The successful establishment of desired species is directly related to how well you remove and control undesirable competitors, many of which are exotic plant species. Complete elimination of this vegetation should be your goal. There are several techniques available to achieve this goal. Choose a technique or combination of techniques suitable for your site and appropriate for your skill level and available resources.

Methods for Removing Vegetation:

Cultivation

This method includes such techniques as plowing, tilling, rototilling, and scarifying. Cultivation serves to kill undesirable plants and their germinating seeds. This process can be effective but labor intensive and requires the use of machinery. Repetition will probably be required to kill plants that germinate from dormant seeds brought to the surface. Many perennial weeds may not be destroyed by this process, and may, in fact, be spread and increased. This is not an appropriate technique for erosion prone sites. Repeated cultivation may be detrimental to the soil structure.

Herbicide Treatment

If this method is chosen, use a low toxicity, non-persistent herbicide, such as Round-up or Kleenup and follow the manufacturer's instructions carefully. Apply the chemical to green, actively growing vegetation. Wait two weeks and apply again, if necessary.

If your site contains a lot of rank or previous year's growth, it will probably be necessary to mow and rake up the cuttings. After cleaning up, allow the regrowth to reach 6-8 inches tall before applying the herbicide. Tilling done later during seed bed

preparation may bring dormant seed to the surface, resulting in the need for an additional treatment with herbicide or additional tilling for control. This treatment is an effective technique for weed removal and works well on erosion prone sites. Remember that school districts may restrict the use of herbicides or require the spraying be conducted by a licensed applicator.

Solarization Method

Solarization is the process of trapping heat generated by sunlight to kill plants and sterilize the soil. This method involves wetting the soil surface and covering it with clear or black plastic sheeting. Some studies indicate that clear plastic is more effective than the black. The material will have to be anchored down to keep it in place. In our climate, ultraviolet light tends to break the plastic down within one season. To be totally effective, the plastic should remain in place for an entire year to allow for the control of both cool and warm season plant species. While this is a safe process, it can be expensive and impractical for a large area. Some of the tougher plant species may still persist after this treatment.

Your site may require a combination of these methods to achieve the best results. You will find that your efforts will be rewarded by higher survival of your desired species.

Seedbed Preparation

For the most part, seedbed preparation should only consist of lightly tilling or discing of the soil. The goal is to prepare the soil to enable good seed contact with the soil. Tilling or discing should be restricted to the top one or two inches of the soil. By tilling deeper, you encourage undesirable dormant seeds to germinate.

2. PLANTING

The planting process provides another good opportunity to involve students. Students can do everything from selecting the proper plant species for your site to doing the actual installation.

Plant Selection

Select species native to this area. Choose species that match your site conditions. Remember that most of the plants in a prairie wildflower area prefer

full sunlight. Select a mixture with approximately 60% grass species and 40% forbs. You may find that emphasizing perennial species will result in a more successful project. Prepared seed mixes available on the market tend to have a high percentage of annual species. Purchase seeds from a reputable source. [Avoid purchasing seed mixes or “seed mats” that don’t list the flower species on their packaging. These mixes are usually designed for cooler climates and cannot handle our summer heat.] If you collect seeds from the wild, make sure you obtain the permission of the landowner. Never collect more than 50% of the seed available in that wild spot. By leaving half the available seed, this will leave seeds to germinate in the wild next year. Rescuing plants from an area that will be developed, with the landowner’s permission, would be the exception to the collection rule.

Seeding Rates

The seeding rate is the amount of seed applied to a given area, usually shown as lbs./acre or ozs./ 1000 sq. ft.. Seeding rate is based on the PLS (pure live seed) content of your mixture. Seed purchased from a reputable dealer will have the PLS content indicated on the packaging, as well as the recommended seeding rate. You will not know the PLS content for seeds you hand collect from the wild and planting rates may be difficult to calculate. For calculating seeding rates for collected seed, use the rates recommended by seed dealers and then err to the excessive.

Planting Technique

Many of the seeds you will be working with are very small. Several thousand seeds per one ounce is not uncommon. To evenly distribute such tiny seed on your site, it is necessary to dilute them by mixing them with a suitable material, such as dampened sand or sawdust. Use a volume of sand or sawdust equal to or greater than the volume of your seeds.

The more you dilute your seed mixture, the more students you can involve in the planting activity. Divide the mixture in half. Distribute one half of the mixture between the students and have them broadcast it gradually while walking across the site. Distribute the second half of the seed and broadcast it while walking perpendicular to your first path. This process will allow for a more even distribution

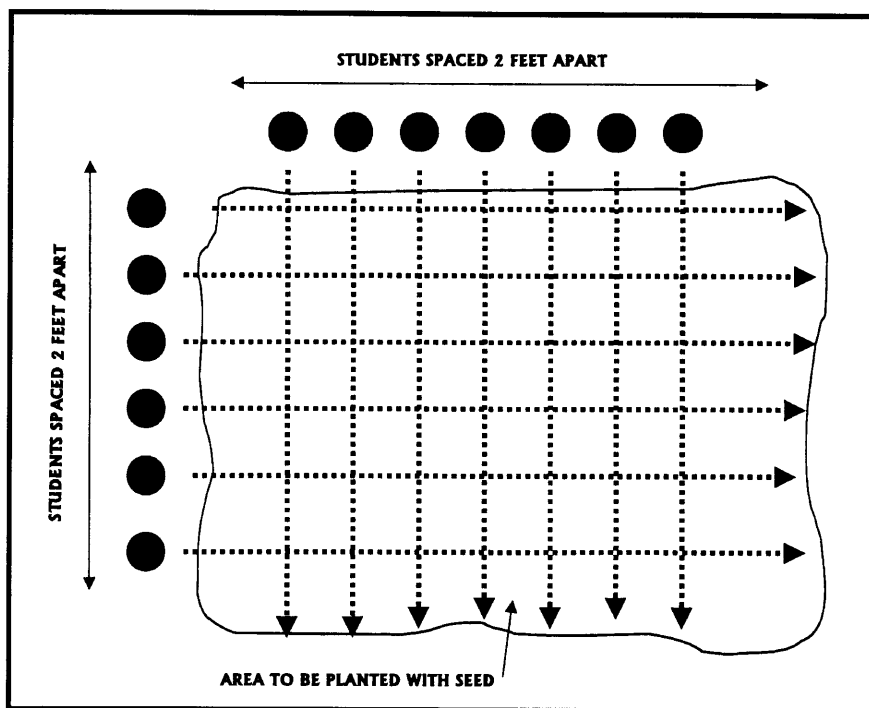


Figure (34). Student Seed Planting Activity. Students line up on two sides of the site to be planted with seed. Students on one side walk in straight lines from their side to the opposite side, gently releasing seed all along their path. Then students from the other side walk in lines perpendicular to the original students' paths. This process results in a fairly even distribution of the seeds.

of the seed mixture. Lightly rake the soil surface. Have the students walk back and forth across the site or rent a lawn roller to gently push the seed mixture into the soil surface. Good soil contact is important for germination success. **Burying the seed is not your goal.** Many of these seeds require light to germinate. Watering after planting may not be necessary and may actually favor the germination of weed seeds. Late summer through fall is the best time to plant warm season grasses and spring or summer blooming wildflowers. Late winter into early spring is the best time to plant fall-blooming wildflowers.

