

Bobcat

General information

Bobcats are carnivorous predators that occur throughout the U.S. They are seldom active during the day. Bobcats may be a significant cause of mortality to pronghorn and wild turkeys, but are not considered a major source of mortality for deer. They are classified as a furbearer game species in many states.

Habitat requirements

Diet: rabbits, rodents, opossums, raccoons, skunks, pronghorns, deer, snakes, and many bird species, including wild turkeys, ruffed grouse, northern bobwhite, domestic poultry, and other livestock

Water: water requirements are not well known; free-standing water is used

Cover: early successional areas with woody encroachment, young regenerating forests, mature forest (pine and hardwood), rocky outcrops and ledges, hollow logs, and other sheltered spots for denning

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for bobcat prey species

Edge Feathering: can provide increased cover and food for prey species

Field Borders: can provide increased usable space for bobcat and prey species

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection)* will provide increased dense cover and food resources for various prey species; *Forest Stand Improvement* can provide enhanced understory development and forage for various prey species; down woody debris (logs) can provide denning sites for bobcat

Livestock Management: should prevent overgrazing; livestock should be excluded from forests to prevent destruction of forest understory, which provides food and cover for many prey species

Plant Shrubs: in areas where additional shrub cover is needed to attract prey and provide security cover

Plant Trees: in areas where additional forest cover is needed to attract prey and provide security cover

Set-back Succession: *Prescribed Fire* can be used to maintain brushy cover, *Herbicide Applications, Chaining, Chainsawing, Drum-chopping, and Root-plowing* can be used to reduce or maintain early successional communities, woodlands, and forest understory

Decrease Harvest: may be necessary when additional bobcats are desired and hunting or trapping efforts may be limiting growth



Increase Harvest: where populations can sustain additional hunting or trapping pressure for recreation and where populations need to be lowered

Water Developments for Wildlife: if no water source is present, a small pond or shallow impoundment may provide drinking water, but also increase potential prey

Wildlife Damage Management: may be necessary if poultry or other livestock depredation is a problem

Wildlife or Fish Survey: track counts, scent stations, trapper harvest data, and trail cameras are used to estimate population trends

Brazilian free-tailed bat

General information

The Brazilian free-tailed bat roosts in large numbers at a relatively small number of roost sites. They have brown fur with broad ears, large climbing feet, and a characteristic “free,” mouse-like tail. Anywhere from dozens to millions of bats may roost at a single site, which could be a cave, bridge, or other building structures with cracks or niches where bats can escape during the day. They are frequently found around and in buildings and have earned the nickname “house bats.” At dusk, these free-tailed bats emerge from roosts to feed on insects and are estimated to eat between 6,000 and 18,000 metric tons of insects annually, in Texas alone! This insectivore is beneficial both for human comfort and the reduction of agricultural pests. Millions of bats that roost in the U.S. spend their winters in Mexico, Central America, and possibly South America. In contrast, Brazilian free-tailed bats in some areas such as east Texas are non-migratory and remain during winter. Each female gives birth to one pup, which is unable to fly and without fur. Seventy percent or more of the young are born within a 10-day period in mid-summer. Young bats live in large congregations on cave ceilings. At about one month old, young bats are able to fly to find their own insects. Although a small percentage of the Brazilian free-tailed bat populations carry rabies (about 24 percent), humans occasionally use pesticides to poison the bats and vandalize key roosting sites because of fear.



J. N. Stuart



Habitat requirements

Diet: insects, such as moths, beetles, flying ants, and June bugs

Water: require free-standing water; Brazilian free-tailed bats sweep over water sources and drink while flying

Cover: caves, mine tunnels, hollow trees, bridges, and other buildings for roost sites during the day; young remain on the ceiling for about a month after birth

Wildlife management practices

Nesting Structures: providing man-made structures for bats to roost can help expand their population or decrease concentrations at existing roost locations.

Wildlife Damage Management: education on how to properly handle dead bats to protect humans from the rabies virus could decrease fears of bats spreading the disease

Wildlife or Fish Survey: exit counts from caves are used to estimate population trends

Collared peccary

General information

The collared peccary (also called javelina [“*have-a-leena*”]) is a game mammal found in the southwestern U.S. Although similar in appearance to pigs, the collared peccary is not in the same taxonomic family as pigs. They have a smaller body size than pigs with 4-toed hooves on their front feet and 3 toes on their back feet. The peccary’s large head and long snout are capped off by sharp tusks pointing toward the ground. Their black, bristly coats include a white collar around their neck. Javelinas have a strong-smelling musk gland on the top portion of their rump, which they use to mark their home range. They run in herds of a few to several dozen within fairly small home ranges and usually can be found cooling off near water or resting in the shade during the heat of the day. Collared peccaries are the only wild ungulate in the western hemisphere that breed all year long, and breeding may be dependent upon rain events. Females will give birth to 1 to 5 young. Peccaries may be aggressive, increasing unnecessary fear among humans, but will not attack unless they are defending themselves. Often confused with pigs, they push dirt around, but do not root-up the ground.



C. Burnett



Habitat requirements

Diet: cacti, mesquite beans, lechuguilla and other succulent vegetation, fruit, mast, insects, and small lizards

Water: free-standing water is required unless prickly pear is abundant

Cover: thickets of brush, prickly pear, scrub oak, or rocky canyons

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative vegetation is competing with native vegetation and reducing habitat quality for collared peccary

Plant Shrubs: planting prickly pear cacti where limited may increase available food resources

Set-back Succession: *Prescribed Fire, Chaining, and Drum-chopping* can be used to maintain low-growing shrub cover and herbaceous groundcover

Water Developments for Wildlife: peccaries do not sweat; thus, free-standing water is necessary for cooling in hot environments

Decrease Harvest: when populations are declining in good habitat and additional animals are desired

Increase Harvest: when additional harvest is desired and populations can withstand additional harvest and when the population needs to be lowered

Wildlife or Fish Survey: spotlight surveys, camera surveys, and hunter harvest data can assess population trends

Columbian black-tailed deer

General information

The Columbian black-tailed deer is a subspecies of mule deer that occurs in the coastal regions of northwestern North America (northern California, Oregon, Washington, and southern British Columbia). Columbian black-tailed deer use a mixture of openings (with herbaceous groundcover and scattered shrubs) and conifer forest. Black-tailed deer are ruminants (animals with a four-chambered stomach) and are adapted to eat higher-quality forages more so than some other ruminants (such as elk or cattle). Black-tailed deer are crepuscular (active at dawn and dusk) and prefer relatively flat areas at mid- to low elevations (below 1,500 ft.) on south-facing slopes. These sites tend to be dominated by vine maple, huckleberry, and salal plant communities, which provide preferred forage, minimal duration of snow cover, and protection from cold winds. Where overabundant, black-tailed deer can cause damage to ornamental plantings, forest crops, and row crops, and can be hazardous for motor vehicles.

