

APPENDIX L

EFFECTS OF QUAIL MANAGEMENT ON NONGAME SPECIES

Paraphrased from "Beef, Brush, & Bobwhites" by Guthery, pages 163-64:

"We studied response of nongame birds to bobwhite management on mesquite rangeland in the Rolling Plains. Management included disced strips, tepee and permanent brush shelters, half-cut mesquite and food plantings. For 1 year, we counted nongame birds on the managed site and on a similar site with no management. Nongame birds benefitted...there were more species and higher densities on the managed than on the unmanaged site in 10 of 12 months. With management, we increased the availability of seeds for *any* bird that eats seeds, not just bobwhites. Any time habitat diversity is increased, there is likely to be an increase in the number of species using the habitat...because the changes are made on a relatively small scale, you should lose no bird species. On the other hand, recommendations on grazing and brush management favor some species of nongame, but *do not* favor others. Birds or mammals that require dense brush are not adapted to the more open areas preferred for bobwhites. Birds or mammals that require high condition rangeland may not inhabit pastures in the lower condition required for bobwhites."

Paraphrased from "Interaction of Range Management or Nonmanagement with Wildlife Habitat and Wildlife" by Kozicky and Fulbright, pages 221-222:

Livestock Grazing: Researchers found that eastern meadowlarks were more numerous under moderate than under heavy grazing. Long-billed curlew numbers are significantly correlated with spring and fall grazing intensity. Arizona researchers stated that a grazed area supported significantly higher numbers of birds in summer, while densities did not differ in winter. Grazing appeared to favor birds as a class over rodents. In a study of four grazing treatments, bird species richness was highest under heavy short duration grazing (HSDG) and HSDG was the only system to show an increase in bird species diversity between years.

Brush Management: Researchers observed no difference in bird density, species diversity, or species richness...between untreated sites and sites later sprayed with herbicides to control mesquites. The density of mockingbirds was lower on treated than untreated areas, but no other species was affected. Habitat management to favor mourning doves and bobwhite quail was associated with a 54% increase in combined density of nongame birds. A researcher found that, as habitats changed from brush to clearings, tree-foraging birds were replaced by ground-foraging species. Clearing brush at any intensity decreased total bird density but improved species richness and diversity relative to untreated areas.

Prescribed Burning: Researchers stated that the absence of the deliberate use of fire to control vegetation succession has done untold damage to prairie wildlife. Research found that ground-nesting lark sparrow nests were more numerous in the most recent burns and declined with

increasing litter build-up.

Food for thought:

1) Should managers be concerned with improving conditions for single species or entire "systems"? *Comprehensive habitat planning and management will support more wildlife diversity.*

2) Can Conservation Reserve Program (CRP) land be managed for game and nongame wildlife? *Absolutely. See appendix entitled "Wildlife Considerations in the Management of CRP Lands" to understand how this works.*

3) The axe, fire, plow, cow, and gun are tools for the wildlife manager. Is "no manipulation" of habitat for a specified time a management option? *Absolutely. It is what range management specialists refer to as the tool of rest.*

Parting thought: The strength of the traditional wildlife management approach is that it explicitly uses and enhances *natural processes* to perpetuate populations.

APPENDIX M

Specific Management Recommendations for Rio Grande Wild Turkeys

Rio Grande turkeys are present throughout the Rolling Plains in riparian areas and are limited in distribution within the High Plains by availability of protected roost sites and surface water. Fairly stable populations have been established in these counties due to suitable habitat, protection by private landowners, and restoration efforts by the Wildlife Division of TPWD. These populations are presently subjected to hunting during the regular fall and spring turkey season.

Although Rio Grande wild turkeys are non-migratory resident species, they have large home ranges that change with the season of the year. Turkeys tend to be widely dispersed during the spring and summer nesting/brood-rearing period. Nesting and brood-rearing habitat is similar to that required for quail, but on a larger scale: scattered thickets of low growing brush, patchy residual herbaceous vegetation, a moderately grazed, diverse grass/forb plant community that produces seeds and insects.



After the breeding season, numerous smaller flocks that were widely dispersed during the summer tend to congregate into large winter flocks. The ranges of winter flocks are centered around riparian areas (the floodplains of large creeks and rivers) that have moderately dense stands of tall, full canopied trees. These winter flocks will disperse several miles from their riparian area roost sites on daily feeding forays. Turkeys are attracted to feeders (not recommended for eastern turkey) and supplemental food plantings provided for deer and quail. The nearness of a ranch to a winter roost site(s), and the availability of a food source, would determine to what extent turkeys are present during the winter months.

Habitat management for the wild turkey concerns the availability of water, food, and cover. The distribution of these key components of the range is of major importance. Turkeys require water daily and can obtain water from foods or free water (ponds, creeks, rivers, etc.) Grassy or brushy nesting and brood-rearing cover is probably the most important cover requirement. Food

availability of the native range can be increased by the following activities: (1) Moderately stock the range with domestic animals. (2) Utilize a deferred rotation system of grazing. (3) Control total deer numbers by harvesting does. (4) Prescribed burns can be utilized to increase production of forbs, grasses and fruit or mast producing browse plants. In summary, range management activities that increase the diversity of grasses, forbs, shrubs, trees, and vines improves the habitat for the wild turkey. These same management practices are also beneficial to deer, quail, and many other wildlife species.

Preservation of roosting sites is a key factor to maintain a turkey population on a sustained basis. Turkey also need escape cover to travel to and from roosting sites. Mature trees utilized as roosting sites include , cottonwood, elm, hackberry, western soapberry, and large mesquite. Dense brush thickets or solid block clearing both furnish poor habitat for the turkey. Clearing programs that leave brush strips between cleared areas are advantageous. Avoid removing hardwood trees such as the various species of oaks, hackberry, elm, or large mesquite. If clearing is needed to improve the range, irregular shaped cleared strips that follow topography are best.

See the following appendix related to *riparian zones* in the High Plains and Rolling Plains of northwest Texas and their importance to Rio Grande wild turkeys and other wildlife species.