Establishing your habitat with containerized plants rather than from seed will give you quicker results. However, you may find the cost prohibitive and that not as many species are available in containers. An alternative would be to have students raise the plants from seed and transplant them to the habitat. You may choose to use this alternative method for those plant species that are difficult to germinate in the field and then have your students intersperse the seedlings with those that were seeded directly into the ground.

3. Maintenance

Most seeds will germinate the first year. If optimum conditions do not exist the first year, some seeds may lie dormant and then germinate the second year. Many of the grasses concentrate on establishing root systems the first year and as a result, do not produce much top growth. The second year these grasses will produce more top growth and may bloom.

This several year process aids in prairie management. Many unwanted weeds are annuals that will grow taller than your desired prairie species. Therefore, to maintain the prairie, you can cut down the taller annual weeds without damaging your new grass or wildflower seedlings. The goal is to cut the undesirable annuals before they produce and distribute their seed. During the second or third years, you may want to reseed any bare spots or add transplants to increase your plant diversity.

Controlling Invasive Species

You will probably discover that spot applications of herbicide and hand weeding are necessary. If used, a herbicide should be applied to a specific problem plant only, called spot treatment, rather than sprayed widely over the area. Be persistent in controlling invaders, such as bermuda grass and johnson grass. If these tough, invasive grasses persist while your project becomes established, it will be extremely difficult to control them. After these invaders wind their way among your desired plants, spot treatment with herbicide can be almost impossible. Without control, they will eventually outcompete the natives and become the dominate plants in your site.

Prairies benefit from occasionally being burned. In most cases, this is not practical on a school site. An annual mowing in late winter will be your best substitute. However, do not mow your entire site at one time. Instead, mow in small sections at a time, or in a mosaic of strips with unmowed sections in between. As the prairie wildflower area matures, it will provide wintering areas for various insects. Leaving some of it untouched each year assures that some winter cover remains available for wildlife.

ROOT SYSTEMS IN A PRAIRIE

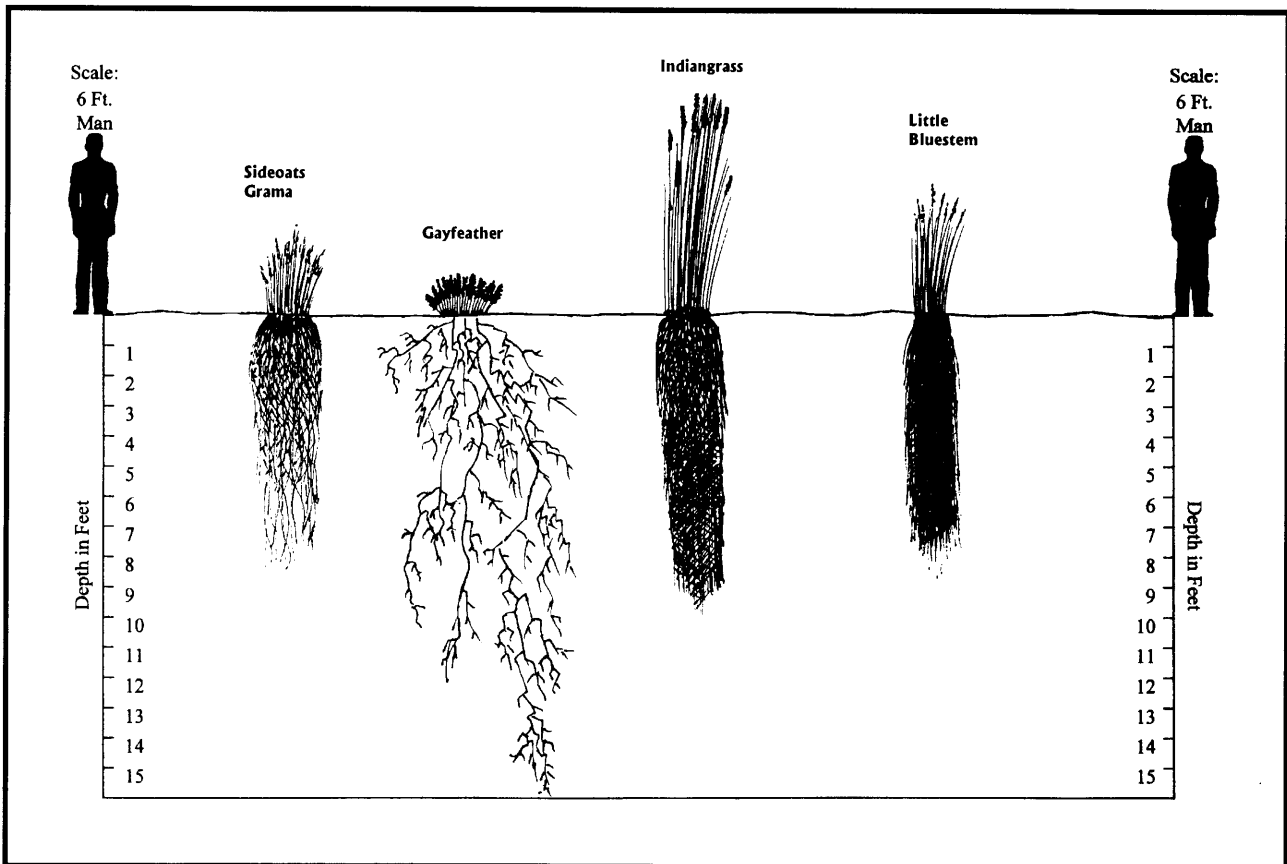
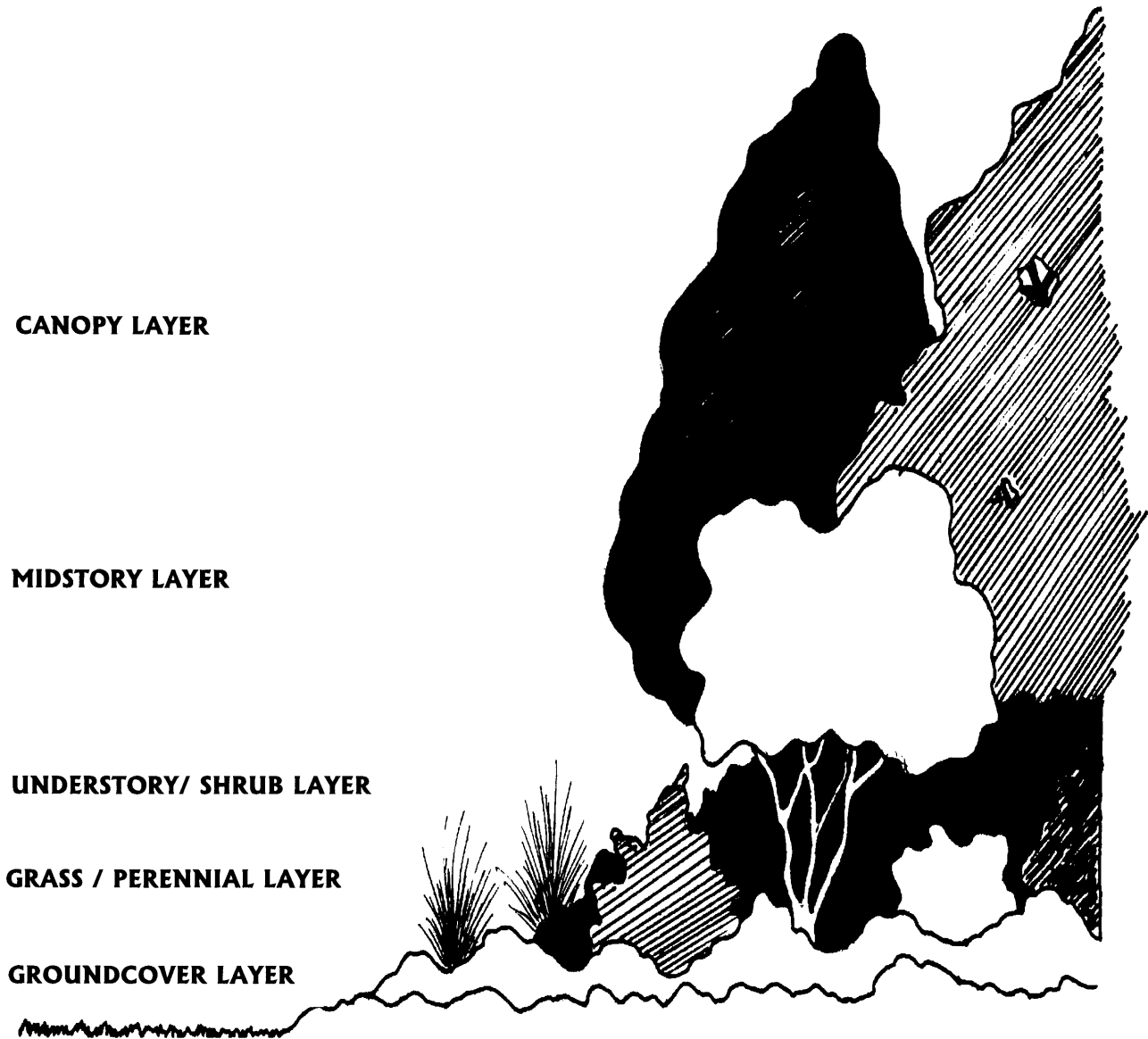