Habitat requirements

Diet: forbs, browse, soft mast, grains, and grasses

Water: obtain most of their water from diet, but will drink free-standing water when available

Cover: mixture of dense young forest, mature forest, and early successional cover

Wildlife management practices

Control Nonnative Invasive Vegetation: may be necessary if the native plant community is being outcompeted and food and cover resources are being reduced

Edge Feathering: will encourage shrub and young tree growth to enhance travel corridors, fawning cover, and forage availability

Field Borders: to increase fawning cover and forage availability around fields

Forest Management: *Forest Regeneration*, especially *Clearcut*, can stimulate herbaceous cover and provide additional brushy cover for a few years; *Forest Stand Improvement* can stimulate additional herbaceous cover and browse in the understory, if the understory is limited

Leave Crop Unharvested: to provide additional food resource, especially near cover

Livestock Management: should prevent overgrazing in early successional areas to maintain forage and browse for black-tailed deer; livestock should be excluded from forested areas where black-tailed deer is a focal species to maintain the forest understory

Plant Food Plots: to provide additional nutrition, particularly during summer lactation period and during winter in some areas where naturally occurring food resources are limited

Plant Native Grasses and Forbs: where early successional



Erin Willett



cover is limited and additional grasses and forbs are needed for forage

Plant Shrubs: in large open areas where additional shrub cover, browse, or soft mast is needed

Plant Trees: in large open areas where additional forest cover is needed

Set-back Succession: *Prescribed Fire* can be used to maintain early successional openings and to improve forest understory structure and composition for increased forage and soft mast; *Disking* can be used to maintain early successional openings; *Chainsawing* and *Root-plowing* can be used to create forest openings and maintain shrub-dominated communities

Soil Conservation Agriculture: eliminate fall tillage of grain-crop residue adjacent to cover to make waste grain available as an additional food source

Water Developments for Wildlife: where water is limiting (within one-half mile), ponds and shallow impoundments can provide water for drinking

Decrease Harvest: if hunting pressure is limiting population growth where an increase is desired

Increase Harvest: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered

Wildlife Damage Management: fencing, repellents, and scare tactics may be helpful to keep deer from ornamental plantings, gardens, and some crops; reducing the population through shooting is recommended when local overabundance is causing crop depredation and increasing vehicle collisions

Wildlife or Fish Survey: spotlight surveys, camera surveys, and hunter harvest data can assess population trends

Common muskrat

General information

Muskrats are large rodents found throughout the U.S., especially in shallow marshes with abundant cattails. They are mainly nocturnal and need water at least 4 feet deep or flowing water that allows free movement under ice during winter. Muskrats prefer water 1 to 2 feet deep during summer, with about 20 percent of the wetland open water, free of emergent aquatic vegetation. Muskrats build lodges of cattails or other herbaceous vegetation, but do not use sticks or limbs. They sometimes nest in a bank burrow along a waterway. Burrowing and denning activities can cause problems in flooded agricultural areas, such as rice fields and waterfowl management areas.

Habitat requirements

Diet: roots, tubers, and green shoots of emergent aquatic vegetation, such as cattails and bulrushes

Water: necessary water obtained from diet

Cover: primarily shallow-water wetlands with a mixture of open water and emergent aquatic vegetation; den in lodges built from cattails and bulrushes; loaf on floating logs or tops of lodges

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive aquatic vegetation is competing with the native aquatic plant community and reduce habitat quality for common muskrat

Livestock Management: livestock should be restricted from riparian areas and other wetlands; this may require development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old, decadent wetland vegetation

Water Control Structures: should be installed if not present in levees or dams to control water levels and allow cattails and bulrushes to grow

Water Developments for Wildlife: small impoundments can be built in low-lying areas to provide habitat

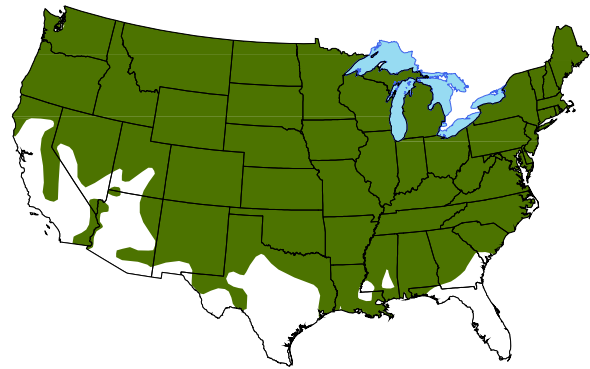
Decrease Harvest: when trapping efforts have reduced population below desirable levels

Increase Harvest: when populations can sustain additional trapping or where populations need to be lowered

Wildlife Damage Management: may be necessary when muskrats damage dikes in agricultural areas and waterfowl management areas; populations are typically reduced by trapping



Bo Zaremba



Wildlife or Fish Survey: observation surveys, track counts, and presence of lodges are used to estimate population trends

Coyote

General information

Coyotes are found throughout the continental U.S. and have even been observed in large cities and urban areas. Grasslands, shrubland, and farmland provide optimal habitat for coyotes, but they also use forested areas as well. Coyotes den in a variety of places, including brush-covered slopes, steep banks, rock ledges, thickets, and hollow logs. Coyotes are most active at night, during early morning, and around sunset, but they may be active throughout the day. Coyotes live in packs, alone, or in mated pairs, depending on the time of year. Coyotes are considered omnivores as they have an extremely varied diet that fluctuates with the seasons.



Steve Thompson

Habitat requirements

Diet: rodents, rabbits, and other small mammals, insects, birds, eggs, deer, carrion, and soft mast; livestock and wild ungulates (deer, elk, pronghorn) usually are represented in coyote stomachs as carrion; however, in some cases, coyotes prey heavily on deer and pronghorn fawns, and can limit reproductive success in some situations

Water: requirements are not well documented; necessary water probably is obtained in diet

Cover: grasslands, shrublands, regenerating forest, mature forest; crevices and burrows along river banks, rock ledges, brushpiles, and holes under stumps or abandoned buildings are used as den sites for raising pups



Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation reduces habitat quality for coyote prey species

Edge Feathering: (in some ecoregions) to increase cover and food availability for prey species around fields

Field Borders: to increase usable space for prey species around fields

Forest Management: (in some ecoregions) *Forest Regeneration (Clearcutting, Shelterwood, Seed-tree, Group Selection)* and *Forest Stand Improvement* can improve habitat for prey and lead to more abundant prey

Livestock Management: should maintain adequate cover for prey species

Plant Native Grasses and Forbs: where additional early successional cover is needed for prey and planting is necessary

Plant Shrubs: in areas where additional shrub cover is needed to attract prey and provide security cover for coyotes

Set-back Succession: *Prescribed Fire, Disking, Chaining, and Herbicide Applications* are recommended to maintain herbaceous openings; *Prescribed Fire* can be used to

enhance forest understory structure and composition; *Chainsawing* can be used to create additional forest openings where necessary

Decrease Harvest: where hunting or trapping has limited population and additional coyotes are desired to control a prey species that is overburdened

Increase Harvest: through hunting or trapping where coyote populations need to be lowered

Wildlife Damage Management: may be necessary where livestock or pet depredation is a problem, and more rarely where they are suppressing or causing a decline in the population of some species that have been identified as focal species for management, such as white-tailed deer or wild turkey (see **Wildlife Damage Management Techniques**)

Wildlife or Fish Survey: track counts, trapper harvest data, and camera surveys are used to estimate population trends

NOTE: Situations in which landowners would manage for coyotes are exceptionally rare. However, the coyote is a native predator and plays an important role in many ecosystems. Although management is rarely, if ever, implemented to promote coyotes, management for their prey helps both prey populations and coyote populations and promotes a healthy ecosystem.

Desert cottontail

General information

Desert cottontails can be found in woodlands, grasslands, creosote brush, and desert areas from California to Texas and from northern Montana to Mexico. In the **Hot Desert** ecoregion, desert cottontails use thick shrub cover interspersed with open areas. Riparian and urban areas also are used. Because cottontails do not travel far, shelter and food must be close together.

