Wildlife Management Practices

1. Artificial Feeders

General Description
Artificial feeders are used primarily to feed songbirds and butterflies and should not be used for terrestrial species. A wide variety of feeder designs, methods, and different foods are available. Most bird species prefer black-oil sunflower seeds and white proso millet. Species like hairy woodpecker prefer to eat suet (fat) rather than seeds. Eastern bluebirds will consume meal worms from a feeder. Species like the mourning dove prefer to eat on the ground rather than in a tree or on a balcony.

For many people in urban areas, bird feeders are often their only opportunity to view wildlife. This interaction is good; however, it may also be hazardous for birds. Since feeders draw birds close together, disease transmission becomes more problematic. Feeders that are not cleaned properly can regularly promote the spread of various diseases. In addition, feeders can aid predators such as housecats and may lure birds into close proximity with houses and automobiles, which often proves fatal for birds. It is essential that bird feeders be properly maintained and placed in a suitable location.

2 -3. Decrease or Increase Harvest

Note: The judge will provide clues as to whether or not this practice is necessary. (If nothing is mentioned in the scenario, do not select this practice.)

General Description
Legal harvest is a means to keep fish and wildlife species in balance with the habitat. In good habitat, decreasing harvest can sometimes help a local population rebound in size. Increasing harvest can provide meat and recreation for people, and/or help reduce conflicts with people, such as deer-vehicle accidents or damage to farm crops. Following are descriptions of when a decrease or increase of harvest is warranted.

Bass:
Needed when fish samples and fishing records reveal these situations:
Decrease harvest when:
- there has been no recent hatch of bluegill. (No tiny bluegill fry are collected or seen.)
- many medium-sized bluegill are found in poor condition.
- bass are few in number but large and in good condition.

Increase harvest when:
- many recently hatched bluegill are collected.
- very few medium-sized bluegill are collected.
- bass are less than one pound and in poor condition.
- few or no young bass are collected.

Bluegill:
Needed when fish samples and fishing records reveal these situations:
Decrease harvest when:
- there are many recently hatched bluegill. (Many tiny bluegill fry are collected or seen.)
- very few medium-sized bluegill are collected.
- bass are less than one pound and in poor condition.
- no young bass are collected.

Increase harvest when:

- there has been no recent hatch of bluegill. (No tiny bluegill fry are collected or seen.)
- many medium-sized bluegill are found in poor condition.
- bass are few in number but large and in good condition.

Target the harvest towards removing medium-sized bluegill using a seine harvest or shoreline rotenone (restricted-use chemical which kills fish).

To collect fish data:

- Seines (large fish nets) are used to sample fish in ponds to determine a harvest strategy.
- Fishing records can be kept by anglers who catch fish – including species, length and gender.
- Seining is usually not effective for collecting fish in streams. Fish in streams are usually collected using a fishing rod or are electroshocked.
- Electroshocking involves running a small electrical current between two rods. The rods are moved up and down the stream and fish that are between the rods are stunned and float to the surface. The fish are collected in a net and the age, condition, and numbers are recorded to determine the stream balance. The fish are then revived and returned to the stream.

Game birds and mammals:

Decrease harvest:

Regulated hunting is the primary tool used to keep game species within carrying capacity of the habitat. However, when harvest data, observation data and animal health indicates species populations are low, it is sometimes necessary to decrease harvest levels. A decrease in harvest is used when surveys show a continual population decline or when hunting success has continued to decline over a long period of time.

Increase harvest:

Needed when animals show signs of stress and overpopulation, such as any of the following:

- Increase in the prevalence of diseases and parasites.
- Destruction of habitat by overgrazing or overbrowsing.
- Poor body condition and weight loss.
- Poor reproduction.
- Fewer young animals are harvested by hunters.
- Higher percentage of older than younger animals in fall population counts.

Regulated hunting is the most effective and efficient practice to remove surplus animals and keep wildlife populations in balance with their habitat. When scientific data indicates animals are above carrying capacity, it is often necessary to increase harvest.

4. Do Not Disturb Nesting Sites

General Description

All wildlife must procreate to sustain their species. Because one or both parents invest a great amount of energy and time in breeding and rearing young, it is important that nest sites not be disturbed. In urban areas increased nest disturbance may be realized due to greater human density. The more a nest site is disturbed, the greater chance the parent will abandon the site and young. Additionally, predators' acute sense of smell can easily pick up human scent left at or near the nest site and can use that as a guide to finding and depredating the nest.

- Keep all cats indoors.
- Do not approach or handle nest, eggs or young.

By not disturbing nesting sites, more young birds are expected to live to maturity.

5. Establish Native Grasses and Forbs

General Description

Native grasses and forbs are recommended primarily to provide nesting and escape cover for small game, especially quail and rabbits. They also serve as bedding cover for white-tailed deer, nesting cover for wild turkeys and several songbirds, and as a haven for many small mammals. Native warm-season grasses grow during the summer months. Cool-season grasses grow primarily in the spring and fall, and often go dormant during the summer.

Introduced (non-native) grasses are not recommended because they do not provide suitable habitat structure. These sod-forming grasses are too thick for young quail and turkey chicks to maneuver. Introduced grasses provide few, if any, habitat benefits for wildlife. Also, the competitive nature of non-native grasses keeps native grasses and forbs from becoming established.

Native grasses can be planted or established by killing existing non-native plants – especially tall fescue, Johnsongrass and Bermudagrass – with selective herbicides (e.g., imazapic) and allowing seeds lying dormant in the seed bank to germinate. If planted, native legumes (e.g., partridge pea and Illinois bundleflower) may be sown with the native grasses. Seeds from these legumes are relished by quail and other birds during fall and winter.