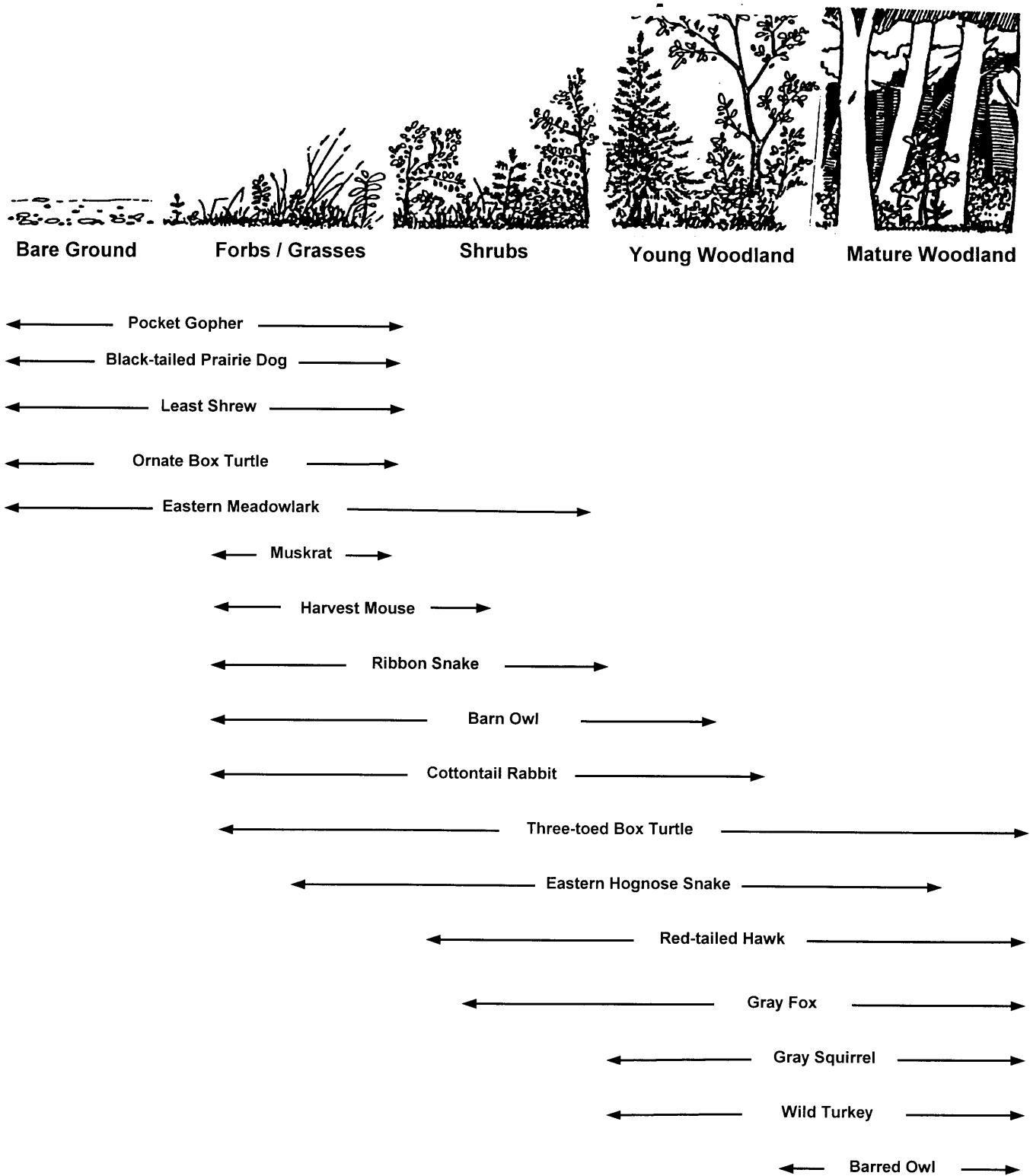
Figure (35). Prairie Root Systems. Extensive root systems are essential for vigorous growth, even during unfavorable weather conditions. The roots hold the plant in place and absorb soil water and nutrients. Perennial plant roots function as surplus food storage centers. Most of the plant root material is concentrated within the top 12 inches of soil; however, as illustrated, many desirable species have deep, vigorous feeding root systems. Illustration by Michele G. Foss.

Appendix N: Vertical Layering in a Habitat



Layers in a habitat. Try to reproduce the many vegetation diversity and layers in a natural habitat in your school habitat. The majority of wildlife species utilize the lower two thirds of a habitat. Illustration by Michele G. Foss.

Appendix O: Stages of Plant Succession and Associated Wildlife Species



Stages of Plant Succession and Associated Wildlife Species. Modified from Homes for Wildlife, published by the New Hampshire Fish and Game Department.

Appendix P: Constructing Raised Beds

If you are constructing raised beds for planting annuals or perennials, delineation and preparation of your beds should be done prior to planting.