APPENDIX N

MANAGING RIPARIAN HABITAT FOR WILDLIFE IN NORTHWEST TEXAS

Riparian areas are lands adjacent to streams and intermittent draws where vegetation is strongly influenced by the presence of water. This habitat type is especially important in northwest Texas due to presence of water and lush vegetation typically surrounded by harsher, drier, less productive environments. Even though they comprise only 2-5% of habitat in the Panhandle, these are some of the most productive wildlife areas. Riparian zones in the Rolling Plains can be likened to playas in the High Plains...wetland environments that are "oases" for wildlife. Examples are Wolf Creek, Canadian River, Washita River, Sweetwater Creek, and forks of the Red, Wichita, and Brazos Rivers. Common species are teal, mallards, pintails, wood ducks, mourning doves, wild turkeys, quail, opossums, fox squirrels, rabbits, coyotes, foxes, raccoons, skunks, bobcats, beavers, white-tailed deer, bald eagles (wintering), common snapping turtles, red-eared sliders, and yellow mud turtles. Neotropical (summer migrant) birds include Mississippi kites, kestrels, killdeer, western kingbirds, purple martins, swallows, robins, warblers, sparrows, flycatchers, buntings, and vireos. Overstory timber is typically cottonwood, with a mid-story of hackberry, soapberry, bumelia (chittam), persimmon, native pecan, western dogwood (limited), and understory plants like buttonbush, native plum, sedges, switchgrass, bluestems, native wildflowers, forbs, and legumes.

Key impacts to these riparian systems are dams, grazing, fire, and exotic plant invasion. Each impact deserves discussion; however, *planned grazing systems* may be the most important management tool available to the landowner for riparian conservation. Common sense points are:

- Each area has unique characteristics that must be accounted for in developing a grazing strategy. Cattle tend to prefer lush, green vegetation in riparian zones and therefore concentrate in these areas unless special management provisions are not instituted, i.e. fencing.
- No one grazing strategy fits all conditions.
- A grazing plan is only as good as the management that goes into it.
- Riparian pastures reduce management complexity and improve the odds and speed of achieving objectives.
- When grazing riparian areas with upland pastures, one or more of the following management techniques probably will have to be added to improve a *degraded* riparian area:
 - Provide water, salt, and supplemental feeding away from riparian zones; herd to limit livestock use of riparian zones; add more pastures to increase management

flexibility and increase rest for riparian zones.

Two basic approaches, from least to most complicated are:

- Exclude livestock from the riparian area with stream corridor fencing; or
- Put riparian areas in separate pastures to get tight control over the season, duration, and intensity of livestock use.

You don't have to have all the answers before you get started! A good manager can make almost any grazing strategy work, and a poor manager can make any plan fail. A single guiding principle for healthy riparian zones as part of grazing systems is *short grazing periods and long rest periods*. This generally promotes plant diversity and increased productivity for wildlife and livestock.

Systems Favoring Wildlife Habitat and Healthy Riparian Areas

Winter Grazing - Graze when plants are dormant to provide rest during the growing season. This promotes plant vigor, seed, and root production. However; the manager must watch for damage to streambanks and overuse on previous season's growth on shrubs and trees. This is generally an excellent strategy for recovery of deteriorated uplands and riparian areas.

Three-Pasture Rest Rotation Grazing - This provides for grazing a pasture in spring the first year, summer the second, and rest during the third year. With attention to the degree of plant utilization, this system has produced good results for upland grasses. This is generally beneficial for sedge-rush-grass communities, but can be detrimental to riparian tree seedlings. Attention to woody species utilization is necessary for this grazing strategy to improve shrub and tree regeneration (i.e. fruit production, roosting habitat, loafing areas, nesting cavities, escape cover).

Early Grazing - Graze early during the growing season; early spring in cool season areas, early summer in warm season areas, if pastures can be designed to fit vegetation. This plan usually results in good dispersal of cattle and minimizes use of riparian woody plants. *Caution:* heavy grazing every year at this time can seriously damage preferred plants. However, with management, this strategy has the potential to influence the development of riparian woody vegetation.

Help to get started is available from: ***Practicing landowners*** in the Panhandle, the **USDA *Natural Resources Conservation Service*** (field offices throughout the area), and ***Texas Parks & Wildlife Department*** (wildlife staff throughout the area).

Note: Some material adapted from *Managing Change: Livestock Grazing on Western Riparian Areas*, by the Northwest Resource Information Center, Inc., P. O. Box 427, Eagle, Idaho 83616.

APPENDIX O

General Guidelines for Woody Plantings Used to Restore/Enhance Riparian Zones in the High Plains

by

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These guidelines were developed to aid landowners in planning for riparian restoration/enhancement projects involving establishment of native woody vegetation. They have been compiled from references and work done in similar habitats within the Southern Great Plains, and were designed to fulfill requirements of state and federal incentive programs. The author gratefully acknowledges input from Texas Forest Service, Texas Agricultural Extension Service, U. S. Fish & Wildlife Service, the USDA Natural Resources Conservation Service, and USDA Wildlife Services - Texas Wildlife Damage Management Program.

- For establishment of overstory timber, use native plains cottonwood (*Populus sargentii*) poles from the nearest available source and plant according to procedures in ***Revegetating Southwest Riparian Areas*** (Cooperative Extension Service, New Mexico State University) during January or February. Poles should be planted within 50 feet of a stream to have the best chance of survival (with water table fluctuation), and should not exceed a density of more than 10 trees per acre at maturity. (Plant @ 15 per acre with 70% survival expected; spacing between trees should be ~40-50 feet to allow for crown development at maturity with a height of 60-80 feet). The desired effect is to replicate mature cottonwood stands that are open, savannah-like, and irregularly-shaped. To achieve a natural appearance and improve wildlife habitat value, avoid planting in straight lines. Where possible, a tractor-mounted post hole digger and hand crew is recommended for installation during winter months. Pole plantings that are one (1) to five (5) acres in size are recommended as partial fulfillment of habitat requirements for most species.
- Individual poles should be protected from beaver damage by construction of circular barriers with room for growth expansion by using t-posts and heavy net-wire. This will also protect against cattle or hog damage caused by rubbing against poles during the first few years of establishment. For additional information concerning prevention of wildlife damage to plantings, contact USDA Wildlife Services (Texas Wildlife Damage Management Program) at 806/651-2880.
- For establishment of the fruiting, deciduous midstory component, use native species such as hackberry (*Celtis occidentalis*), little walnut (*Juglans microcarpa*), western soapberry (*Sapindus drummondii*), and roughleaf dogwood (*Cornus drummondii*). Plant in irregularly-