Native grasses and forbs should be burned or disked occasionally (every two to five years) to prevent deterioration of the vegetative structure through litter buildup and excessive woody plant succession. Fields or sections of fields can be burned and/or disked each year to provide a diversity of habitat types to serve the different needs of wildlife. Usually burning or disking is conducted just prior to spring green-up so that nests and young wildlife are not disturbed. In general, disking in the fall releases hard-seeded forbs and legumes while disking in the spring releases annual grasses. Ideally native grasses should not be mowed, though may be necessary initially to reduce competition from other plants. If used for grazing or haying, paddocks of native grasses should be rotated and not clipped below 6 to 8 inches.

Effect on Habitat

- Fields of native grasses are particularly useful for wildlife in areas with little acreage in Stages 2 and 3 and in areas where the majority of early successional habitat is in hayfields or pastures of non-native forages (e.g., tall fescue, orchardgrass)
- Fields of native grasses enhance habitat for many wildlife species (e.g., rabbits and quail) by providing winter, nesting and/or roosting cover. Ground-nesting birds usually build their nests at the base of a native grass bunch/clump.

6. Fish or Wildlife Survey

NOTE: While fish/wildlife surveys are always important, they should not be recommended if it is stated or the field condition sheet indicates that a survey has been completed recently.

General Description

Fish surveys

Population balance is first established in ponds by stocking the correct number of fish. After the first year, check pond balance during early summer by seining at intervals around the pond. Four to five seine sweeps in an average pond is usually enough.

Balance is determined by comparing age groups, condition, and numbers of bass and bluegill caught in the seine and from fishing records. Recent reproduction of both bass and bluegill in the seine indicate that the fish population is balanced. Fish caught by hook-and-line can be evaluated on body condition (fat, skinny, size of head in relation to body, etc.). Trout do not often reproduce in ponds, so overall health of the fish is used as an indicator of pond balance. Unwanted species (bullheads, crappie, etc.) may also be caught in the seine or when fishing, indicating that the pond needs to be poisoned (with Rotenone) or drained. Seining is usually not effective for collecting fish in streams. Fish in streams are usually collected by fishing or are electroshocked. Electroshocking involves running a small electrical current between two conducting rods which are moved up and down the stream. Fish that are stunned float to the surface and the age, condition and numbers are recorded to determine the stream balance. The fish are then revived and returned to the stream.

Wildlife surveys

Monitoring wildlife for trends of increasing/decreasing populations and body weights of animals is important for wildlife managers. Data on whitetail deer, black bear, wild turkeys, ruffed grouse, bobwhite quail, mourning doves and many songbirds are routinely collected by wildlife biologists using infrared triggered cameras, roadside counts, call counts, check stations, transects and questionnaires. These data are then used to prescribe future harvesting or land management strategies.

7. Forest Management Techniques

General Description

Timber management and wildlife management are inseparable partners in forested habitats. Harvesting timber is one method of enhancing wildlife habitat. Several silvicultural methods are used to regenerate forest stands. The method recommended for a given stand varies greatly depending on forest type and composition and the objectives of the landowner.

NOTE: Harvesting timber should be recommended as a silvicultural tool to regenerate stands — not merely to create "openings." Regenerated forests result in new forests, not fields. Where additional fields of native grasses and forbs are needed, 'Forest Management: Timber Harvest' should NOT be recommended automatically. 'Manipulation of Succession' should be considered to reach this management objective.

Timber Harvest and Regeneration

Timber is harvested with regeneration in mind. Regeneration is the act of renewing tree cover by establishing young trees naturally or artificially such as planting tree seedlings promptly after the previous stand or forest has been removed. Following are types of timber regeneration strategies:

A. Clearcut regeneration method harvests all the trees on a given site. More sunlight is allowed into the forest floor with this method than with any other. Clearcutting generally releases shade intolerant species (e.g., yellow poplar, black cherry, basswood) when present.

B. Shelterwood regeneration method removes a pre-determined number of trees from the stand to allow development of seedlings (regeneration) from beneath. Later (6 to 8 years), the remaining overstory (shelterwood) is removed as the regeneration becomes developed.

C. Seed-tree regeneration method leaves a few good seed-producing trees per acre to regenerate a new stand. This method is often used in pines and other species with lightweight, wind-carried seeds. The seed trees are usually harvested after the crop of new trees becomes established.

Pines are often planted with tree seedlings after harvest to establish a new stand. Hardwood stands are almost always regenerated naturally and are not planted. Whatever the method used, forested land to be harvested should be chosen so that food and cover for wildlife are in close proximity. Tracts harvested should have adjacent unharvested stands to provide travel corridors and space for wildlife that do not use young stands.

Effect on Habitat

- Harvesting timber generally sets back succession and produces new forest growth with a greater stem density. According to the site and regeneration method, timber harvest reverts Stage 6 forest to Stages 3 and 4, which will grow into Stage 5 within a few years.
- Timber harvest methods enhance cover for many prey species, which provides food for predators.
- According to the site and regeneration method, harvesting timber can stimulate forb growth, providing additional food (forage, seeds and insects) and cover many species.
- Retaining snags and cavity trees when harvesting timber provides nesting, roosting, denning and perching sites for those species that use them.

Timber Stand Improvement

Timber Stand Improvement (TSI) may involve any of several techniques used to improve the quality and composition of forest stands by shifting resources (sunlight and nutrients) toward production of desired products, which include timber and/or wildlife. TSI most often involves some type of **thinning**, which reduces stand density to influence stand growth. Thinnings may be pre-commercial or commercial. Pre-commercial thinnings are conducted before the trees have sale value. Commercial thinnings involve removing at least part of the trees for a useful product. Removing trees increases the amount of sunlight entering the forest canopy, and is used to promote increased growth of the remaining trees through changes in stand composition and structure (cover) in the understory and mid-story to favor food producing plants, both woody and herbaceous.