1. Kill or remove the grass from the bed area. There are several methods you may choose.

- One method involves using herbicides, such as Roundup, to kill the grass. Remember that most general herbicides kill all plant material they touch, so spray on windless days.
- Another method, called smothering, involves placing black plastic, 3 to 7 layers of newspaper, or cardboard over the grass to deprive it of light. A variation is to place plastic down with a layer of mulch on top. The cover must remain in place for approximately 3 months. When ready to plant, you may remove the cover completely, or simply cut holes through the plastic to plant. The dead grass layer may be left in place to decompose, thus forming a weed barrier and providing nutrients for the soil.
- Another alternative is to dig out the grass layer by hand. Simply tilling the grass, especially Bermuda grass, into the ground without killing it first is a mistake. The grass usually re-seeds or re-sprouts and grows up through your newly planted bed, requiring you to dig it out by hand.

2. Estimate the amount of soil, mulch, sand, or compost you need. To do this, determine the number of square feet of garden bed you need to fill. Then decide how deep (in inches) you want your soil. Remember that fluffy soil will eventually settle, so plan to add a little extra. Use the Soil Estimation Formula (Figure) to determine the number of cubic yards of soil you need.

(Example: Your planting area measures 10 feet long by 12 feet wide. You want the soil in a raised bed 4 inches deep. Multiply 10 feet by 12 feet by 4 inches. Divide by 324. You will need to order 1.5 cubic yards of soil for your area.)

3. Add any soil amendments at this time to correct deficiencies in the soil. (See Soil Health) Till or mix the soil by shovel. Water the soil and allow the area to settle for a week.

4. Use garden hose, rope, string, stakes, lines of flour, or spray paint to temporarily delineate bed edges. Add edging, if desired.

SOIL ESTIMATION FORMULA

$$\text{Volume of Soil (cubic yards)} = \frac{\text{Length of Area (feet)} \times \text{Width of Area (feet)} \times \text{Depth of Area (inches)}}{324}$$

Figure (36). This formula determines the amount of soil, compost, or mulch, in cubic yards, that you will need to order. Pay close attention to the units of measurement when using the formula. Do NOT convert so that all the units are the same.

SOIL HEALTH

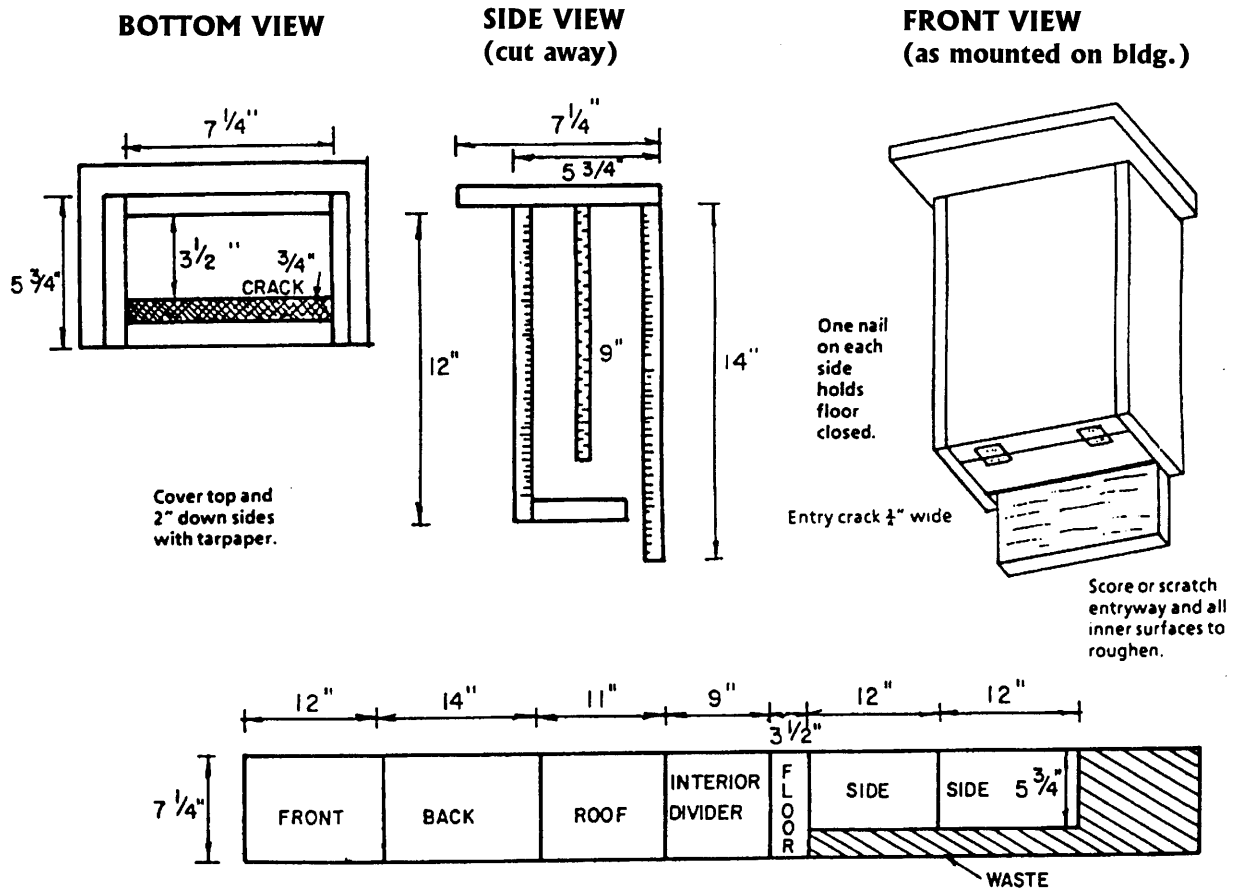
Good soil health insures plant health. Soil should be loose, fluffy, and fairly well-drained. If your soil resembles hard packed cement, then you need to add some ingredients to amend the soil, such as compost, mulch, leaves, or sand. By mixing in the appropriate ingredients, you return needed nutrients to the soil and improve its ability to drain water.

- **Simply add small amounts of compost and dead leaves to the soil and till them in. Over a long period, these additions will gradually improve the soil.**
- **For a quicker solution, order a larger amount of compost or topsoil and add this regularly to your topsoil.**

Appendix Q: Nest Box Specifications

BIRD SPECIES	FLOOR SIZE (Inches)	DEPTH OF CAVITY (Inches)	ENTRANCE HEIGHT ABOVE FLOOR (Inches)	DIAMETER OF ENTRANCE (Inches)	HEIGHT ABOVE GROUND (Feet)
Eastern Bluebird	5 x 5	8	6	1 1/2	5
Chickadee	4 x 4	8 – 10	6 – 8	1 1/8	4 – 15
Carolina Wren	4 x 4	6 – 8	1 – 6	1 1/2	6 – 10
House Wren	4 x 4	8 – 10	1 – 6	1 1/4	6 – 10
Tufted Titmouse	4 x 4	8 – 10	6 – 8	1 1/4	6 – 15
Red-headed Woodpecker	6 x 6	12	10	2	10 – 20
Northern Flicker	7 x 7	16 – 18	14 – 16	2 1/2	6 – 20
Barn Owl	10 x 18	15 – 18	4	6	12 – 18
Screech Owl	8 x 8	12 – 15	9 – 12	3	10 – 30
Wood Duck	10 x 18	10 – 24	12 – 16	4	10 – 20

Appendix R: Bat House Plan (Small)