Habitat requirements

Diet: a variety of forbs and grasses spring through fall; in winter, bark and twigs of shrubs are important; buds, grain, seeds, and soft mast also are eaten when available

Water: necessary water obtained from diet

Cover: grassland, shrub vegetation, and ground burrows for hiding and nesting cover

Wildlife management practices

Control Nonnative Invasive Vegetation: where nonnative invasive vegetation is competing with native vegetation and limiting habitat for cottontails

Field Borders: to increase usable space around row crop fields

Forest Management: (**Mediterranean** ecoregion only)

Forest Regeneration (Clearcut) provides optimal brushy cover for a few years

Leave Crop Unharvested: to provide additional food and cover, especially corn, alfalfa, and wheat

Livestock Management: prevent overgrazing to allow ample amounts of herbaceous vegetation for nesting, cover, and forage; livestock should be excluded from food plots

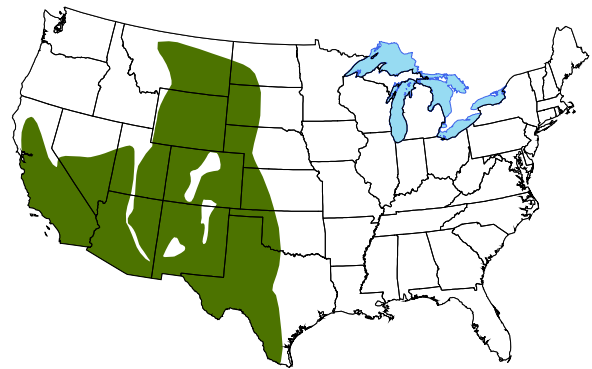
Plant Food Plots: where rainfall is sufficient, forage plots may be planted adjacent to shrub cover

Plant Native Grasses and Forbs: where early successional cover is limited and planting is necessary to provide additional grasses and forbs

Plant Shrubs: in areas where shrub cover is lacking

Set-back Succession: *Prescribed Fire* is recommended to maintain herbaceous openings; *Prescribed Fire* and *Chaining* can rejuvenate decadent shrublands and encourage additional herbaceous groundcover (burning is not recommended in the **Hot Desert** ecoregion unless sufficient precipitation is available); *Mowing* can be used to maintain herbaceous openings in **Urban** areas

Soil Conservation Agriculture: cropland tillage may be delayed in spring to allow use of standing stubble for cover; tillage may be eliminated in the fall to allow access to waste grain



Decrease Harvest: may be necessary when additional rabbits are desired and hunting or trapping is limiting growth

Increase Harvest: where populations can sustain additional hunting and trapping pressure for recreation and where populations need to be lowered

Wildlife Damage Management: shooting, trapping, and exclusion techniques can be used where there is damage to ornamental and garden plants

Wildlife or Fish Survey: observation counts, track counts, and transect flush counts can be used to estimate population trends

Eastern cottontail

General information

Eastern cottontails occur in the eastern half of the country. They prefer brushy cover interspersed with herbaceous openings. Eastern cottontails also are found in suburban areas, parks, golf courses, and stream corridors. Eastern cottontails are prey for the majority of carnivorous predators within its range. They are prolific breeders; females may have 7 litters per year, with 3 to 6 young per litter. This reproductive rate is required to perpetuate populations because 70 to 80 percent of all rabbits die each year.

Habitat requirements

Diet: forbs and grasses, browse, and soft mast from spring through fall; in winter, bark of shrubs and trees, as well as buds and browse

Water: necessary water obtained from diet

Cover: shrub cover, brushpiles, native warm-season grasses and forbs for loafing and escape cover; burrows also are used for denning and escape

Wildlife management practices

Control Nonnative Invasive Vegetation: where nonnative invasive vegetation is competing with native vegetation and limiting habitat for cottontails; sod grasses, such as tall fescue and bermudagrass, can be especially problematic

Edge Feathering: to increase usable space around fields

Field Borders: to increase usable space around fields

Forest Management: *Forest Regeneration (Clearcut)*, provides optimal brushy cover for a few years; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Leave Crop Unharvested: to provide additional food and cover, especially corn, alfalfa, and wheat

Livestock Management: should prevent overgrazing to allow sufficient herbaceous vegetation for nesting, cover, and forage in fields and other early successional areas; exclude livestock from food plots

Plant Food Plots: where additional forage is needed; linear plantings may be situated adjacent to dense cover

Plant Native Grasses and Forbs: where early successional cover is limiting and planting is required to promote additional grasses and forbs

Plant Shrubs: in relatively large openings with few shrubs; field borders, fencerows, and other idle land areas may be good places to plant but usually shrubs and brushy cover will develop naturally in most areas through succession

Set-back Succession: *Prescribed Fire*, *Disking*, and *Herbicide Applications* are recommended to maintain early successional areas, especially when litter accumulation



Aubrey Deck



is limiting germination of the seedbank and when woody encroachment begins to shade-out herbaceous groundcover; *Chaining*, *Prescribed Fire*, and *Herbicide Applications* can be used to rejuvenate shrublands, especially where herbaceous groundcover is shaded out; *Chainsawing*, *Dozer-clearing*, and *Root-plowing* can be used to convert forest cover to early successional communities that may include brushy cover; *Mowing* can be used to maintain herbaceous openings in **Urban** areas

Soil Conservation Agriculture: fall tillage may be delayed until spring to allow use of standing stubble for cover and waste grain for food

Decrease Harvest: may be necessary when additional rabbits are desired and hunting or trapping efforts are limiting growth; low rabbit populations are almost always a result of inadequate habitat, not harvest levels

Increase Harvest: where populations can sustain additional hunting or trapping pressure for recreation or where populations need to be lowered

Wildlife Damage Management: shooting, trapping, and exclusion techniques can be used where there is damage to ornamental and garden plants

Wildlife or Fish Survey: observation counts, track counts, hunter harvest data, and transect flush counts can be used to estimate population trends

Eastern fox squirrel

General information

The eastern fox squirrel is found in the eastern half of the U.S., except for areas of New England. Eastern fox squirrels use mature forest interspersed with small openings, as well as oak and pine woodlands and savannas. Riparian areas are important in the Midwest. Fox squirrels also may be found in urban areas where there are lots of trees. Fox squirrels spend much time foraging on the ground. They build a leaf nest, usually in the crotch of the main trunk of a tree more than 30 feet aboveground, but will regularly use natural cavities in trees, especially in winter.

Habitat requirements

Diet: a variety of hard mast, acorns, seeds, tree buds and flowers, mushrooms, soft mast, eggs, and corn

Water: necessary water generally is obtained through diet, but freestanding water may be used in late summer

Cover: mature hardwood and pine forest, small openings, woodlands, and savannas; nest in tree cavities or build a nest of twigs and leaves

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for eastern fox squirrels; kudzu, nonnative sod grasses, cogongrass, bush honeysuckles, and Japanese stiltgrass may be particularly problematic in some areas

Edge Feathering: can enhance forest structure and increase food availability in forested areas surrounding fields

Forest Management: *Forest Regeneration (Single-tree Selection, Group Selection)* may improve forest or woodland structure and increase food availability; *Forest Stand Improvement* can encourage larger crowns of mast-producing trees and enable oaks, hickories, beech, and others to produce more mast; also can increase soft mast availability and provide snags for potential den sites

Leave Crop Unharvested: (corn) so squirrels can glean waste grain from the field; especially important during years of poor mast production

Livestock Management: should prevent overgrazing, especially in savannas and woodlands where grazing is allowed; livestock should be excluded from riparian areas, especially in open landscapes where tree cover is limited to riparian areas

Plant Food Plots: grain food plots, especially corn, can provide an important food source, during winters with poor mast availability

Plant Trees: in large open areas where tree cover is limiting

Set-back Succession: *Prescribed Fire* is required to maintain savannas and woodlands; *Prescribed Fire* and *Disking* are used to maintain relatively small early successional openings; *Herbicide Applications* can