shaped mottes (clumps) of at least 1½ acres in size, using a species mix* containing at least 50 seedlings, located separate and away from cottonwood pole plantings. Spacing between seedlings should be at least 30 feet to allow for crown development at maturity, with expected heights ranging from ~30-50 feet. Establish a minimum of one (1) planting per 25 acres and a maximum of one (1) planting per 5 acres. Plant during March-April using a tractor-mounted post hole digger, hand crew, fabric squares (@ 3 or 4 feet) and 2-3 gallons of water/seedling at planting time with a water tank. Seedlings should be protected from browsing animals with commercial tree protector tubes installed at planting time. *Note: Little walnut also requires “wet feet” to survive; therefore, establish mottes with this species at the lowest possible elevation (closest to water table), nearby but separate from the developing cottonwood canopy. Hackberry, western soapberry, and roughleaf dogwood may be established in mixed stands further up slope (at higher elevations) within the riparian zone.

- For establishment of understory shrubs like aromatic sumac (*Rhus aromatica*) and native plum (*Prunus angustifolia*), follow the same procedures as in midstory establishment. Plant in irregularly-shaped mottes (clumps) of at least ½ acre in size containing a minimum of 100 seedlings, located separate and away from cottonwood (overstory) and deciduous tree (midstory) plantings to achieve a mosaic of different canopy heights at maturity. Spacing between seedlings should be at least 12 feet to allow for crown development at maturity, with expected heights ranging from ~6-8 feet. Establish a minimum of one (1) planting per 25 acres and a maximum of one (1) planting per 5 acres.
- To provide comprehensive environmental benefits at most sites, including stream bank stabilization, sediment filtration, aquatic habitat, wildlife habitat, and filtration for soluble nutrients, a *minimum* project development width of 100 yards on each side of the creek/stream channel is recommended. Widths up to 200 yards on either side of a stream course can be expected to yield higher habitat and aesthetic values.
- Riparian fencing is recommended at the stated widths, if not already in place, to increase manageability of these zones as distinctive grazing areas that require special treatment. Periodic grazing is a good management tool to maintain desirable native grasses, forbs, and legumes; however, it should be carried out in a manner that is not detrimental to woody species being established. Fencing enables control of specific seasons and duration of livestock grazing (see below). Specifications for 4-5 strand barbed wire fencing, as described in the Field Office Technical Guide at local offices of the USDA Natural Resources Conservation Service, is the recommended standard.
- Prior to planting season, some areas may need treatments like strip mowing or heavy grazing to remove rank vegetation. After establishment, individual poles/seedlings will need protection from grazing animals. Preferably, winter grazing of a short duration and moderate stocking rate should be employed for the first 5 years after planting (establishment phase) to minimize/avoid damage to woody plants during the growing season.

- Noxious invading species like salt cedar (*Tamarix spp.*) and Russian olive (*Elaeagnus angustifolia*) are detrimental to the long term health and habitat value of riparian zones. Aggressive control/eradication is recommended; however, effective treatments can be expensive. For more information, contact Texas Agricultural Extension Service, the USDA Natural Resources Conservation Service, Texas Tech University, or Texas Parks & Wildlife Department.

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APPENDIX P

Wildlife Considerations in the Management of CRP Lands

Permanent vegetative cover afforded by the Conservation Reserve Program (CRP) is generally beneficial to wildlife in the Southern Great Plains. Voluntary retention of these lands in permanent cover will provide long term benefits to soil, water, wildlife, and wetland resources through increased infiltration of rainwater, reduced runoff, and improved soil fertility. To the extent that the 1996 Farm Act recognized filterstrips, grass waterways, riparian areas, field windbreaks, shelterbelts, shallow water areas, and acreage with an erodibility index of more than 15 as ineligible for “early out” contract provisions, a positive consideration for wildlife and wildlife habitat was provided. Likewise, a determination by the Secretary of Agriculture that acreage enrolled under the wetland criteria during the 8th and 9th signup periods and acreage on which a CRP useful life easement is filed will be ineligible for “early out”, as stated in the Interim Rule for CRP, dated August 27, 1996, was another positive consideration for wildlife and wetland habitat. Finally, the most significant consideration given to wildlife and wildlife habitat was elevation to *co-equal status with soil and water resources* in the language of the Act itself.

What are some key wildlife considerations for CRP landowners in the High Plains and Rolling Plains of Texas? As a rule, increasing plant species diversity greatly improves the wildlife habitat value of CRP, especially within *microhabitats*, at the farm and neighborhood level. In most cases, CRP grass monocultures cannot be expected to provide optimum wildlife habitat because they lack the required diversity to address limiting factors (food, cover, water, interspersions) of many groups of species endemic to ecological areas within the SGP (i.e. High Plains & Rolling Plains Ecological Areas in Texas). Also, the size, shape, and interspersions of these tracts in relation to other land use greatly influences their value as a component of habitat. For example, no less than several thousand acres of CRP comprised of buffalograss, blue grama, sideoats grama, and native forbs, located adjacent to native shortgrass rangeland and managed with a rotational grazing/burning system favoring a forb (food) component, would be required to significantly impact pronghorn antelope or certain grassland birds. On the other hand, 40, 80, and 160-acre parcels of diverse native grass/legume mixtures, strategically located at quarter-mile intervals in intensively-farmed (feed grain) areas, could be expected to greatly increase carrying capacity for ring-necked pheasants. In short, if habitat enhancement for species/groups of species is a (CRP) landowner objective, there are key factors to consider in a) retention and enhancement of existing tracts and b) establishment of new lands in the program. The following suggestions are based on life history and ecology of species found within rangeland and agricultural habitats in the Southern Great Plains.