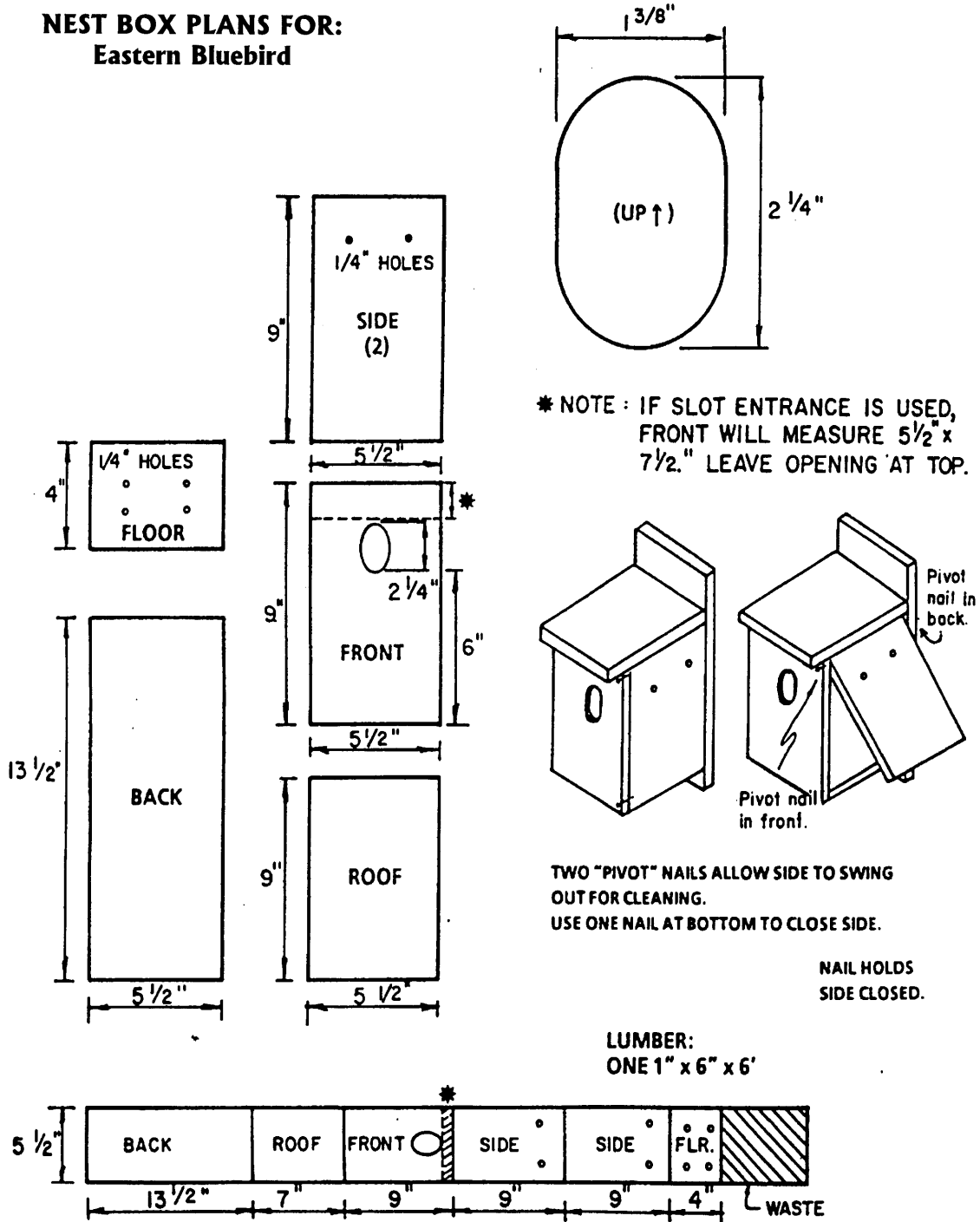


LUMBER: 1 inch X 8 inch X 8 feet

Plans for a small bat house. Reprinted from Woodworking for Wildlife, Minnesota Department of Natural Resources.

Appendix S: Small Nest Box Plan

NEST BOX PLANS FOR: Eastern Bluebird



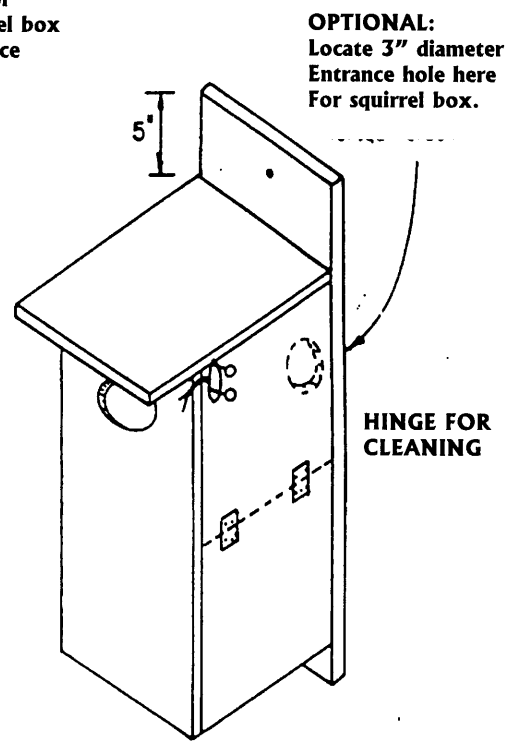
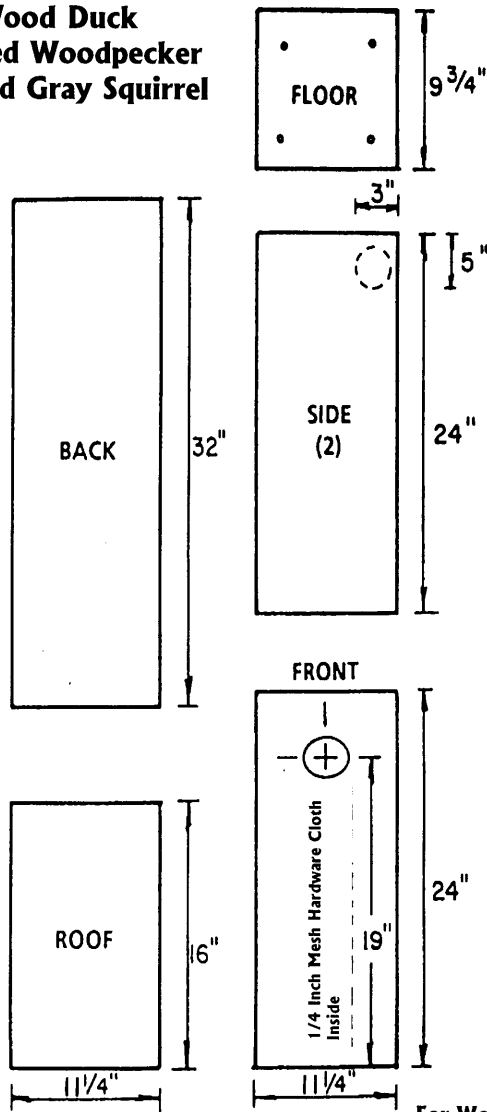
Plans for bluebird nest box. Reprinted from Woodworking for Wildlife, Minnesota Department of Natural Resources.