Joe Fischer



be used to reduce unwanted tree cover or woody encroachment; *Chainsawing* and *Dozer-clearing* can be used to create small openings

Soil Conservation Agriculture: eliminate tilling cornfields in the fall to provide additional food

Water Developments for Wildlife: small ponds may be dug where water may be limiting within 1/4 mile

Decrease Harvest: may be necessary when additional fox squirrels are desired and hunting pressure is limiting growth

Increase Harvest: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered

Wildlife Damage Management: exclusion from buildings, trapping, or shooting may be necessary if damage is occurring

Wildlife or Fish Survey: observational surveys are most often used to estimate population trends

Eastern gray squirrel

General information

The eastern gray squirrel lives primarily in mature deciduous forests and woodlands. They also forage along the edge of crop fields, especially mature cornfields. Eastern gray squirrels have adapted to parks and other urban areas where mature trees are available. Eastern gray squirrels forage both in trees and on the ground. They den in cavities of mature trees and also build nests, generally 30 feet or more aboveground. Eastern gray squirrels will use nest boxes, but nesting structures are not necessary because squirrels build nests when cavities are not available. Thus, cavities are not a limiting factor for eastern gray squirrel populations.

Habitat requirements

Diet: a variety of hard and soft mast, miscellaneous seeds, grains, bark, buds, and mushrooms; they also may eat bird eggs

Water: necessary water generally is obtained through diet, but free-standing water is also used

Cover: mature forest and woodlands; suburban and urban areas with mature trees; den in tree cavities and also build nests of leaves and twigs

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native species and reduce habitat quality for eastern gray squirrel; several nonnative trees, such as tree-of-heaven and royal paulownia, and nonnative groundcover and vines, such as Japanese stiltgrass, kudzu, and English ivy, can displace more valuable native species and make finding food difficult

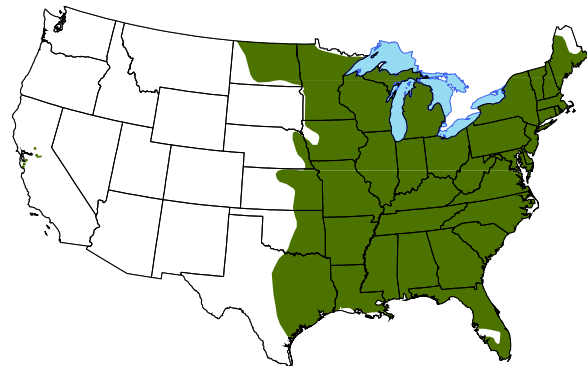
Forest Management: *Forest Regeneration (Group Selection, Single-tree Selection)* can increase soft mast and availability of various seed-producing plants used by eastern gray squirrels; *Forest Stand Improvement* can encourage larger crowns of mast-producing trees and enable oaks, hickories, beech, and others to produce more mast; also can increase soft mast availability and provide snags for potential den sites

Leave Crop Unharvested: (corn) where crop is adjacent to woods or tree line where squirrels can clean grain; especially important during years of poor mast production

Livestock Management: should prevent overgrazing in woodlands and forests; livestock should be excluded from riparian areas in open landscapes where tree cover is largely limited to riparian areas; livestock should be excluded from food plots and from areas where trees have been planted to enhance habitat for eastern gray squirrels



Laura Perlick



Plant Food Plots: grain food plots, especially corn, can provide an important food source during winters with poor mast availability

Plant Trees: plant mast trees (especially oaks and hickories) where they are limiting; most appropriate for large open areas that do not represent habitat for gray squirrels; also may be appropriate where composition of wooded areas is lacking mast and limiting gray squirrel population

Decrease Harvest: may be necessary when additional gray squirrels are desired and hunting pressure is limiting population growth

Increase Harvest: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered

Wildlife Damage Management: may be required if gray squirrels become a nuisance around houses

Wildlife or Fish Survey: observation counts are most often used to estimate population trends

Artificial Feeders: may be used in urban areas to increase viewing opportunities

Elk

General information

Elk primarily occur in mountainous regions of western North America (from New Mexico to Oregon and Canada). They also have been reintroduced in multiple states of the eastern United States. Elk are ruminants (animals with a four-chambered stomach), as are other ungulate species in North America, such as white-tailed deer and mule deer. Elk stomachs are much larger than those of deer, which allows elk to eat more and bed down to chew their cud for an extended period. For this reason, elk may only feed twice a day during some portions of the year to avoid exposure and risk of predation. Elk use forest interspersed with openings. Male elk (bulls) rigorously defend a harem (breeding groups of up to 30 cows) during breeding season (September – October). Nutritional requirements and diet change seasonally. Elk rely on forbs and grasses in spring and summer, and eat browse such as aspen, maples, and poplar, during winter when food availability is limited. Elk that occupy ranges with high elevations will migrate to lower elevations and south-facing slopes in winter to find food and avoid deep snow and cold winds. When overabundant, elk can cause significant damage to ornamental plantings, forest crops, and row crops, and can be hazardous for motor vehicles.

Habitat requirements

Diet: predominantly forbs and grasses, but also browse, especially when palatable forbs and grasses are not available

Water: free-standing water used regularly in summer; water should be within one-half mile

Cover: mature woods for loafing and calving; early successional openings and young forest for foraging

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for elk

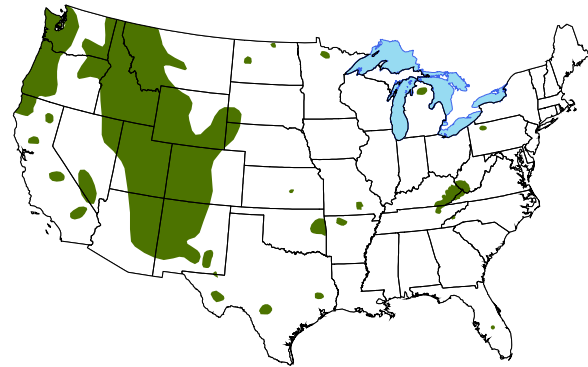
Edge Feathering: may increase forage availability in woods around fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Group Selection)* will provide additional forage for a few years; *Forest Stand Improvement* can improve forage availability and stimulate understory/midstory cover; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Livestock Management: livestock should be excluded from forested areas managed for elk; where elk is a focal species, livestock grazing in open lands and woodlands should be managed to prevent overgrazing and provide sufficient forage for elk



Erwin and Peggy Bauer



Plant Food Plots: where naturally occurring food sources are limiting, forage food plots may provide additional nutrition

Plant Native Grasses and Forbs: where early successional vegetation is limiting and planting is necessary for establishment

Plant Trees: where additional forest cover is needed

Set-back Succession: *Prescribed Fire and Herbicide Applications* is recommended to maintain early successional openings and stimulate additional herbaceous forage in forested areas with adequate sunlight; *Chainsawing, Dozer-clearing, and Root-plowing* may be used to convert forest to early succession and increase forage availability

Water Developments for Wildlife: small ponds may be constructed if water is not available within one-half mile

Decrease Harvest: may be necessary when hunting pressure is limiting growth of elk population where an increase is desired

Increase Harvest: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered; when populations need to be lowered because of habitat considerations, increased harvest should concentrate on females

Wildlife Damage Management: necessary when elk begin to damage hay and crop fields, or when they become a nuisance in suburban areas; both lethal and nonlethal practices can be effective

Wildlife or Fish Survey: aerial surveys, observational counts, and trail cameras can be used to estimate population trends

Fisher

General information

Fishers are furbearers found in forests in the upper Great Lakes area and the mountains of the Pacific and northeastern U.S. Fishers were once a valuable fur resource that led to over-trapping and population decline in many areas. Fishers are likely more adept at preying on porcupines than any other predator. A desire to control porcupines in some areas because of the damage they cause to trees has led to large-scale reintroduction of fishers throughout many portions of their former range. Fishers are now re-established as far south as West Virginia and Pennsylvania along the Appalachian Mountain range.