Effect on Habitat

- Timber Stand Improvement results in increased herbaceous growth in the understory, which improves brooding habitat cover and provides additional forage.
- Timber Stand Improvement can increase woody stem density in the mid-story, which improves cover for certain species, such as ruffed grouse.

8. Grain: Leave Unharvested

General Description

Strips or blocks of grain or other crops (e.g., soybeans) can be left unharvested. This is especially valuable if the strips are left adjacent to cover. This practice should be recommended only if there is an unharvested crop present. It is not applicable to grain food plots.

Effect on Habitat

- Provides a food source for many species of wildlife and their prey.

9. Harvest Timing of Crops

General Description

When wildlife is the primary objective, it is often necessary to avoid harvesting crops or hay during nesting and fawning seasons to reduce nest destruction and mortality. Farm machinery can destroy nests and mortally wound wildlife. Young with limited mobility are particularly vulnerable to this. If it is not possible to avoid harvesting during the entire nesting season, any significant delay can be a benefit.

10. Manipulation of Succession

General Description

Succession is the orderly predictable series of changes in plant species composition through time and occurs in all natural communities. Wildlife habitat is most often managed by setting back succession in an effort to retain successional stages beneficial for the intended wildlife species. Each of these techniques is applicable for manipulating succession in different habitats for various species.

Mechanical Treatment

Manipulating succession using mechanical treatments means using a piece of equipment to set back plant succession. Types of mechanical approaches are mowing, chaining/roller beating, disking or chainsawing.

A. Mowing – Mowing is most often done with a large rotary mower mounted behind a tractor. Sometimes, a mulching machine is used to mow large shrubs and small trees. To avoid disrupting nesting birds and destroying cover, mowing should not be conducted until late winter/early spring. When used to manage fields, mowing should be prescribed only when it is apparent that woody species are encroaching in the field. In other words, mowing grassy fields is unnecessary. When possible, prescribed burning and disking should be implemented instead of mowing.

Effect on Habitat

- Helps keep vegetative succession in Stages 2 or 3.
- Sometimes reverts succession from Stage 4 to Stage 3. Helps remove competition from certain species of shrubs, allowing grasses and forbs to grow better.
- Sometimes helps keep vegetative succession in Stage 4. Maintains low shrub growth with certain species of shrubs by encouraging resprouting.
- In Stages 2, 3 and 4, helps rejuvenate grasses, forbs and shrubs, which improves nesting habitat for many species of birds.
- May be used to reduce weed competition in forage food plots.
- May be used in wetlands to increase interspersion by reducing vegetative cover.
- Disadvantage of mowing is that it causes thatch build-up, which reduces availability of invertebrates and seed to young quail, grouse and turkeys and other ground feeding birds. Thatch build-up also reduces the ability of these animals to move through the field and suppresses the seed bank.

B. Chaining/Roller Beating - Chaining utilizes a large chain strung between two bulldozers running parallel to each other (50 to 100 feet apart) to knock down shrubs and small trees. Roller beating utilizes bulldozers pulling a roller with large, sharp metal blades to knock down

and chop up large shrubs and small trees. Roller beating is an alternative to chaining and has almost the same effect on vegetation. Both techniques are used where rugged terrain, rocks or large shrubs prevent the use of a mower or mulcher. This practice is not used to manipulate understory vegetation in woodlands. Prescribed fire is the preferred method to maintain the desired vegetative composition and structure within woodlands.

Effect on Habitat

- Helps remove competition of some kinds of shrubs, allowing grasses and forbs to grow better.
- Sometimes helps keep vegetative succession in Stage 4. Maintains low shrub growth with some kinds of shrubs by encouraging resprouting.
- In Stage 5 causes succession to revert back to Stage 4.

C. Disking - Disking mixes the upper soil layer and incorporates organic material into the soil, facilitating decomposition and stimulating the seed bank. Disking is a highly preferred, relatively inexpensive and effective management practice for releasing grass-bound fields, creating bare ground, and encouraging germination and growth of forbs.

Disking should be performed on a rotational basis, usually in winter. Similar to controlled burning, timing of disking and disking intensity strongly influences vegetation composition and structure.

Disking should be used instead of mowing when and where possible and should be used where burning is not possible.

NOTE: While disking is often used to create firebreaks to facilitate controlled burning, for the purpose of this contest, it should not be recommended in order to burn.

Disking should not be prescribed for fields of perennial non-native grasses (i.e. tall fescue, orchardgrasses, and bermudagrass). Fields with these grasses should be converted to native grasses and forbs using herbicides (chemical treatment).

Effect on Habitat

- Areas in successional Stages 2, 3 and 4 can be disked to maintain/promote growth of annual and perennial forbs and grasses. Disking promotes fresh herbaceous growth and enhances foraging habitat for many wildlife species.
- In Stage 3, disking causes succession to revert to Stage 2.
- In Stage 4, disking causes succession to revert to Stage 2 or 3.

- In planted pines, disking can be used in Stages 5 and 6 to reduce unwanted woody stems and encourage herbaceous growth.

D. Chainsawing, feller-bunchering, clipping and other mechanical methods of tree removal such as lop-and-scattering may be used to kill and/or remove trees in forests, savannahs and woodlands where trees are not needed or additional areas of early succession are needed by the species to be managed. Chainsawing typically is used by non-industrial private landowners to remove individual trees for improved wildlife habitat and firewood, whereas the other methods are used by commercial tree removal companies, timber operations or public utilities for large-scale tree removal.