Big Game (Mule Deer, White-tailed Deer, Pronghorn Antelope)

These animals benefit from planned grazing/burning systems on CRP lands because of improved vegetative composition and increased digestibility and palatability of plant material,

especially native legumes and forbs. Deferment of strategically located grazing units will help increase productivity by providing fawning and escape cover to minimize losses to coyotes. The most intensive systems with higher stocking rates may tend to favor pronghorn antelope and “species of special concern” such as swift fox (*Vulpes velox*) on larger CRP tracts that were seeded to shortgrass and are surrounded by remnant (shortgrass) prairie. Maintenance of livestock water will satisfy the needs of these species. CRP areas located between brush tracts/canyonlands and agricultural crops will act as travel corridors and tend to promote range expansion of mule deer and white-tailed deer. Intensive grazing/burning systems augmented by interseeding of legumes/forbs (i.e. Eldorado engelmanndaisy, maximilian sunflower, Illinois bundleflower, and alfalfa) may help alleviate real/perceived crop damage on adjacent agricultural lands. Brush encroachment will favor white-tailed deer over mule deer where they occur sympatrically, and will eventually disfavor pronghorns, depending on plant density and reduction of visibility. Browse establishment (fourwing saltbush, aromatic sumac) for big game will also benefit upland game birds. Finally, retention of larger tracts *with management* where big game is present, often only in moderate densities in “plains” habitats, can be expected to positively impact this species group and other grassland birds and mammals by reducing habitat fragmentation.

Upland Game Birds (Bobwhite Quail, Scaled Quail, Ring-necked Pheasants, Lesser Prairie Chickens, and Rio Grande Wild Turkeys)

These species also benefit from rotational grazing/burning systems on CRP lands because of increased forb (food) production and insect (food) availability, improved brood range (bare ground shaded by vegetation of differing heights), and interspersions created by this type of management. Retention of smaller tracts associated with range or farmed areas and “fencerow” habitat will favor bobwhite quail and ring-necked pheasants, while larger tracts adjacent to rangeland can benefit bobwhite or scaled quail, provided that other essential habitat components are located nearby on adjacent lands. Generally, lack of woody cover is limiting to quail on CRP lands, and can be remedied by brush establishment along fencerows, field borders, and in clumps or “mottes” when compatibly planned with grazing, burning, or haying operations. Less woody cover (~10-15%) generally favors scaled quail; conversely, increased woody canopy (~25-30%) promotes bobwhites, provided other management is included. Lesser prairie chickens and Rio Grande wild turkeys require greater diversity of woody cover, legumes, forbs, and native grasses on larger CRP tracts adjacent to occupied habitats. Retention of larger tracts in occupied prairie chicken and wild turkey range, *with management*, can be expected to eventually benefit these species that have higher mobility and larger home ranges. Ring-necked pheasants will thrive in areas of diverse native grass/legume/forb tracts of 40-160 acres interspersed with playa wetlands, agricultural feed grains, fencerows, and roadsides because of the interspersions created to provide heavy winter cover, nesting cover, brood range, and food afforded by retention of smaller CRP tracts. Even retention of *circle irrigation corners in CRP cover* at the farm level can provide excellent pheasant habitat in association with grain production. Haying can be compatible with upland “ground-nesting” bird production, provided a) it is delayed until *after the peak of nesting season* (generally July 15th), b) portions of fields are left undisturbed in strategic locations (i.e.

adjacent to fencerows, crop fields, playa wetlands, brush, “no-mow” roadside areas), and c) fields are periodically managed with fire to prevent accumulation of excessive ground litter. A policy of periodic managed haying on CRP lands, rather than “emergency” haying, could be a positive consideration for wildlife in the SGP.

Grassland Birds (i.e. Song Sparrow, Field Sparrow, Dickcissel, Red-winged Blackbird, Grasshopper Sparrow)

CRP fields seeded to permanent vegetation provide superior nesting habitat for grassland birds compared to rowcrop fields. Long term studies conducted in the SGP have documented *21 times the number of grassland bird nests in CRP fields* compared to rowcrop fields, and *31 times the number of successful nests*. This is considered a true success of CRP by wildlifers, as many of these grassland bird species have been in decline. Species like the mountain plover, long-billed curlew, upland sandpiper, Swainson’s hawk, common nighthawk, lark bunting, yellow-headed blackbird, common yellowthroat, Cassin’s kingbird, Baird’s sparrow, and bobolink will all benefit from grazing/burning management systems on CRP tracts adjacent to shortgrass and mid-grass rangeland in the SGP. Notice that management practices/considerations for this group are compatible with those for other species/groups affiliated with retention of larger CRP tracts and rangelands in the SGP.

Waterfowl and Wetland Wildlife (Ducks, Geese, Cranes, Reptiles, Amphibians, Shorebirds)

Retaining a 3:1 ratio (or at least 2:1) of CRP upland grass buffer to playa basin acreage would effectively protect any playa in the SGP, especially in intensively agricultural areas, to provide quality habitat for reptiles and amphibians, prevent further degradation/siltation of basins, and provide quality nesting cover for pheasants and ducks in many neighborhoods. Our region is a major waterfowl wintering area for ducks, geese, sandhill cranes, and American bald eagles. Additionally, we summer many neotropical migratory birds, including shorebirds, in and around wet playas, and our Ogallala Aquifer is recharged through the 25,390 playas located throughout the SGP. Retention of permanent vegetative buffers in CRP around playas, protection with fencing, management of buffers with planned grazing/burning, and interseeding of legumes is *highly recommended* for the benefit of waterfowl and wetland habitats. These practices are totally compatible with the goals of the ***Playa Lakes Joint Venture***, our region’s contribution to the *North American Waterfowl Management Plan*, and to strategies set forth by farmers, ranchers, and sportsmen, including CRP contract holders, serving on the Panhandle Regional Advisory Group currently helping to craft the *State Wetlands Plan*, a voluntary initiative being guided by Texas Parks & Wildlife Department.

For more detail on wildlife considerations in the management of CRP lands, please see the accompanying publication entitled ***“Wildlife Habitat Management on Former CRP Lands”***, consult with your NRCS Field Office for current rules as they evolve, and seek advise from your local wildlife biologist with the Texas Parks & Wildlife Department @ 806/655-3782 or -3975; FAX 806/655-4045 (Panhandle District). Free, confidential, non-binding assistance is available

to landowners through the Department's *Private Lands Enhancement Program*.