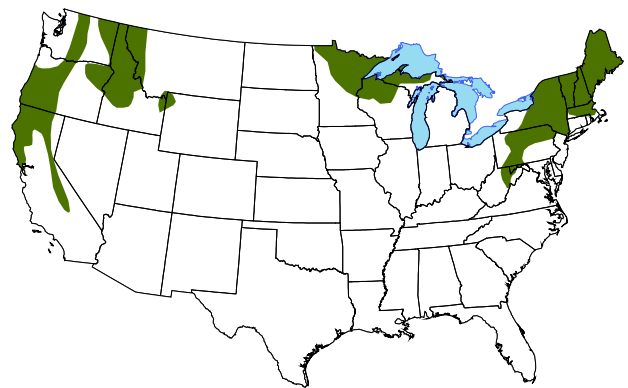
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Habitat requirements

Diet: primarily small rodents and snowshoe hare; will readily consume other rodents, rabbits, porcupines, insects, reptiles, soft mast, and carrion; and small domestic pets

Water: necessary water obtained from diet

Cover: mature conifer or mixed hardwood forests with abundant down woody debris; den in hollow logs, snags, or live trees



Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation is competing with native vegetation and reducing habitat quality

Create Snags: in forested areas where denning cavities are suspected to be limiting the population

Forest Management: *Forest Regeneration (Single-tree Selection, Group Selection)* can improve forest structure for several prey species; *Forest Stand Improvement* can increase understory development that can lead to increased prey populations; forest management can also increase down woody debris

Plant Trees: in large open areas where additional forest cover is needed (should maintain >50 percent canopy cover)

Decrease Harvest: may be necessary when trapping pressure is limiting population growth and additional fishers are desired

Increase Harvest: where populations can sustain additional trapping pressure or a reduction in the population is desired

Wildlife Damage Management: may be necessary if small domestic pet depredation is a problem

Wildlife or Fish Survey: scent stations, track counts, trapper harvest data, and trail cameras may be used to estimate population trends

Gray fox

General information

Gray foxes are common and widespread in North America. They are typically associated with deciduous forest landscapes, and generally avoid areas with large expanses of agriculture. They are most active at night or near dawn and dusk. Dens are used primarily during the breeding season. Gray foxes are unique among canids (species in the family that includes dogs) because of their ability to climb trees.

Habitat requirements

Diet: primarily small mammals, birds, insects, hard and soft mast, and occasionally carrion

Water: requirements largely unknown; gray foxes likely drink free-standing water and get some water from the foods they consume

Cover: mostly deciduous forest; breeding dens are located in brushy or wooded areas and found in hollow trees or logs, under large rocks, or in underground burrows; daytime resting sites are generally aboveground in trees, thickets, and brushy areas, or rocky crevices

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative species begin to compete with native plant species and reduce habitat quality for gray fox or their prey

Create Snags: when large (>12 inches) down woody debris is needed for breeding dens or resting sites

Edge Feathering: to enhance cover for prey and provide additional soft mast around fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection, Single-tree Selection)* in large areas of mature forest and *Forest Stand Improvement* practices may increase prey abundance, soft mast, hollow logs for breeding dens, and daytime resting sites

Livestock Management: livestock should be excluded from forested areas because they consume plants in the understory that provide cover and food for gray fox and associated prey

Plant Shrubs: in relatively large openings devoid of brushy cover or thickets to create resting sites, provide cover for den locations, and provide soft mast

Plant Trees: in large open areas to increase deciduous forest conditions

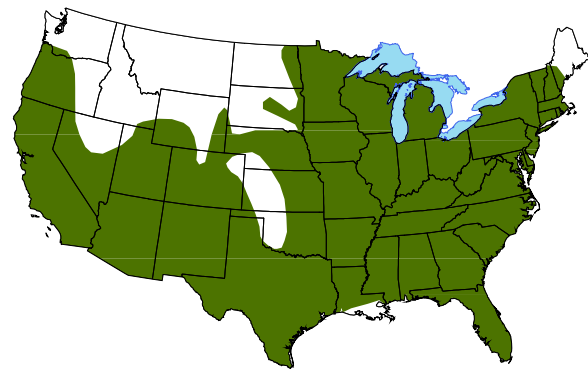
Set-back Succession: low-intensity *Prescribed Fire* can be used in forests and woodlands to enhance cover for prey and soft mast production

Decrease Harvest: to promote an increase in population where current harvest levels are limiting population

Increase Harvest: when the population can sustain



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additional harvest and increased harvest is desired for recreational trapping or hunting; to promote increased abundance of prey species, such as eastern cottontails or tree squirrels, if gray fox has been identified as limiting those populations; when population reduction is desired

Wildlife Damage Management: exclusion practices can discourage gray foxes from denning under human structures; exclusion practices and trapping can prevent gray foxes from preying on small livestock, such as chickens

Wildlife or Fish Survey: scent stations, track counts, trapper harvest data, and trail cameras may be used to estimate population trends

Indiana bat

General information

The Indiana bat is an endangered species that occurs over most of the eastern United States. The Indiana bat population is in decline because of susceptibility to disturbance during hibernation and a disease known as white nose syndrome. Bats must store fat reserves and then hibernate (from October – April) to survive through winter when food is limiting. If they are disturbed by human activity or if cave temperatures increase, they may starve from using critical energy reserves. Male Indiana bats roost alone or in small groups during spring and summer, whereas females roost in larger maternal colonies (100+ individuals). Females give birth to one pup in June, and then young are nursed under loose tree bark, usually in wooded areas near water. Inserting gates in front of cave openings that allow passage of bats but prevent human intrusion can prevent disturbing Indiana bats during hibernation.

Habitat requirements

Diet: insects (up to half their body weight per night)

Water: although they get some from their food, they also use free-standing water by drinking while on the fly; bats commonly forage for insects over water bodies

Cover: winter hibernation occurs in caves, also known as hibernacula, or other areas that are cool, humid, with stable temperatures of 33-50 F (nearly half of all Indiana bats use caves); trees with flaky bark (like shagbark hickory or mature white oak) or snags along forest edges and water bodies are used for roosting; mature mixed deciduous forest with canopy gaps and riparian zones are used for foraging

Wildlife management practices

Conservation Easement: can protect property with caves that this declining species is using for hibernacula

Control Nonnative Invasive Vegetation: may be required if desirable trees for roosting are being outcompeted by nonnative invasive species

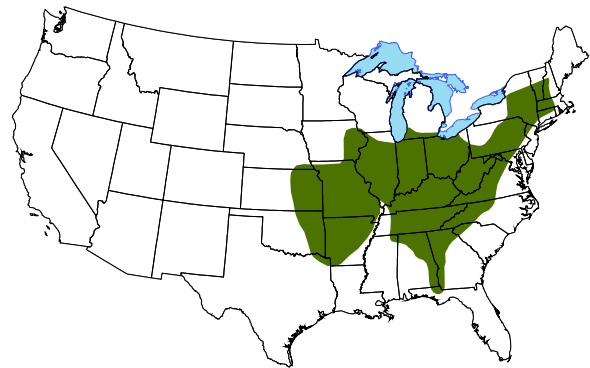
Create Snags: can provide temporary foraging and roosting sites if an adequate number of trees are not already available