Appendix T: Large Nest Box Plan

NEST BOX PLANS FOR:

Wood Duck
Pileated Woodpecker
Fox and Gray Squirrel

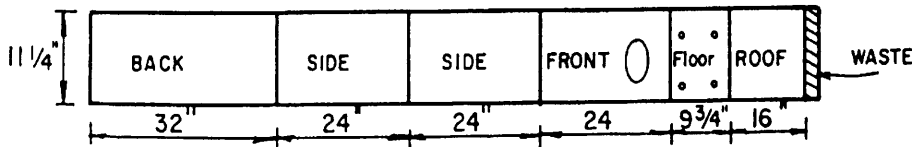
Wood Duck 3" high & 4" wide oval
Fox and Gray Squirrel 3" diameter round
Pileated Woodpecker 4" diameter round



Lumber
 One 1 inch X 12 inch X 12 foot

For Wood Duck House:
 Place 3 to 4 inches of
 Wood chips in bottom of
 box.

For Pileated Woodpecker
House: Fill box to top with
 sawdust.

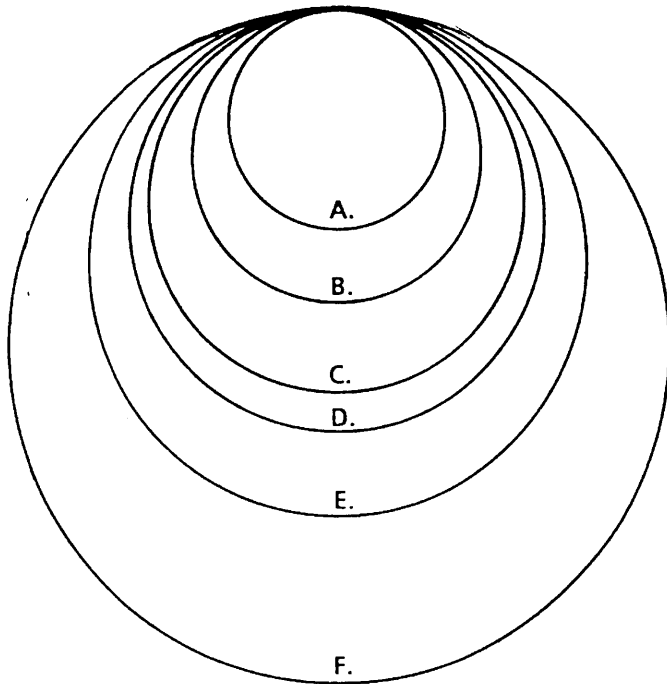


Note: Pileated Woodpecker box should be constructed from One 2 inch X 12 inch X 12 foot cedar. Floor must be 8 1/4 inches Long instead of 9 3/4 inches.

Plans for wood duck, squirrel, pileated woodpecker, and raccoon nest box. Printed from the Woodworking for Wildlife, Minnesota Department of Natural Resources.

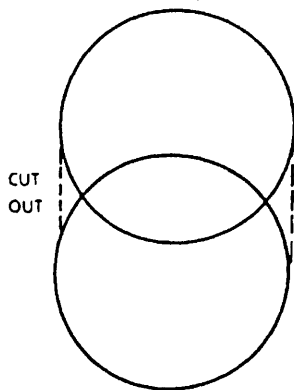
Nest Box Entrance Hole Sizes

ENTRANCE HOLE SIZES FOR SONG-
BIRD, WOODPECKER, AND SQUIRREL
NEST BOXES

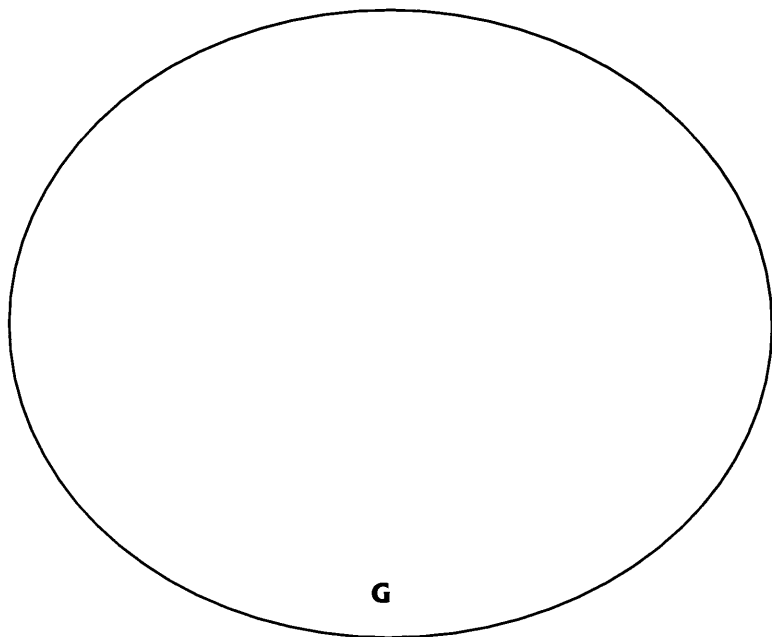


TRACE ONTO WOOD WITH
CARBON PAPER.

- A. House Wren, Chickadee, Titmouse, Prothonotary Warbler
- B. Great Crested Flycatcher
- C. Purple Martin
- D. Common Flicker
- E. Squirrel, Screech Owl, Kestrel
- F. Pileated Woodpecker
- G. Wood Duck



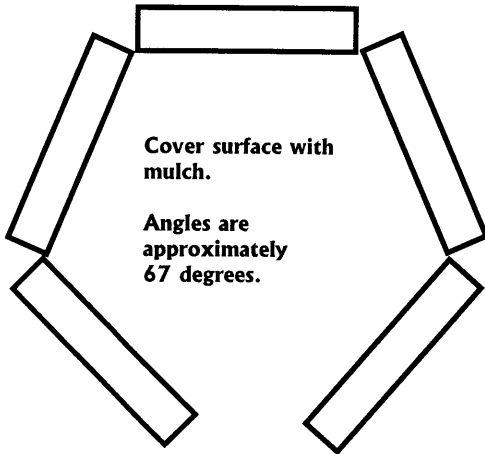
EASTERN BLUEBIRD &
TREE SWALLOW
(DRILL 2 HOLES 1 3/8"
DIAMETER. CENTERED 7/8"
APART.)