APPENDIX Q

NATIVE BRUSH ESTABLISHMENT ON RANGELAND FOR WILDLIFE

A strategy to improve rangeland for wildlife in selected locations throughout the High Plains and Rolling Plains is *native brush establishment* through transplanting *fourwing saltbush* (*Atriplex canescens*). This native shrub is excellent deer/pronghorn browse, quail cover, attractive to songbirds, very drought hardy, reserve cattle feed (14% protein), and adaptable to a wide range of soil types. A key feature is that during the spring, it is not so palatable that cattle will choose it ahead of grasses when they are growing luxuriantly; rather, cattle will take it later in the growing season. So you benefit wildlife, livestock, and aesthetics. Although it is compatible with grazing systems after establishment, transplanted seedlings should ideally be protected from grazing for at least the first growing season. Dr. Darrell Ueckert, noted saltbush expert with the Texas Agricultural Extension Service at San Angelo (915/653-4576), advises the following establishment technique:

- Transplant locally-grown and adapted seedlings from Texas Forest Service in Lubbock (806/746-5801), also available through local Soil & Water Conservation Districts in (individual "bullets").
- Seedlings should be transplanted with a 3-point hitch forestry transplanter (Texas Parks & Wildlife Department or Texas Forest Service) into a freshly-ripped furrow, either in mottes or sculpted to natural contours of the landscape. Fifteen (15) feet minimum spacing within or between rows is recommended for our semi-arid climate. Size and distribution of plots should be determined based upon landowner goals, compatibility with grazing systems, and cover needs of targeted species (mule deer - 15 to 40% canopy cover; bobwhite quail - 25% canopy; scaled quail - 10 to 15% canopy; pronghorns - 5 to 10%). Landowners wishing to consider the needs of neotropical (summer) migratory birds and "species of special concern" like the black-tailed prairie dog or swift fox that depend on shortgrass prairie may wish to consult with a local Department biologist for advise prior to employing this technique.
- For optimal survival, transplanting should be done after our "rainy season" has begun, usually mid-May, so as to *minimize* the need for supplemental watering during the first year. Ideally, seedlings should be watered with 2-3 gallons per plant as part of the transplanting operation. Simply put, "if it doesn't rain, don't plant", as this strategy does not utilize the high-successful weed barrier fabric mulch employed by regional biologists in shelterbelt installation (contact the *Wildlife Division Field Office* in Canyon @ 806/655-3782 to arrange a field tour with one of our cooperators).
- Consider establishing initial mottes or "contours" in conjunction with riparian zones, draws, and gentle slopes (<3%) to take advantage of deeper soil types and existing/planned fencing (see *Riparian Management*). The growth form of saltbush should be larger on bottom sites and slightly smaller on gentle slopes or uplands (average

3-4 feet height).

Free technical assistance is available to landowners wishing to enhance wildlife habitat and populations through the Department's ***Private Lands Enhancement Program***. Contact your local biologist or the Wildlife Division at 806/655-3782 for more information.

Tentative Recommendations for Establishment of Woody Quail Cover and Deer Browse Plots on farm or ranch lands in the High Plains and Rolling Plains*

The following procedures are recommended for establishment of native, drought-hardy shrubs like aromatic sumac (*Rhus aromatica*), native plum (*Prunus angustifolia*), and four-wing saltbush (*Atriplex canescens*) as overhead protective cover for quail and deer browse plots:

- Plant in irregularly-shaped mottes (clumps) of at least ½ acre in size containing a minimum of 100 seedlings, using a species mix as mentioned above.
- Spacing between seedlings should be at least 12 feet to allow for crown development at maturity, with expected canopy heights ranging from ~6-8 feet, which will vary with shrub species, soil type, and topography.
- Establish a minimum of one (1) planting per 25 acres and a maximum of one (1) planting per 5 acres. Plant during March-April using a tractor-mounted post hole digger, hand crew, fabric squares (3-feet or 4-feet) and 2-3 gallons of water per seedling at planting time with a water tank (clean, preferably one not used for chemicals).
- Seedlings should be protected from browsing animals (deer and rabbits) with commercial tree protector tubes installed at planting time.
- Where livestock grazing is present, shrub mottes (clumps) should be fenced with a 4-strand barbed-wire fence (recommend NRCS specifications) or a 2-strand high-tensile electric fence to prevent trampling and promote longevity of the planting for cover. A 20-foot buffer around the outside edge of shrubs is recommended to enhance the cover value of such plantings for wildlife.

*these guidelines may be customized for cropland, native range, or lands enrolled in CRP; woody plant growth form and development will vary according to location, topography, annual precipitation, and soil type

*Prepared by **Gene T. Miller**, Technical Guidance Biologist, TPWD @ 806/655-3782, on 7/26/00 and are offered only as **generic** recommendations which may subject to revision upon inspection of a particular property and according to goals and objectives established by the landowner.*

APPENDIX R

Establishing Shelterbelts for Wildlife

Landowners can increase wildlife habitat value in carefully-selected areas within the High Plains and Rolling Plains by creating shelterbelts, living snow fences, and habitat corridors. Care should be taken to install plantings in association with intensively agricultural areas and/or in conjunction with CRP lands, rather than establishing new, large plantings in areas of extensive shortgrass prairie habitat, so as not to actually degrade habitat quality for other endemic species. Texas Parks & Wildlife Department (TPWD) biologists, in cooperation with Texas Forest Service, have successfully used state-of-the-art techniques, locally-grown and adapted seedlings, and enlisted the support of private landowners in a cooperative effort with conservation organizations and governmental agencies to establish demonstrations of this technique. Habitat improvement for ring-necked pheasants, scaled quail, and bobwhite quail is often the key objective.

SPECIFICATIONS

Design Recommendations

- Minimum shelterbelt length is 1/4 mile (1320' tree rows) plus 40' borders on each end for a total of 1400' from one fenced end to another.
- Minimum width is 150' (from fence to fence), consisting of a 4-row planting with a evergreen row 20' from the fence, followed by an evergreen row at a 20' interval, followed by a deciduous tree row at a 40' interval, followed by a shrub row at a 40' interval, then a 30' border to the fence.
- 5-row planting width is 170' (fence-20'-evergreen row-20'-evergreen row-40'-deciduous tree row-40'-deciduous tree row-30'-shrub row-20'-fence).
- 6-row planting width is 190' (fence-20'-evergreen row-20'-evergreen row-40'-deciduous tree row-40'-deciduous tree row-30'-shrub row-20'-shrub row-20'-fence).