Forest Management: *Forest Regeneration (Group Selection)* provides small openings used for foraging; *Forest Stand Improvement* can favor tree species with flaky bark used for roosting and create more open space around tree crowns where Indiana bats forage

Nesting Structures: artificial roosting structures, such as BrandenBark™, may be installed in addition to *Create Snags* for maternal colonies where roost sites are limiting



Susi von Oettingen



Plant Trees: in large open areas where forest cover is limiting

Set-back Succession: *Prescribed Fire* can be used in mature woods to reduce midstory and facilitate foraging

Water Developments for Wildlife: small impoundments and ponds (<1 ac) may be created in forested areas where surface water is limiting for Indiana bats

Wildlife or Fish Survey: roost counts during hibernation and acoustic sampling surveys are used to survey Indiana bat populations

Mink

General information

Mink occur in Alaska, Canada, and across most of the U.S. They are mainly nocturnal and are found along stream banks, riverbanks, and edges of a variety of wetlands. Mink are strictly carnivorous. Most prey is found in close association with dense vegetation along wetland edges and other riparian areas. Availability of den sites is considered a key factor in how mink use an area. Areas with lots of trees and shrubs and limited livestock grazing near riparian areas usually have more den sites. Mink can eat significant numbers of upland nesting waterfowl or gamebirds, especially in areas where nesting cover is limited.



Bo Zaremba

Habitat requirements

Diet: rabbits, mice, muskrats, crayfish, snakes, and birds

Water: necessary water probably obtained through diet

Cover: closely associated with water; riparian areas and wetland edges; dens often located under log jams and tree roots, old muskrat burrows, and rock piles

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for mink and their prey

Livestock Management: livestock should be excluded from wetlands and riparian areas where mink is a focal species; this may include development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old decadent wetland vegetation that can improve habitat for prey

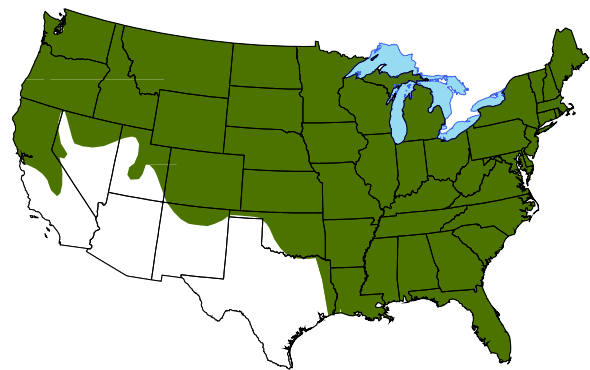
Water Control Structures: are necessary to regulate water level and manipulate growth of emergent aquatic vegetation adjacent to an impoundment

Water Developments for Wildlife: shallow impoundments can be developed to increase habitat where needed

Decrease Harvest: may be necessary when trapping pressure is limiting population and an increase in population is desired

Increase Harvest: where populations can sustain additional trapping pressure, and when mink have been identified limiting upland nesting waterfowl or gamebirds

Wildlife Damage Management: mink may occasionally kill domestic poultry, but this is rare and localized. Trapping and exclusion are effective methods to reduce damage.



Wildlife or Fish Survey: track counts and trapper harvest data are often used to estimate population trends

Moose

General information

The moose is the largest member of the deer family. Adult males can reach 1,800 pounds and females may weigh 1,000 pounds. Males exhibit palmated (flattened or palm-like) antlers, whereas most other members of the deer family have a dendritic (twig-like) antler configuration. Moose are herbivores and inhabit both boreal and mixed deciduous forests in temperate and subarctic climates. Moose are typically solitary and do not group into herds. Predators include wolves, bears, and humans. Moose are typically found around wetlands (such as swamps, streams, lakes) because of the abundance of browse and aquatic plants moose prefer. The moose is the only deer species that can dive underwater to reach plants on stream, marsh, and lake bottoms. An adult moose can consume as much as 70 pounds of vegetation per day. In spring, moose are often drawn to roadways to satisfy their sodium requirements where they lick salt applied to road surfaces to melt snow and ice. This habit leads to moose-vehicle collisions wherever roads are salted during winter. Moose populations have rebounded over the past 30-40 years as pollution in waterways has been reduced and abandoned farms have succeeded into shrub-dominated and young forest cover.

Habitat requirements

Diet: leaves and twigs of willow, maple, aspen, mountain ash, and birch trees, as well as aquatic vegetation, including submerged aquatic vegetation, which may represent as much as half of the diet

Water: water requirements are met through consumption of aquatic vegetation and standing water where they are typically found

Cover: riparian areas along streams and rivers, edges of marshes adjacent to thick upland cover, mature softwood stands during extreme cold and/or deep snowfall

Wildlife management practices

Control Nonnative Invasive Vegetation: may be necessary when native plant communities, both upland and aquatic, are being threatened by nonnative invasive vegetation and habitat quality for moose is declining

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Group Selection)* will provide increased browse

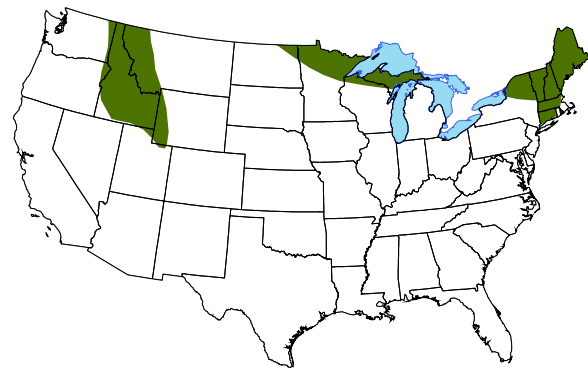
Plant Shrubs: may be necessary in large open areas where additional shrub cover is needed

Plant Trees: may be necessary in large open areas where additional forest cover is needed

Repair Spillway/Levee: if not functioning properly



Karen Laubenstein



Set-back Succession: *Prescribed Fire and Chainsawing* can be used to rejuvenate and enhance low-growing woody cover and increase browse

Water Control Structures: should be installed in existing dikes and levees if not already present to manipulate water levels and maintain aquatic vegetation surrounding wetlands

Water Developments for Wildlife: shallow impoundments can be created if a lack of wetlands are limiting the presence or abundance of moose

Decrease Harvest: may be necessary if hunter harvest has limited the population and a population increase is desired, or if winter mortality, particularly from winter tick loads on calves and yearlings, is excessive

Increase Harvest: may be implemented if the moose population needs to be lowered

Wildlife or Fish Survey: aerial surveys may be used to monitor moose populations

Mountain cottontail

General information

Mountain cottontails occur in the mountainous regions of the western U.S. They use thick shrubs and burrows for nesting and cover, and eat a variety of forbs, grasses, and browse. They have relatively small home ranges and daily movements, so food and cover should be close together.