NOTE: For the purpose of the contest, a distinction is made between creating forest openings for wildlife versus timber regeneration. “Manipulation of Succession” is the practice describing

the creation and maintenance of openings in a forest. "Forest Management Techniques" describes tree removal for the purpose of regenerating a forest. In summary, if the intent is to create openings and maintain them, use this practice. If the intent is to remove trees followed by replanting or natural regeneration of a forest, then use the practice "Forest Management Techniques."

Effect on Habitat

- Implementing this practice implies that once the trees are removed, the area is to be maintained indefinitely in the earlier successional stages.
- **NOTE:** For the purpose of this contest, do not recommend forest management techniques such as clearcut to achieve this management goal.

Fire (Prescribed Burning)

Prescribed burning can be the most effective and efficient practice for managing one or more habitat types for most wildlife species. Prescribed fire is encouraged to maintain Stages 2–4 and to influence understory composition and structure within Stages 5 and 6 of the Southeast Mixed and Outer Coastal Plain and Eastern Deciduous Forests. Timing of burning and frequency of burning strongly influence vegetation composition and structure. Prescribed fire should be used in fields instead of mowing/mulching whenever burning is possible.

Although a very beneficial practice, prescribed burning may not be applicable in all locations. Sites in close proximity to urban areas, hospitals or busy roadways may not be suitable for burning due to safety and smoke management concerns.

Burning should be conducted only when danger of wildfire is low (i.e., when the wind, temperature and humidity allow a controlled burn) and should be conducted under the close supervision of forestry or wildlife professionals experienced with prescribed fire.

Effect on Habitat

- Reduces litter layer (e.g., dead leaves and grass), which reduces chance of wildfire and enables the seed bank to germinate.
- Improves seed and invertebrate availability for many species.
- Scarifies (breaks down outside coating) some seeds so they can germinate.
- Releases nutrients into the soil.
- Burning during the dormant season does not significantly alter vegetation composition. Small woody stems may be top-killed, but usually resprout.
- Burning during the late growing season more effectively kills woody stems and may reduce density of native warm-season grasses and encourages additional forb cover.

Grazing Management

This practice is for managing the use of vegetation by livestock to enhance wildlife habitat. Like a chainsaw or a prescribed burn, livestock are a tool for achieving a particular habitat condition and a wildlife management goal. Only recommend this practice when evidence of livestock use is present or information on livestock usage is provided.

Grazing management may be used to exclude livestock from sensitive areas or to manipulate successional stages to benefit wildlife by adjusting stocking rate, season of use or grazing system. Stocking rate, which is the amount of land allotted to each animal for the entire grazable portion of the year, is the MOST important consideration concerning livestock grazing management. The season of use can affect the response of grasses to grazing. Livestock

should be excluded from areas during the nesting season. A grazing system is a planned effort by livestock managers to leave some grazing areas unused for at least part of the year. Examples of grazing systems include deferred-rotation, rest-rotation, seasonal suitability, best pasture and short duration.

Livestock distribution can be controlled with fencing, herding, or access to water. Regardless of pasture type, proper stocking rate must be practiced to prevent improper grazing. The term "improper grazing" is used to describe livestock grazing that fails to meet land objectives such as soil conservation, plant species diversity, maintenance of wildlife habitat and adequate livestock nutrition.

Effect on Habitat

- Proper stocking rate and/or rotational grazing can be used to alter the vegetation structure and composition to favor wildlife.
- Livestock may be used to manipulate the height and structure of native warm season grasses providing excellent wildlife habitat.
- Reducing livestock use of riparian areas may improve the habitat for many wildlife species. Fencing can help reduce siltation, turbidity and stream bank erosion while reducing stream and pond pollution from livestock wastes. Provide alternative water sources away from riparian areas.
- Grazing should not be used to manipulate nonnative forage pasture (e.g. tall fescue, orchardgrass, bermudagrass) for wildlife because these grasses are detrimental to wildlife, displacing otherwise suitable habitat. Chemical treatment of these grasses is recommended.

Chemical Treatment

Herbicides are often applied to control unwanted vegetation and encourage plants that are more desirable for wildlife.

Effect on Habitat

- In many habitats, hardwood brush reduces vegetative diversity and limits many plants that are important for wildlife.
- Mowing/mulching and chaining/roller beating stimulate resprouting.
- Proper herbicide applications control unwanted woody growth and encourage more herbaceous groundcover.
- Many areas are covered with non-native grasses and forbs that provide little food or cover for wildlife and exhibit a growth pattern that prevents many wildlife species from using the area. These areas can be sprayed to eradicate the undesirable species and promote desirable native species from the seed bank or desirable species can be seeded if not present in the seed bank.
- Each succession manipulation technique is applicable for manipulating succession in different habitats for various wildlife species. In some instances, more than one technique may be applied. Refer to Concepts 4, 5, 6 and 7. For the written and oral segments of the contest, you should specify which practice(s) should be used and why that practice is applicable.

11. Nesting Structures

General Description

Some species den, nest and/or roost in cavities they don't excavate themselves (e.g., bluebirds, wood ducks, screech owls). If natural cavities are not available, artificial cavities (nest boxes)

can be used. Many species need a certain kind of cavity (e.g., diameter of hole, depth, area) in a certain location (field, woods or water) and at a certain distance above the ground (height in feet). The particular design and placement of nest boxes often determines which wildlife species will use the structures. Following is a table with some information about nest box designs.

NOTE: Nesting structures for Canada geese or raccoons are not recommended in many areas because resident Canada geese and raccoons have become too numerous and are a nuisance. Instead, creation of quality nesting habitat is required to impact population recruitment. Nest boxes should be monitored to ensure use by targeted species.