Customized designs are possible depending on soil type and topography with on-site recommendation by TPWD, Texas Forest Service, or NRCS personnel. Sculpting of multirow plantings along the contour of the land is highly recommended for creation of more edge effect for upland game birds and for aesthetics.

Species

- Evergreen species recommended for planting are Eastern red cedar (*Juniperus virginiana*) and Rocky Mountain juniper (*Juniperus scopulorum*).
- Deciduous tree species recommended for planting are Osage orange or Bois d'arc (*Maclura pomifera*), Honeylocust (*Gleditsia triacanthos*), Chittamwood or bumelia (*Bumelia lanuginosa*), and Mulberry* (*Morus rubra*).
- Shrub species recommended for planting are Fourwing saltbush (*Atriplex canescens*), Skunkbush sumac (*Rhus aromatica*), American Plum (*Prunus americana*), Sand (or native) plum* (*Prunus*

angustifolia), and Nanking cherry (*Prunus tomentosa*).

*To be used only from Amarillo south

Spacing

- Within rows, shrubs and evergreens should be spaced at 10' intervals. Deciduous trees should be spaced at 15' intervals.

Fencing

- Fencing is highly recommended on all shelterbelts with a 4-strand barbed wire fence (NRCS specs). Standard clearance on all plantings is 20' minimum from the sides of outside tree rows, with a 40' border on each end. **Fencing is to be done prior to shelterbelt installation.**
- 24" x 1" poultry netting should be placed around exterior of fence at bottom with 4" draped on the ground (critical for rodent control).

Placement

- When shelterbelt is installed on the north side of an east-west road, site should be planned so as to have the first evergreen row no closer than 200' from the driving edge of the road. (Functionally, this planting will serve as a living snow fence).
- In all cases, shelterbelts should be at least 50' away from road intersections for traffic safety.

Site Preparation

- On grassland (range or CRP land), an area slightly larger than the area to be fenced should be mowed clean if needed to remove rank vegetation in order to facilitate fencing and planting operation.
- On grassland (range or CRP land), where land is classified as highly erodible (HEL), sod must not be removed from the entire site.
- For site prep of individual tree/shrub row to be planted, a 10' wide strip (seedbed), centered on the "planting line", should be disced, plowed, and/or roto-tilled in the fall or early winter, so as to remove all grass. The goal is to achieve a high-quality seedbed for mechanical tree planting and fabric laying. **This is critical to establishment and success of the planting.**
- **On clay and clay loam sites**, at least the "planting line" on each 10' strip should be chiseled to a depth of 12" or greater during the fall prior to planting. Chiseling greatly facilitates use of the tree planter. **This is critical to establishment and success of the planting.**
- Shelterbelt planting sites on cropland classified as highly erodible (HEL) should be fall sown to a

temporary cover crop of wheat or other suitable annual. The cover crop should be sown at least 60' to the windward side(s) for soil stabilization. During the spring, a permanent native grass-legume cover should be sown between tree rows and for a distance of 60' to the windward side(s).

- On non-erodible cropland, site should remain fallow during the winter months with crop residue in place, except for timely site prep of tree row "seedbeds".

Planting Stock

Source

- Seedling source should be from the same region as the planting area. Materials from Texas Forest Service (West Texas Nursery) in Lubbock, distributed through local Soil & Water Conservation Districts, are recommended. **The use of locally-grown and adapted planting materials is critical to the establishment and success of the planting.** Landowners wishing to use **chittamwood** (bumelia) should order from Oklahoma Department of Agriculture, Forestry Services (Mr. Al Myatt), 405/288-2385, as it is not available from Texas Forest Service. Oklahoma can also serve as "backup" for those using **osage orange** (bois d'arc) if the supply in Lubbock expires on a certain year.

Type of Stock

- Deciduous seedlings (1-0 and 2-0) may be bare-root stock. Minimum stem caliper at the root collar is 3/16" for 1-0 seedlings and 1/2" for 2-0 seedlings. Minimum height is 12" for 1-0 stock and 15 inches for 2-0 stock.
- Evergreen seedlings (1-0 and 2-0) **should be containerized** with a minimum stem caliper at the root collar of 3/16" for 1-0 seedlings and 3/8" for 2-0 seedlings.

Planting Method

- Landowner should plan to use 2 tractors (50+ hp, Cat II, 3-pt hitch) **with operators** on planting day, **plus a crew of 6 persons** (minimum) to install planting. If a contract installation crew is available, landowner may opt to use the service with possible cost share assistance (contact Texas Forest Service @ 806/746-5801).
- A tractor-drawn tree planter (Category II, 3-point hitch) is recommended for installation of said plantings. Landowners may rent a tree planter from Texas Forest Service (806/746-5801) in Lubbock.
- Weed barrier fabric (6' width) should be installed by machine (Category II, 3-point hitch) immediately after trees are planted. Texas Forest Service's fabric-laying machine can be available for use by landowners by prior arrangement. Some local Quail Unlimited chapters are beginning to obtain such equipment for use with landowners on cooperative projects. Seedlings will be pulled up through a slit cut in the fabric.
- **On clay sites**, 6" companion pins should be placed offset from the row at 1' intervals on each side

of seedlings and midway between each seedling in the row center.

- **On sandy sites**, one shovel of soil should be placed in the row center between each seedling in lieu of companion pins.
- Protection of evergreens from wind damage should be accomplished by placement of wind screens on the west and south side of each seedling **at planting time**.
- Lastly, individual seedlings should be hand watered **at planting time** with nurse tank, provided by the landowner.

Maintenance and Care

Supplemental Watering

- Supplemental watering **at least twice** during the growing season (depending on moisture conditions) is recommended for the first 3 years. The rates are adjustable because of soil type. Sufficient water should be applied to thoroughly soak the soil below the root zone. (The weed barrier fabric will accept water at the rate of about 9 gallons per square foot per minute).