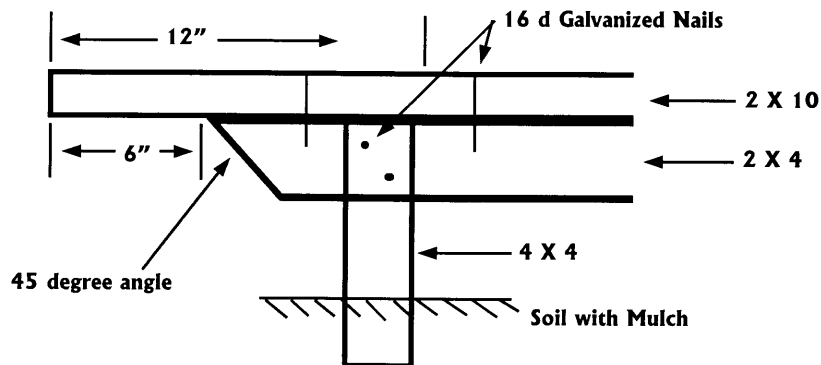
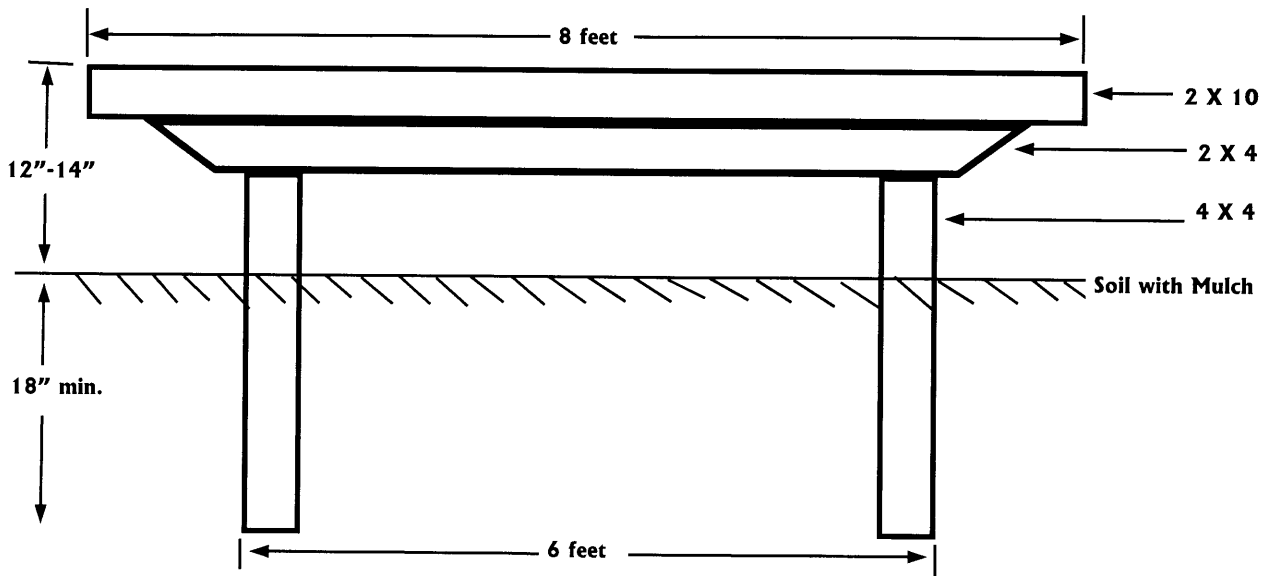
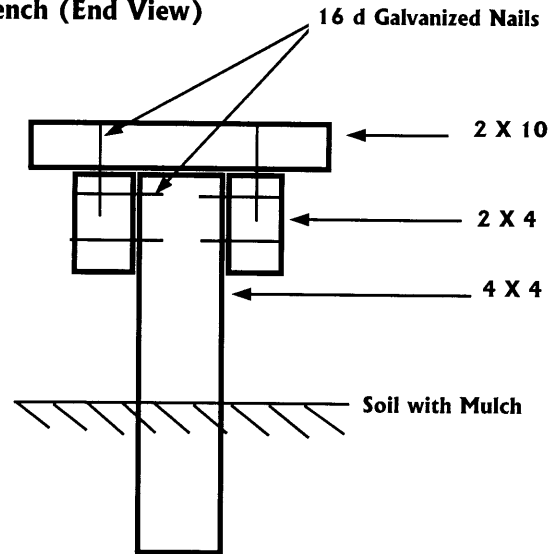
Each species prefers a specific hole size in their in their nest box. Use the illustration above to trace the correct hole shape and size onto the wood.

Appendix U: Sample Bench Design

Bench Configuration



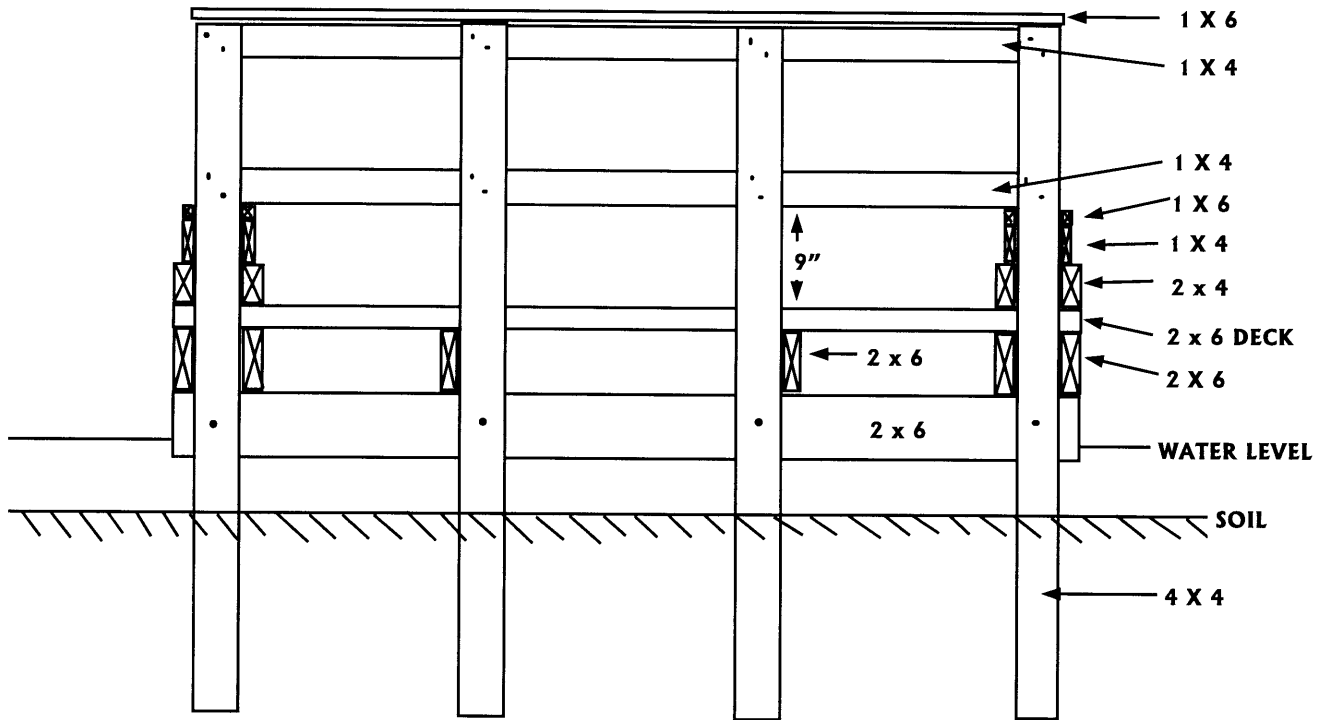
Bench (End View)