Effect on Habitat

- In open areas (Stages 2, 3 and 4) nest boxes are useful for bluebirds unless an abundance of nesting cavities in trees or fence posts are present. Nest boxes for bluebirds should not be placed any closer than 80 yards apart to prevent excessive territorial fighting between males.
- Near water sources, nesting structures provide secure nesting sites for wood ducks where trees with cavities suitable for nesting are absent. Nest boxes for wood ducks should not be placed any closer than 100 yards apart and ideally should not be visible from one box to another to prevent dump-nesting by females not incubating a particular nest.

12. Plant Flowers

General Description

Planting annual and perennial flowers provides food and cover for many wildlife species. Additionally, flowers improve the general beauty of an area.

Because of the expense, planting flowers is usually reserved as an urban activity. Potted plants grown in greenhouses are often purchased in relatively small quantities and hand-planted around homes or in gardens. Establishing native forbs, as in the practice “Establishing Native Grasses and Forbs” from seed, can have the same effect on a larger scale. Some forbs or “weeds” are also wildflowers.

Effect on Habitat

- Planting annual and perennial flowers can benefit wildlife requiring food and cover in Stages 2 and 3 vegetation.
- Planting certain types of flowers can provide nectar sources for hummingbirds and butterflies.
- Plant only native flowers.
- Plant a variety of flowers that will provide food and cover in all four seasons.
- Plantings should be arranged in proximity to other cover so they are accessible to wildlife.

13. Plant Food Plots

General Description

Planting grain and forage food plots can be beneficial for many wildlife species (game and non-game, birds and mammals) primarily by providing supplemental food, but also by providing additional cover in some circumstances. It is important to note that food plots should be considered supplemental to the existing natural habitat. The primary objective for food plots should be to provide nutrition for various wildlife species during periods when naturally occurring foods are limited (e.g., late summer and winter). In addition, food plots are often used to

facilitate harvest of some wildlife species. Plots should not be placed within view of property lines or public roads.

Grain food plots are annual warm-season plantings that include corn, grain sorghum and millet as well as other seed such as buckwheat, sunflowers, soybeans and cowpeas. Forage food plots may be annual or perennial, warm- or cool-season plots. Popular forage plantings include clovers, wheat, oats, rape (canola), chicory, winter peas, soybeans, cowpeas and lablab. Food plots should be dispersed throughout the property being managed.

Generally, one to five percent of a property being managed for wildlife may be in food plots. Food plots may be long and narrow (300 to 400 feet long and 15 to 20 feet wide) or square blocks, depending on wildlife species managed and the type of food plot planted. Preferably food plots are located at the edge between two or more kinds of habitat, such as between woodland and old field near a creek. If possible, food plots should be located adjacent to natural cover (e.g., brushy fencerows, hedgerows and other thicket-type areas).

Exclusion cages should be erected in all forage plots to monitor planting success and amount of grazing pressure.

Food plots can be planted for waterfowl. Mallards often feed in flooded fields or warm-season grain food plots. Plots of millets, corn, rice or grain sorghum may be flooded a few inches deep during the fall migration to provide an additional food source for ducks through the winter. Large flocks of Canada geese will feed in muddy fields of winter wheat.

In urban areas, planting food plots can serve the same purpose as in rural areas. Food plots in urban areas, however, also serve an aesthetic purpose in addition to providing food and cover. These can be thought of as vegetable gardens, flower beds, rooftop gardens or other landscaped areas.

In downtown urban areas, residential green space may be very limited. Urbanites can create rooftop or balcony gardens for wildlife habitat, and as such, rooftop or balcony gardens should provide food, water and cover. Stages 2, 3, 4 and 5 may be provided through a rooftop or balcony garden, although none in large quantities. Ideally, plant native vegetation to provide food and cover year-round. Moving water will attract more wildlife than water that is stationary.

Effect on Habitat

- In areas where row-cropping (corn, grain sorghum, soybeans, etc.) is scarce, grain food plots can supply high-energy foods through fall and into late winter.
- In areas where little herbaceous vegetation is present (e.g., pine plantations, or large areas of Stages 4, 5 and/or 6) and/or where herbaceous vegetation is of no value to wildlife (e.g., fields of tall fescue or bermudagrass) forage plots can supply high-protein foods, especially during late summer and through winter and spring.
- In urban areas, food plots supplement food sources for a variety of wildlife during times of the year when food is less abundant and where green space is not present.

14. Plant Shrubs

General Description

When properly located, various shrubs can benefit many species of wildlife. In large open areas, planting multiple rows of shrubs is beneficial for those species requiring additional shrub cover. Fruiting shrubs are especially good when planted in fencerows, hedgerows, field/woods orders, odd areas (e.g., field corners and gullies) and any other areas where soft mast may be

lacking. Establishing hedgerows of shrubs to break-up fields is very beneficial, especially when planted adjacent to native grasses and/or a good food source. Plant shrubs in winter while they are still dormant.

Effect on Habitat
- Can provide additional food and cover for many wildlife species in areas where specific species of shrubs are lacking.
- Shrubs are an important component of travel lanes, which allow wildlife to move safely across open fields between two areas of cover.
- Establishing hedgerows by planting shrubs may be used to increase interspersion of cover types.
- Shrub plantings may be useful in some urban settings where desirable cover and/or soft mast are lacking.
- Hedgerows allow animals to find suitable habitat for feeding, nesting or cover.
- Establishing hedgerows increases the amount of edge and creates smaller fields in close proximity that can be managed differently to meet the various food and cover requirements for different wildlife species.
- Used to help develop riparian buffers.

15. Plant Trees

General Description
Trees are planted to benefit many species of wildlife and can provide food (hard or soft mast) and/or cover. Trees should be planted in winter while they are still dormant. For specifics about what, when and how to plant mast trees, contact your county extension office.