Vegetation Shading

- On east-west plantings where vegetation height immediately adjacent to the tree row exceeds 2', a 6' wide strip should be shreaded **on the south side** of the row to prevent shading. Likewise, on north-south plantings, the **west side of the tree row** should be shreaded (6'). **This is important for the the first 2 years.**

Protection

- All shelterbelt plantings should be protected from any possible livestock grazing/trampling with fencing as previously described. For technical assistance on prairie dog, gopher, or rabbit control measures, contact Texas Parks & Wildlife Department or Texas Animal Damage Control Service (in Canyon, 806/656-2880).
- 24" x 1" poultry netting should be installed on the outside of fence with 4" draped (L-shape) and buried at the bottom for rodent control.
- Firebreaks around tree plantings are recommended. They can be established by removing all flammable materials through discing or scraping. The firebreak width should be 2 1/2 times the height of the surrounding vegetation but not less than 4' wide. Firebreaks offer the opportunity for annual wildlife food plots. **Firebreaks on CRP sites should be shreaded annually as needed.**
- Wind protection is required for conifer (evergreen) seedlings. Wind screens should be used to protect each seedling from wind damage (see Planting Method) and are commercially available.
- Trees should be inspected periodically to detect insect or disease problems. Contact the Texas Forest Service for specific diagnosis and recommended control measures.

Tree Replacement

- Loss of seedlings less than 3 years from original planting date should be replaced. Replacement of older trees is recommended if the resultant gap in the shelterbelt is larger than the average crown spread of adjacent trees. Replanting should be done with the same species.

Refer to various appendices contained herein for a detailed understanding of woody cover requirements for wildlife species occurring throughout the High Plains and Rolling Plains. TPWD biologists in the region are available through the *Private Lands Enhancement Program* to show landowners firsthand the validity of this technique for habitat enhancement in our semi-arid environment without drip irrigation. Overall survival on plantings installed since 1993 has been greater than 95% with impressive growth rates.

APPENDIX S

General Comments Concerning Federally Listed Endangered Species

Awareness is the key to owning and managing lands on which federally listed endangered species occur. The following is a simple key for *High Plains and Rolling Plains* landowners to use, and detailed (confidential) consultation with a Department wildlife biologist is advised prior to implementation of habitat manipulation practices.

- o Gray wolf (*Canus lupus*) - This species historically occurred throughout the High Plains of Texas and is now thought to be extirpated.
- o Black-footed ferret (*Mustela nigripes*) - This species is thought to be extinct in the High Plains of Texas; however, it did occur in the black-tailed prairie dog-burrowing owl-prairie rattlesnake complex that exists today in prairie dog towns on shortgrass prairie sites.
- o American peregrine falcon (*Falco peregrinus anatum*) - This is a neotropical (summer) migratory species infrequently observed gliding over prairies and croplands.

To the best of our knowledge, there are no habitat manipulation practices recommended herein that would adversely impact these species. For a current update of listings for any county in the High Plains or Rolling Plains, contact TPWD in Austin @ 1-800-792-1112 .



APPENDIX T

Nongame Wildlife Management Recommendations

Following is a list and brief description of management practices that are beneficial to nongame species of wildlife. It should be noted that many of the practices are also beneficial to and recommended for game species (eg. deer, dove, turkey quail, etc.). Conversely, most management practices directed at managing game species will also be beneficial to many species of nongame wildlife.

HABITAT CONTROL

Prairie/grassland restoration - Establishing a mixture of native grasses and forbs on disturbed range or farm land to provide habitat for wildlife diversity. Use the TPWD wildscape plant list.

Forest/woodland restoration - Establishing native trees and shrubs where appropriate to restore native habitats for wildlife diversity. Use the TPWD wildscape plant list.

Shrubland restoration - Establishing native shrubs or small trees where appropriate to restore native habitats for wildlife diversity. Use TPWD the wildscape plant list.

Wetland restoration - Establishing water flows and native vegetation in altered coastal and inland wetlands to provide wildlife habitat.

Riparian area management - Provide alternate livestock feeding and watering sites, exclude pastures with riparian areas from livestock grazing or fence out livestock. Defer grazing in riparian areas during April - October.

Prescribed burning - The use of fire to restore, enhance or maintain native habitats for wildlife diversity.

Mowing - Used to manage invading woody plants and maintain desirable herbaceous vegetation for wildlife food and cover. Mow before or after nesting season to avoid grassland nesting birds (most nesting occurs generally April-June).

Exotic or "weedy" plant control - Use of fire, selective herbicides, and mechanical methods to control invasive plants in important habitat types to maintain or restore wildlife populations.

Conversion of exotic vegetation - Removal and replacement of exotic vegetation with native plants for wildlife habitat.

Restore and maintain native prairie/grassland - Prescribed burns should be conducted according to TPWD, USDA Natural Resource Conservation Service, Texas Agricultural Extension Service and Texas Natural Resource Conservation Commission protocols in coordination with local Fire Department. Most burns are conducted during December-March. Late winter-early spring burns will not impact cool season forbs as much as mid-winter burns. Summer burns are more risky, but could be more effective at woody plant control. If mechanical brush control is used leave brush piles for small mammals. Reseed areas with native grass/forb mixtures as necessary.

Enhance mid-succession brush habitat - Promote brush regeneration with prescribed fire and/or mechanical methods that remove the top-growth of woody plants but encourage root sprouting. Use proper grazing management.

Protect karst, caves and other underground resources - Construct appropriate cave gates or other features to minimize human disturbance to roosting bats. Insure quality underground water resources through proper disposal of toxicants and runoff management. Maintain unobstructed cave entrance for easy access by bats.

EROSION CONTROL

Riparian area management - Provide alternate livestock feeding and watering sites, exclude pastures with riparian areas from livestock grazing or fence out livestock. Defer grazing in riparian areas during April - October. Control erosion using water structures and native plants.

Prairie/grassland restoration - Establishing a mixture of native grasses and forbs on disturbed range or farm land to provide habitat for wildlife diversity. Use the TPWD wildscape plant list.

Forest/woodland restoration - Establishing native trees and shrubs where appropriate to restore native habitats for wildlife diversity. Use the TPWD wildscape plant list.