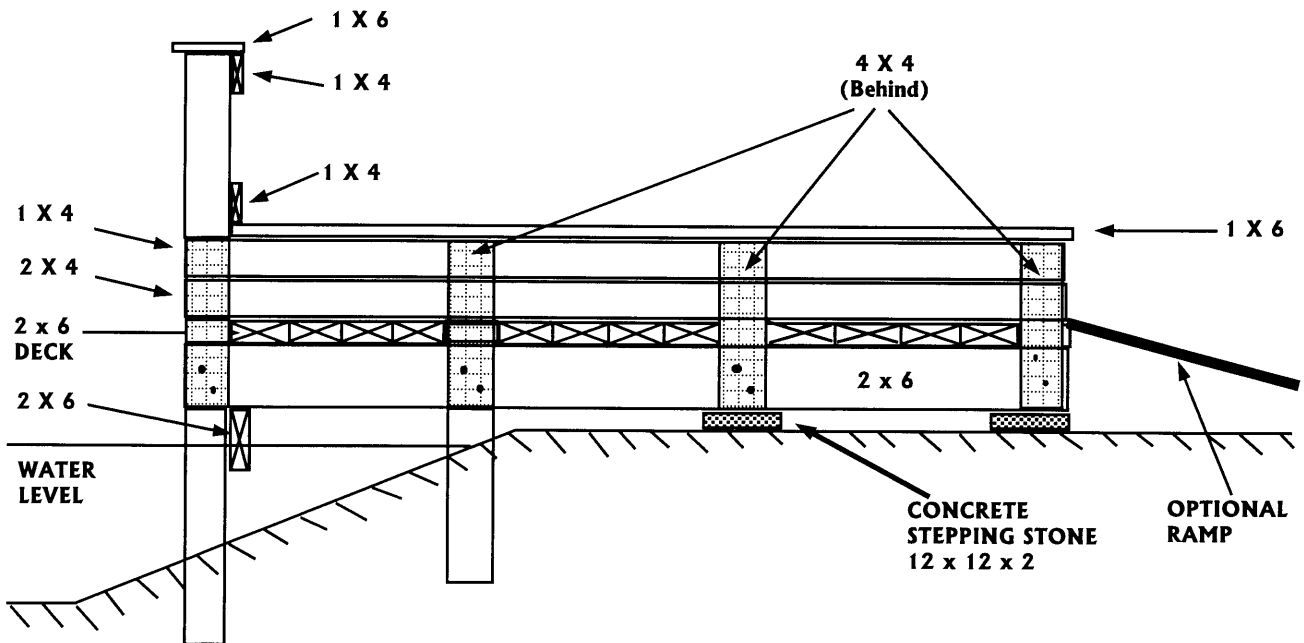
Typical outdoor bench design. Note that all lumber is pressure treated yellow pine. Nails are 16 penny galvanized screw or ring shank. Landscape timbers may be substituted for the 4 X 4 material. Nails are spaced 12 inches apart off center. Design by Ronald K. Jones, U. S. Fish and Wildlife Service.

Appendix V: Sample Study Platform/Deck Design

FRONT POND VIEW



SIDE VIEW



Concept design for Study Platform to provide student access to water features. Style and dimensions of the platform may vary with need, construction techniques, site modifications, etc. Note that all wood is pressure treated. All fasteners are galvanized. Design by Ronald K. Jones, U. S. Fish and Wildlife Service.

Appendix W: Plant Tables

Common Name	Scientific Name	Adaptations				Dimensions		Landscape Functions										Wildlife Uses												
		Full Sun	Partial Shade	Shade	Well-drained	Moist	Wet, Poor Drainage	Mature Height (feet)	Mature Width (feet)	Understory	Screen, Hedge	Erosion Control	Groundcover	Shade (Fast Growing)	Shade (Slow Growing)	Spring Color	Summer Color	Fall Color	Poorly Drained Sites	Summer Fruit	Fall/Winter Fruit	Seeds/Nuts	Cover/Nesting Sites	Evergreen Cover	Food/Birds, Sm. Mammals	Nectar/Butterflies	Nectar/Hummingbirds	Larval Host/Butterflies		
ANNUALS																														
Clasping-leaf Coneflower	<i>Dracopis amplexicaulis</i>	▲	▲	▲	▲	▲	2-3	1							■															
Drummond Phlox	<i>Phlox drummondii</i>	▲	▲	▲	▲	▲	1	1							■											▲				
Greenthread	<i>Thelesperma filifolium</i>	▲	▲	▲	▲	▲	1	1							■											▲				
Horsemint (Lemon Mint)	<i>Monarda citriodora</i>	▲	▲	▲	▲	▲	1-2	1							■											▲				
Indian Blanket	<i>Gaillardia pulchella</i>	▲	▲	▲	▲	▲	1-2	2							■											▲				
Indian Paintbrush	<i>Castilleja indivisa</i>	▲	▲	▲	▲	▲	1	1							■											▲				
Partridge Pea	<i>Chamaecrista fasciculata</i>	▲	▲	▲	▲	▲	1	1							■											▲				
Plains Coreopsis	<i>Coreopsis tinctoria</i>	▲	▲	▲	▲	▲	1-4	1							■											▲				
Prairie Verbena	<i>Verbena bipinnatifida</i>	▲	▲	▲	▲	▲	1	1-2							■											▲				
Showy Evening Primrose	<i>Oenothera speciosa</i>	▲	▲	▲	▲	▲	1-2	1							■											▲				
Standing Cypress	<i>Ipomopsis rubra</i>	▲	▲	▲	▲	▲	2-6	0.5							■											▲				
Texas Bluebells	<i>Eustoma grandiflora</i>	▲	▲	▲	▲	▲	1-2	0.5							■											▲				
Texas Bluebonnet	<i>Lupinus texanus</i>	▲	▲	▲	▲	▲	1	1							■											▲				
PERENNIALS																														
Autumn Sage	<i>Salvia greggii</i>	▲	▲	▲	▲	▲	2-4	2-3							■															
Black-eyed Susan	<i>Rudbeckia hirta</i>	▲	▲	▲	▲	▲	1-2	1							■												▲			
Boneset	<i>Eupatorium serotinum</i>	▲	▲	▲	▲	▲	2-8	1-2							■												▲			
Butterfly Weed, Native	<i>Asclepias tuberosa</i>	▲	▲	▲	▲	▲	1-2	2							■												▲			
Engelmann Daisy	<i>Engelmannia pinnatifida</i>	▲	▲	▲	▲	▲	1-3	1-3							■												▲			
Gayfeather	<i>Liatris spp.</i>	▲	▲	▲	▲	▲	1-3	1							■												▲			
Giant Foxglove	<i>Penstemon cobaea</i>	▲	▲	▲	▲	▲	1-2.5	0.5							■												▲			
Lance-leaf Coreopsis	<i>Coreopsis lanceolata</i>	▲	▲	▲	▲	▲	1-4	1							■												▲			
Maximilian Sunflower	<i>Helianthus maximiliani</i>	▲	▲	▲	▲	▲	4-6	3							■												▲			
Purple Coneflower	<i>Echinacea purpurea</i>	▲	▲	▲	▲	▲	2	1							■												▲			
Ruellia, Violet	<i>Ruellia nudiflora</i>	▲	▲	▲	▲	▲	1-2	1							■												▲			
Sage, Mealy Blue	<i>Salvia farinacea</i>	▲	▲	▲	▲	▲	2-3	1-2							■												▲			
Sage, Scarlet	<i>Salvia coccinea</i>	▲	▲	▲	▲	▲	3-6	1-2							■												▲			
Wild Columbine	<i>Aquilegia canadensis</i>	▲	▲	▲	▲	▲	1	1							■												▲			
Winecup	<i>Callirhoe involucrata</i>	▲	▲	▲	▲	▲	0.5 - 1	1							■												▲			