Effect on Habitat
- A wide variety of tree species may be planted; species used depend on many factors, such as landowner objectives, region and site.
- A diversity of hard and soft mast producers is recommended where mast is limited.
- Provides additional nesting, perching, denning and roosting cover for many wildlife species.
- Used to help develop riparian buffers.

16. Ponds: Construction

General Description
Ponds can be created using dams, dikes and levees to provide permanent water for fish and wildlife. The design varies, depending on the purpose for constructing the pond and the region where it is constructed. For example, steep sloping sides benefit fish and gentle sloping banks benefit several wildlife species, such as wading birds. Contact your local Natural Resource Conservation Service office for design details. This practice should be recommended for creating **new** ponds with permanent water.

NOTE: Although many wildlife species may use ponds for various reasons, in the contest this practice is intended primarily for fish habitat. When additional water or wetland habitat is needed for various wildlife species, the habitat practice “Water Developments for Wildlife” should be marked.

Effect on Habitat
- Suitable habitat for fish is created by constructing a new pond.

17. Ponds: Deepen Edges

General Description

In ponds with excessive aquatic vegetation along the margins of a pond, the edges should be deepened to a minimum of two to three feet with steep side slopes. If the ponds can be drained, this can be accomplished with a bulldozer or tractor with a rear blade. If the pond cannot be drained, a backhoe can be operated from the top of the pond bank. Soil can be removed from the site or piled around the bank and then smoothed out and planted to native grasses and forbs.

Effect on Habitat

- Reduces rooted aquatic vegetation around the edge of a pond, making prey more easily available to predator fish.

18. Ponds: Fertilize

General Description

Ponds can be fertilized to increase available natural food organisms and prevent rooted aquatic weeds from becoming established. However, not every pond should be fertilized. Fertilization should **NOT** be used in ponds infested with weeds, ponds with excessive water flow, turbid (muddy) ponds, or ponds that will not be fished heavily. Fertilization is needed in fish ponds with water clear enough that you can see your hand clearly with your arm underwater at elbow length (18 inches).

Before beginning a fertilization program, test a sample of the pond water for the total alkalinity and pH. Ponds that are below 20 mg/l total alkalinity will need liming in order for fertilizers to be effective.

Fish ponds should be fertilized in the spring when the water temperature reaches 60 degrees Fahrenheit. For ponds with moderate hardness (50 to 100 mg/l calcium hardness) apply at the rate of 15 pounds of 12-52-4 (or its equivalent) powder, one gallon of 11-37-0 liquid fertilizer, or 15 pounds of granular (0-46-0) per acre at two-week intervals, or until a good green color (phytoplankton bloom) develops in the pond. Make additional applications of fertilizer (at the same rate per surface acre) every three to four weeks, or when the water clears (becomes less green). Fertilization may be continued until water temperatures drop below 60 degrees Fahrenheit in the fall.

Methods for applying fertilizers vary with the type of fertilizer selected. Granular fertilizer must be distributed from a fertilizer platform. Liquid fertilizer should be mixed with pond water and broadcast from a boat for large ponds for from the bank of small ponds. Water soluble powdered fertilizers can be broadcast from a boat for from the bank.

Effect on Habitat

- Pond fertilization stimulates phytoplankton production, which is the first step in the food chain of a fish pond.

19. Ponds: Reduce Turbidity/Reseed Watershed

General Description

Turbid or muddy water limits fish production because natural food organisms need sunlight to grow. Turbidity can be caused by sediment being washed in from the pond banks or watershed, activities of cattle watering in the pond, feeding activities of bottom-dwelling fish such as carp or

buffalo fish, or negatively charged clay particles suspended in the water column. Most events of turbidity are caused by temporary introductions of sediments from the watershed (erosion) or the pond bottom (cattle or fish) and will usually clear in a relatively short period of time.

Reducing erosion in the watershed is best accomplished by reseeding immediately around the watershed where there is evidence of erosion. Turbidity due to pond sediments can be controlled by restricting cattle to a small area of the pond and eliminating bottom-dwelling fishes. Turbidity from suspension of negatively charged clay particles is a more difficult problem. The addition of positively charged compounds such as limestone, gypsum or alum crystals can cause the clay particles to settle. However, the choice of which product and how much to use has to be based on effectiveness, availability, cost and the ability of the pond owner to apply the product correctly.

Effect on Habitat
- Removes/settles silt in the water and allows sunlight to stimulate phytoplankton.
- Improves water quality and provides nesting, brooding and winter cover for some wildlife.

20. Ponds: Repair Spillway

General Description
Needed if the spillway in an existing dam or dike is eroding or otherwise damaged, keeping the pond level too low and increasing the chance of the dam washing away during heavy rains. In special cases, leaks around the spillway or levee structure can be stopped with the addition of special clays or plastic liners (this is expensive).

Effect on Habitat
- Enables pond to fill to appropriate level and precludes vegetation from establishing around the inside perimeter of the pond.

21. Ponds: Restock

General Description
Restocking a pond is a drastic measure and should only be considered after other management approaches have been attempted. Ponds containing wild fish species such as carp, shad, green sunfish or bullhead catfish should be restocked with a balanced predator/prey combination.

Restocking should be done only after all fish in the pond have been removed, either by draining or applying a fish toxicant. In warm water ponds, bluegill fingerlings should be stocked in the late fall, and bass fingerlings are stocked the following June.

Although various states have different stocking recommendations, typical stocking rates are 1,000 bluegill and 100 bass per surface acre if the pond is to be fertilized or 500 bluegill and 50 bass per surface acre if the pond will not be fertilized.