Habitat requirements

Diet: a variety of forbs, grasses, seeds, and soft mast in spring through fall; in winter, bark and browse is most important; grains and alfalfa are eaten when available

Water: necessary water is obtained from diet

Cover: thick shrubs and burrows for nesting and cover

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for mountain cottontail

Forest Management: *Forest Regeneration (Clearcut)* will enhance cover and stimulate additional forage for a few years; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Livestock Management: should prevent overgrazing and maintain sufficient groundcover for rabbits

Plant Food Plots: where additional forage is needed, linear plantings can be situated adjacent to dense cover

Plant Native Grasses and Forbs: where desirable groundcover is lacking and planting is necessary for establishment

Plant Shrubs: where shrub cover is lacking

Set-back Succession: *Prescribed Fire* and *Chaining* can be used to rejuvenate and maintain shrubby cover and stimulate forbs and grass interspersed with shrub cover; *Mowing* may be used in Urban areas to maintain openings

Decease Harvest: may be necessary when additional rabbits are desired and hunting or trapping efforts are limiting growth

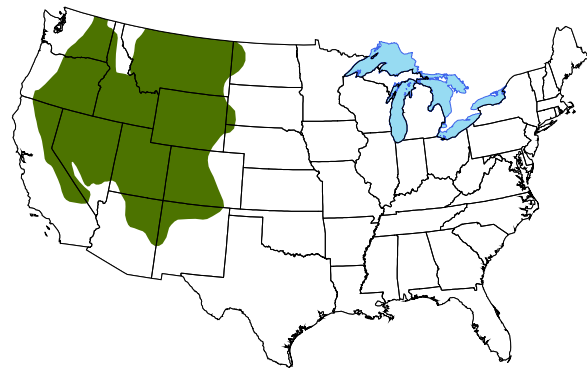
Increase Harvest: where populations can sustain additional hunting or trapping pressure for recreation or where populations need to be lowered

Wildlife Damage Management: may be necessary to control damage to ornamental and landscaping plants and vegetable gardens

Wildlife or Fish Survey: track counts, observation counts, and hunter observation data can be used to estimate population trends



Lewis Scharpf



Mountain lion

General information

The mountain lion (also called cougar, panther, painter, or puma) are predatory cats once common across North America. Adult mountain lions weigh 80 to 200 pounds. Males are larger than females. Mountain lions are typically buff, cinnamon, tawny, or reddish color. Contrary to local belief, there is no such thing as a black mountain lion. Mountain lions are primarily nocturnal, but may be active during daylight hours. The mountain lion is a stalk-and-ambush predator and pursues a wide variety of prey. Populations in the eastern U.S. were drastically reduced as the country was settled. Populations may fluctuate with prey abundance. Mountain lions are a game species in several western states, but have historically been removed because of livestock depredation. The mountain lion is listed as an endangered species in Florida (a.k.a. Florida panther.)

Habitat requirements

Diet: primary food source is deer and rabbits, but beaver, porcupine, mice, skunks, marten, coyote, javelina, bighorn sheep, pronghorn, moose, elk, ruffed grouse, wild turkey, fish, and occasionally domestic livestock, dogs, and house cats also may be eaten

Water: free-standing water is required for drinking; water sources are also used as ambush sites for prey

Cover: coniferous and tropical forests, grasslands, swamps, brushland, and desert edges; mountain lions can survive in most any environment that supports an abundance of deer

Wildlife management practices

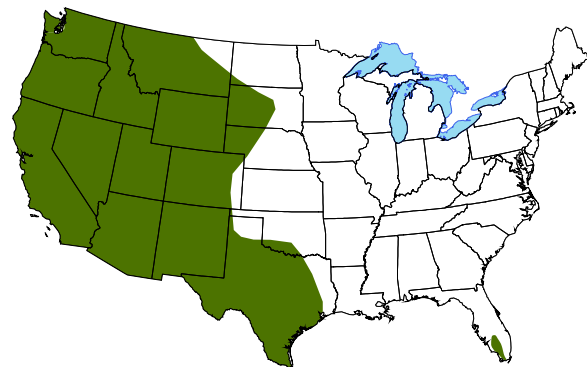
Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for mountain lion

Forest Management: (in some ecoregions) *Forest Regeneration (Clearcut, Shelterwood, Group Selection)* and *Forest Stand Improvement* can enhance cover and food resources for a variety of prey species if prey abundance is limiting mountain lion populations

Plant Shrubs: in large open areas where shrub cover is limiting prey for mountain lions

Plant Trees: (in some ecoregions) in large open areas where additional forest cover is needed

Set-back Succession: *Prescribed Fire, Herbicide Applications, Dozer-clearing, and Drum-chopping* may be used to enhance cover and food availability for several prey species



Water Developments for Wildlife: may be implemented where free-standing water is limited for prey and mountain lions, which also may increase prey opportunities

Decrease Harvest: may be necessary where mountain lion populations have declined and hunting pressure may be limiting population increase

Increase Harvest: may be implemented when mountain lion populations are limiting other wildlife species, such as white-tailed or mule deer

Wildlife Damage Management: may be needed if livestock depredation is problematic and in the rare instance of attacks on humans (approximately 90 attacks on humans have been documented in the last 125 years)

Wildlife or Fish Survey: track counts, scent stations, hunter observation data, and camera surveys can be used to estimate population trends

New England cottontail

General information

The New England cottontail (NE cottontail) is found in isolated areas of Maine, New Hampshire, New York, Connecticut, Massachusetts, and Rhode Island. The USDA-NRCS included them in its Working Lands for Wildlife Initiative. NE cottontail is often confused with the eastern cottontail, which looks very similar, and because the eastern cottontail is more of a habitat generalist, it has been displacing the NE cottontail since the eastern cottontail was introduced to the New England states in the early 1900s. Because this region has dense human populations, habitat distribution for NE cottontail has declined by 86 percent since 1960. In addition to reduction of habitat distribution, urban sprawl also indirectly reduces habitat quality and quantity because of land-use changes (fire suppression, aesthetic mowing, afforestation, and the reduction of timber harvest). The remaining habitat is largely fragmented and isolates local populations, making them more vulnerable to overall population decline. Early successional cover in at least 25-acre blocks is desirable. Habitat may be provided in old-fields, cleared areas (such as utility and railroad right-of-ways), young regenerating forest, shrubby fringes around swamps and beaver ponds, managed early successional openings, and coastal shrublands. Nests are constructed of fur, grass, and leaves on the ground in a 4-inch depression.

Habitat requirements

Diet: forbs, grasses and soft mast in late spring and summer; grasses, leaves, soft mast, and buds in fall; bark, twigs, buds, and grasses in winter

Water: obtained through diet

Cover: early successional cover consisting of shrubs, forbs, and perennial native grasses; evergreen shrubs and trees are critical for escape and thermal cover in winter

Wildlife management practices

Conservation Easement: can protect critical habitat for this declining species

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for NE cottontail

Edge Feathering: to enhance cover and forage availability between fields and forest

Field Borders: to increase usable space around crop fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree)* will enhance habitat for a few years; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Livestock Management: should exclude livestock from



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food plots and prevent overgrazing to allow sufficient herbaceous vegetation for nesting, cover, and forage
Plant Native Grasses and Forbs: where herbaceous vegetation is limiting and planting is necessary to establish desirable cover

Plant Food Plots: where additional forage is needed; linear plantings may be situated adjacent to dense cover

Plant Shrubs: where there is a lack of shrub cover and none is regenerating naturally

Plant Trees: evergreen species may be planted in areas lacking thermal cover in winter

Set-back Succession: *Prescribed Fire, Herbicide Applications, and Disking* can be used to maintain early successional areas; *Prescribed Fire* can be used to rejuvenate and maintain shrub cover; *Chainsawing, Dozer-clearing, and Root-plowing* can be used to convert forest to early successional cover

Decrease Harvest: may be necessary if the local population is declining or cannot withstand harvest.