Trails and signs - Create walkways or paths to manage human impact and reduce erosion in sensitive areas.

PREDATOR CONTROL

Avian predator and parasite control - Reduce the impact of selected avian predators (grackles, ravens, crows) and brown-headed cowbirds on nesting birds through shooting and trapping, grazing management, and maintenance of large blocks of wildlife habitat.

Carnivore-furbearer control - Reduce the impact of coyotes, raccoons and other carnivores on colonial nesting birds.

PROVIDING SUPPLEMENTAL WATER

Wetland restoration - Establishing moist soil management in playa wetlands (High Plains) and managing wet meadow/perched water table/riparian habitats (Rolling Plains).

Well/trough/pond with overflows - Establish additional shallow water supplies through construction of ground-level wildlife ponds, or adding overflow systems on existing wells and troughs. Protect these areas from livestock use.

PROVIDING SUPPLEMENTAL FOOD

Prairie/grassland restoration - Establishing a mixture of native grasses and forbs on disturbed range or farm land to provide habitat for wildlife diversity. Use the TPWD wildscape plant list.

Woody restoration - Establishing native trees and shrubs where appropriate to restore native habitats for wildlife diversity. Use the TPWD wildscape plant list.

Butterfly and hummingbird gardens - Establish native wildflowers, trees, shrubs, vines, or cultivated flowers as food sources for butterflies and hummingbirds. Use the TPWD wildscape plant list.

Feeding stations - Set up liquid, seed and free-choice feeding stations for resident and migratory birds. Especially critical during migration and winter months when natural food sources are scarce.

Reduction of broadcast insecticides - Increases the amount of insects available as a wildlife food source for birds, reptiles and amphibians.

Conversion of exotic vegetation - Removal and replacement of exotic vegetation with native plants for wildlife habitat.

PROVIDING SUPPLEMENTAL SHELTER

Brush piles/rock piles - Leaving or stacking cleared brush and rock to create denning and escape cover for birds, small mammals, reptiles and amphibians.

Thickets of native brush - Create or maintain thickets of native shrubs/trees for refuge.

Prairie/grassland restoration - Establishing a mixture of native grasses and forbs on disturbed range or farm land to provide habitat for wildlife diversity. Use the TPWD wildscape plant list.

Snag maintenance and creation - Protect snags and deadfall for cavity dwelling species. Create snags using selective herbicides or girdling undesirable woody plants.

Nest boxes and perching platforms/poles - Provide nest structures for songbirds, owls, small mammals, bats, raptors, herons, and other nongame species.

CENSUS (Surveys)

Time area counts - The number of individual species seen or heard during a fixed time frame per unit area (eg. point counts for birds, squirrels).

Drift fences/pit fall traps - A system of flashing or similar material arranged on the ground to funnel small wildlife species into buried buckets or other pitfall trap. (used primarily for reptiles and amphibians).

Small mammal traps - Small live traps arranged along a trapline to sample small mammals.

Other or Indicator Species: Bobwhite quail, dove, and wild turkey may be desired game species to have in the area, which may be expressed in the overall objective. The land management techniques that have been recommended primarily for the deer population can benefit these game birds and many other wildlife species also. These are: prescribed burning, disking, cattle rotation or exclusion from woods and certain native grass areas during certain periods, and supplemental food plots. See Appendix G for more information on quail and Appendix I for wild turkey.

Nest/Roost boxes for Cavity Nesters/Roosters: Where suitable nest cavities are in short supply due to lack of dead timber snags that provide cavities or natural timber hollows, artificial nest/roost boxes can be erected to help alleviate these shortages for particular species. Some of the birds and mammals that can benefit from these structures are: bluebirds, chickadees, titmice, prothonotary warbler, wrens, woodpeckers, screech owls, kestrels, wood ducks, black-bellied whistling ducks, squirrels, and bats. The TPWD Nongame and Urban Program can furnish additional information regarding number, specifications, placement, and maintenance of these structures for specific species.

Neotropical Migratory Birds: These are birds that breed in the United States and Canada, and migrate to the Neotropical regions of Mexico, Central and South America, and the Caribbean during the nonbreeding season. As mentioned in the General Habitat Management section at the beginning of this example plan, loss and fragmentation of woodland and native grassland habitat has reduced populations of many neotropical populations. Neotropicals include the following groups of birds: kites, hawks, falcons, owls, cuckoos, nightjars, hummingbirds, flycatchers, swallows, thrushes, vireos, warblers, tanagers, grosbeaks, buntings, sparrows, orioles, and

blackbirds. For more information regarding neotropical status, surveys, and possible management strategies, contact the Partners in Flight Program Coordinator at TPWD Headquarters in Austin.

Waterfowl/Wading Birds: To improve the habitat for dabbling ducks and wading birds, construction of 3 - 4 foot high levees with a drop-board water control structure in suitable low areas could back up and hold water during the fall, winter, spring, summer months, depending on water management strategy. This could provide shallow (6 to 24 inches) water feeding areas for migrant ducks, wading birds, and spring-nesting wood ducks. Exclude livestock from this area with installation of an electric or barbed wire fence around the perimeter, at least 50 yards away from the maximum flooded area. Contact the local Natural Resources Conservation Service or TPWD waterfowl biologist for assistance in location and construction of the levee.

Installation of wood duck nest boxes in and around the edge of shallow water areas can increase nesting sites for wood ducks that are normally present in the summer, but lack suitable nesting sites due to lack of natural cavities in older, damaged trees or lack of these type of trees. One nest box (not within view of other nest boxes) per acre of brood-rearing wetland habitat is usually sufficient. These should be erected on 10 foot metal or treated wooden posts in or at the edge of wetlands.

Feral Hogs should be controlled by shooting and live trapping whenever possible. Most success at this usually occurs during the winter when feral hogs are having to travel more to find food. Beside rooting up pastures, feral hogs compete directly with deer, turkey and most other wildlife species that rely heavily on acorns and other hard and soft mast for winter food. Deer also tend to avoid areas when feral hogs are present.

Other Comments: The development of a Landowner Wildlife Management Association with adjacent and neighboring landowners will greatly enhance any management that you apply to your ranch, and is strongly encouraged. TPWD and TAEX personnel are available to assist in this endeavor.