Effect on Habitat
- Draining ponds and using fish toxicants remove unbalanced fish populations and allow establishment of desirable balanced populations.

22. Retain Snags and Down Woody Material

General Description

Snags are standing dead trees. They provide cavities used by many birds and mammals. In forested habitat, snags and down logs of various tree species with remaining limbs, bark and stumps should be retained for habitat diversity. Dead and down wood is important to numerous species of terrestrial wildlife as sites for feeding, reproducing, hiding, and resting. The use of dead and down material varies as the log decomposes.

In the absence of any snags and when managing for species that use snags and down woody material, it may be necessary to create snags by killing some existing trees by girdling the tree with a hatchet or chainsaw and applying herbicide to the wound. In streams, woody material creates stream diversity and structure that may be used as cover.

As a general rule of thumb, in forested habitat leave or provide a minimum of seven snags, 10 to 20+ inches in diameter, and four down logs per acre. Large down logs 24 inches in diameter, 50 feet long are optimal. In intensively managed forests of smaller material, leave logs of a minimum of 12+ inches in diameter and 20 feet long. Conifer logs usually decay slower and provide habitat over a longer period of time. Logs of different species with remaining limbs, bark, and stumps should be retained for habitat diversity.

In urban areas or areas with high human activity, snags and down woody material need to be removed when posing a safety concern.

Effect on Habitat

- Snags provide roosting and perching sites for many bird species.
- Snags provide woodpeckers with sites for cavity construction. Later, other species (e.g., bluebirds, owls, gray squirrels and wood ducks) may use these cavities for nesting and roosting.
- Snags provide foraging sites for many species.
- Down woody material provides sites for feeding, reproducing, hiding and resting that are important to numerous species of terrestrial wildlife.
- Down logs provide denning sites for bobcats.
- Down logs provide a rich food source for insect and fungi-eating animals, which may increase available prey for bobcats and other species.
- As down logs decompose, they can hold more moisture, providing an essential cool, moist microhabitat for many species of reptiles, amphibians and small mammals.
- Down logs provide drumming sites that are important for the mating rituals of ruffed grouse.
- Dead and down material provides sites for regeneration of some tree and shrub species.
- Dead and decaying logs serve as sites for nitrogen fixation by some bacteria.
- Logs, large limbs and smaller branches in and near water provide shade, cover and food for aquatic organisms, some of which are food for young fish.

23. Rooftop / Balcony Garden

General Description

In urban areas, residential green space may be limited. Instead of creating sprawling planting areas as is done in suburban and rural areas, urbanites create rooftop or balcony gardens. Although limited in space, the goal of rooftop or balcony gardens is to create wildlife habitat, and as such, rooftop or balcony gardens should provide food, water and cover.

Effect on Habitat

- An opportunity to provide food, water and shelter in urban environments to attract wildlife and provide positive opportunities for human/wildlife interactions.

- Stages 2, 3, 4 and 5 may be provided through a rooftop or balcony garden, although none in large quantities.
- Plant only native species.
- Plant vegetation that will provide food and cover year-round.
- Moving water, like a small waterfall or stream, will attract more wildlife than water that is stationary.

24. Soil Test

General Description
Applying fertilizer and lime at environmentally safe rates will improve palatability and production of vegetative habitat and increase cost effectiveness. A soil test is the analysis of a soil sample to determine nutrient content, composition and other characteristics. Tests measure fertility and indicate deficiencies that need to be remedied. **In the absence of a current soil test (one less than 3 years old), a soil test should be obtained in areas where you intend to plant wildlife foods or enhance native vegetation.**

Effect on Habitat
- Increases growth, production and nutrient availability of native plants and food plots.

25. Streams: Dams, Boulders or Logs

General Description
Small (less than 1.5 feet high) dams are built across streams to raise the water level and create pools. Large boulders or logs are placed in streams (with hard bottoms) to improve fish habitat. The rocks need to be large enough so that small floods will not move them. Any structures put in a stream have the potential to alter stream currents in an undesirable manner. The placement and design of such structures should be done with advice from experts in the field.

Effect on Habitat
- Used to create pools for fish to hide and rest. If designed properly, can be used to reduce some kinds of stream erosion.
- Used in areas with considerably more riffles than pools.

26. Tillage Management

General Description
Tillage of cropland may be delayed in spring to allow the use of standing stubble for nesting. Tillage may be eliminated in the fall to allow wildlife access to waste grain. When fall tillage is necessary, avoid inversion tillage (soil is turned over and covers up crop residue), such as moldboard plowing or disking. Instead, till with implements such as chisel plows that can be used without turning the soil over.

Note: Recommend this practice only if a grain crop is present.

Effect on Habitat
- Increases supply of waste grain, which is a food source used by rabbits, squirrels, quail, turkeys, deer and many other wildlife species.

27. Use Pesticides Carefully

General Description

No one likes ants invading their picnic or mosquitoes biting when enjoying outdoor activities. Worms and other insect pests can decimate a garden. But insects are part of the ecosystem and provide a great benefit to a wide range of wildlife species, primarily as a food source. Use pesticides carefully and limit application to the particular location or need.

Effect on Habitat
Using pesticides eliminates food sources for a number of wildlife species. As insectivores, most bat species rely on insects for their sole food source. Many bird species feed insects to their chicks. Some mammals, such as spotted skunks and herps, and reptiles, such as snakes and frogs, also consume insects. Insects are a great source of protein and provide nutritional benefits to wildlife that consume them. Note that pesticides should be avoided when butterflies are the species being managed. Pesticides will kill butterflies or neurologically alter them in the larval stage to the point they do not survive long after emerging from their cocoon.

When Using Pesticides
- Purchase the pesticide with the shortest residual. In other words, apply a pesticide which will put less poison into the environment.
- Use a pesticide that is species-specific so you only target the problem pest and not beneficial invertebrates.
- Follow all directions on manufacturer's label.
- Wear protective clothing when applying pesticides.

28. Water Developments for Wildlife

General Description
Creating a source of drinking water for wildlife is a critical consideration when little or no water source is available from streams, ponds, lakes, rivers, reservoirs, springs, etc. Many different types of water sources are possible, depending on the area and local needs of wildlife. These include:
- **Guzzlers:** Built by covering an area with an apron of fiberglass or some other material that sheds rain. The water is collected in a storage tank and slowly released into a trough from which wildlife can drink. (This practice is more common in the western U.S. in drier locations with little rainfall.)
- **Dugouts:** Basins (dug out with bulldozers or backhoes) designed to collect water from runoff and/or precipitation. Side slopes should be gentle to provide easy access for wildlife. (These could also be considered *reservoirs* in Arkansas.)
- **Shallow Impoundments:** Earthen dikes are constructed to retain water (usually run-off water from precipitation) in natural drainage areas. Placement of the dike is critical to avoid damage from floods and also to collect sufficient water. These impoundments are also used by waterfowl for nesting and brood habitat when flooding occurs in spring and summer. Crop fields (e.g., corn, millets, grain sorghum) can be flooded in the fall and winter to provide areas for waterfowl and other wetland species to feed and rest. A water control device in the dike allows the water level to be manipulated. NOTE: <u>When this practice is recommended, it is assumed that adequate water control structures are included and should not be an additional recommendation.</u>
- **Birdbaths and Backyard Ponds:** Small ponds can be constructed in backyards and other urban areas to provide water for a variety of wildlife. Birdbaths are also useful for providing water in urban settings.

Wetland construction may be necessary in areas lacking natural wetlands. For some wildlife species, wetlands should be maintained to provide for diverse and abundant insect and/or amphibian populations as food sources.

Effect on Habitat
- Provides drinking water for wildlife.
- Provide winter food resources if flooding occurs.
- Attracting wildlife to a water source can provide a source of prey for many predators.

29. Water Level Manipulation Techniques

Water Control Structures: General Description
Various structures made out of concrete, pipes, wood, etc., are used to control the water level in wetlands and ponds. They usually are combined with dams and shallow dikes for water control. These are recommended only when inadequate or no structures are present on an existing dam or dike.

Examples of water control structures designed for waterfowl include flashboard risers, stoplogs, full-round risers, and screw gate structures. See descriptions of water control structures at the following Ducks Unlimited Web site: http://southern.ducks.org/WaterControlStructures.php

Small Dikes for Temporary Flooding: General Description
In the fall and winter, small dikes are used to temporarily flood potential feeding areas for waterfowl by holding rainwater on a field or woods. Grain fields (e.g., corn, millets and grain sorghum) in Stage 6 hardwood stands are examples of feeding areas that can be flooded to attract waterfowl. In spring and summer, existing wetlands and forested areas can be flooded to provide nesting and brooding habitat for various waterfowl, such as redheads and wood ducks. This practice is recommended in areas where there are potential sites for waterfowl feeding and nesting. A water control device in the dike allows the water level to be manipulated. The water is removed from the field prior to spring (similar to letting the water out of a bathtub) so the field can be planted again.

NOTE: When this practice is recommended, it is assumed that adequate water control structures are included and should not be an additional recommendation.

Effect on Habitat
- Allows management of water levels to increase or decrease the amount and type of aquatic vegetation. Useful for creating a desirable mix (interspersion) of open water and emergent aquatic vegetation.
- Water level manipulation techniques are used to create or improve habitat for wildlife, whereas water developments for wildlife are constructed to provide a source of drinking water for wildlife.
- Temporary flooding can improve existing wetlands for nesting and brooding for some waterfowl species, such as redheads, and can improve existing forested areas for nesting and brooding wood ducks.
- Allows management of water levels to increase or decrease the amount and type of aquatic vegetation. Useful for creating a desirable mix (interspersion) of open water and emergent aquatic vegetation.
- Can be used to create shallow water areas.
- Can be used to manage the quality of water and for control of unwanted fish.
- Can be used to control water levels in flooded timber, drawing water down to prevent tree mortality.

30. Wildlife Damage Management Techniques

General Description

Wildlife managers often have to exclude, trap, relocate, frighten, repel, poison, shoot or otherwise kill individual animals in order to reduce or eliminate damaging behaviors and/or health hazards presented by some wildlife species. Examples of wildlife damage include woodpeckers hammering on the side of the house, squirrels nesting in the attic, deer eating ornamental plants in the yard or feeding in soybean fields, bobcats/coyotes/owls preying on livestock, rabbits/raccoons eating vegetable gardens, beavers killing trees, red-winged blackbirds eating crops, and Canada geese loitering on lawns and golf courses. In addition, starlings, English sparrows or rock doves roosting in urban trees and defecating on sidewalks can create a health hazard. Wildlife damage management may be recommended in addition to the practice of increasing harvests if special problems exist on the area being evaluated.

Wildlife Damage Management Techniques include:

- Direct control techniques like shooting, trapping and the use of toxicants to reduce problem animals are commonly used and effective.
- Non-lethal methods of predator control including habitat modification, repellents and the use of exclusion fences or guard dogs are also commonly used.
- Methods of controlling herbivores (deer, rabbits, etc.) include shooting, exclusion fences, taste and area repellents, and scare tactics (such as propane cannons).
- Methods of bird control include frightening devices, exclusion devices and shooting.

See the discussion about Wildlife Damage Management as a concept in Activity II in this handbook.