Wildlife or Fish Survey: because differentiating New England cottontails from Eastern cottontails is very difficult and only reliable under genetic testing or morphological skull identification, wildlife agencies request hunters submit heads of harvested rabbits for identification and analysis of population trends

Pronghorn

General information

Pronghorns are hoofed ungulates found in open prairie and sagebrush desert of the western U.S. Although somewhat similar in appearance, the pronghorn is not an antelope, goat, or deer. The pronghorn is the second-fastest land mammal in the world, reaching a top speed of about 55 mph (cheetahs can run short distances up to 75 mph). Both the male and female pronghorn have horns that are covered in a black keratin sheath, which is shed annually. The sheath curves backward and has a prong which points forward (hence the name, pronghorn). Pronghorns of females are much smaller than those of males. According to location, some pronghorn populations migrate long distances between their summer and winter ranges. Corridors that allow safe passage are a management concern for migrating pronghorn. Pronghorns are generally tan with white markings on the face, neck, stomach, and rump. When alarmed, pronghorn often raise the white hairs on their rump to signal danger to other pronghorn. Pronghorns have fantastic vision, which helps them identify predators in the open country they inhabit.

Habitat requirements

Diet: varies with season; grasses, forbs, and cacti in spring and summer; primarily browse in winter

Water: free-standing water is required

Cover: native grassland and desert sagebrush with flat to rolling terrain that allows long-range visibility

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for pronghorn

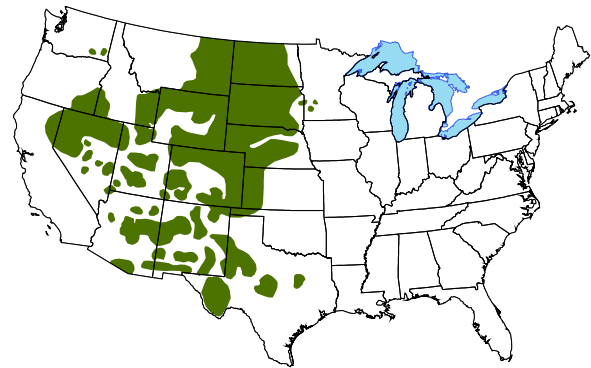
Livestock Management: should maintain appropriate stocking rate to prevent overgrazing and maintain adequate herbaceous groundcover; fencing should be kept to a minimum with at least 16 inches between the ground and the bottom wire, which should be smooth, not barbed; the top wire should not be more than 42 inches aboveground; large blocks of rangeland should be maintained, and no more than 30 percent of a management area should be cropland

Plant Food Plots: in areas where there is adequate rainfall, food plots can provide high-quality forage, such as alfalfa, for increased nutrition

Plant Native Grasses and Forbs: where herbaceous vegetation is lacking and planting is required to establish desirable groundcover



James C. Leupold



Set-back Succession: Prescribed Fire, Chaining, and Root-plowing are recommended to stimulate additional herbaceous groundcover in large expanses of shrubland

Water Developments for Wildlife: where water is limited or absent within two miles, development of dugouts, windmills, and spring developments is warranted

Decrease Harvest: if hunting pressure is limiting population growth where an increase is desired

Increase Harvest: when populations can sustain additional hunting pressure for recreation and where populations need to be lowered

Wildlife Damage Management: may be necessary in areas where crop damage is occurring

Wildlife or Fish Survey: observation counts are used to estimate population trends

Raccoon

General information

Raccoons are very common throughout most of the U.S., except in certain parts of the Rocky Mountains, Nevada, Utah, and Arizona. Raccoons are found in a variety of vegetation types, but are usually most abundant near riparian areas and wetlands. They also are found in urban areas. Raccoons den in hollow trees, in burrows under stumps or brush piles, or in chimneys, attics, and crawl spaces of houses and buildings. They are omnivorous and eat a wide variety of foods. Raccoons can become pests in urban areas and in wetlands (depredating waterfowl nests). Raccoons also have been identified as major predators on gamebird nests and young gamebirds.

Habitat requirements

Diet: crayfish, birds, eggs, small mammals, insects, lizards, snakes, worms, fish, carrion, grains, seeds, hard and soft mast, and foods prepared for human and pet consumption

Water: require water frequently during warm seasons

Cover: riparian areas, bottomland hardwoods, and along other wetlands; natural tree cavities are used for denning and daytime loafing; raccoons also den in ground burrows under stumps, brush piles, junk piles, old abandoned buildings, and rocky cliffs and ledges

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for raccoon

Create Snags: where denning sites are limited

Edge Feathering: to increase usable space for prey around fields

Field Borders: to increase usable space for prey around fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection, Single-tree Selection)* and *Forest Stand Improvement* can stimulate soft mast production and cover for prey

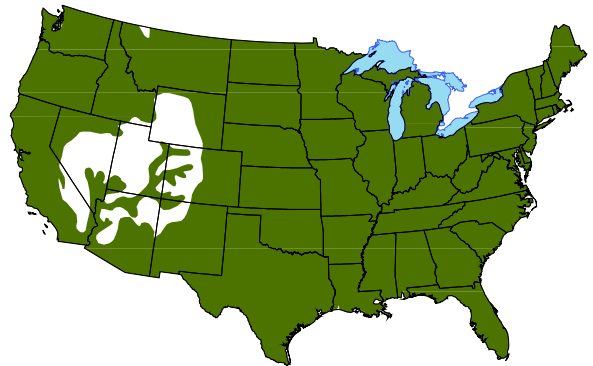
Leave Crop Unharvested: especially cornfields adjacent to bottomland hardwoods and riparian areas

Livestock Management: livestock should be excluded from riparian areas and other wetlands; this may include development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Plant Food Plots: annual grain food plots, especially corn, may be planted where food is limiting and where an increase in raccoon population is desired (this situation is exceptionally rare)

Plant Shrubs: where soft mast is lacking and to provide corridors across large open areas

Plant Trees: in riparian areas and adjacent to wetlands where few trees are present to maintain riparian corridors; maintain approximately 50 percent deciduous forest cover; also in large open areas where there are few



trees

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old decadent wetland vegetation; *Prescribed Fire* and *Disking* can maintain herbaceous openings; *Prescribed Fire*, *Herbicide Applications*, and *Chaining* are recommended to rejuvenate decadent shrub cover

Soil Conservation Agriculture: eliminate fall tillage of grain crop residue adjacent to cover to make waste grain available as an additional food source

Water Control Structures: should be installed in existing dikes, dams, or levees if not present, and if needed, to control water levels and provide water less than 2 feet deep and stimulate emergent vegetation and enhance habitat for prey

Water Developments for Wildlife: shallow impoundments can provide a water source and additional habitat for various prey species

Decrease Harvest: if hunting pressure is limiting population growth where an increase is desired (this situation is rare)

Increase Harvest: where populations can sustain additional hunting or trapping pressure for recreation and where populations need to be lowered for various reasons

Wildlife Damage Management: is often necessary when raccoons get into garbage cans, occupy residences or buildings, or prey upon poultry; exclusion is cost-effective; cultural modification, such as using wildlife-proof trash cans, is effective; trap and kill is most effective for problem raccoons

Wildlife or Fish Survey: track counts, camera surveys, and trapper harvest data may be used to monitor population trends

Red fox

General information

Red foxes are the most widely distributed carnivore in the world and occupy a wide range of ecoregions and vegetation types, including grasslands, shrublands, woodlands, farmlands, and cities. They typically prefer brushy areas in winter. Red foxes are solitary animals and are mostly nocturnal. They can be seen sometimes during the early morning and early evening. Red foxes use dens for shelter and raising young. Red foxes have a characteristic manner of hunting small mammals by standing motionless, listening, and watching intently. When a red fox locates prey, it often leaps high and brings the forelimbs straight down, pinning the prey to the ground.

Habitat requirements

Diet: primarily small mammals, birds, insects, hard and soft mast, and occasionally carrion; red foxes will store food and are very good at relocating these caches

Water: requirements largely unknown; they likely drink free-standing water and get some water from the foods they consume

Cover: prefer a mixture of herbaceous openings with brushy cover, shrubland, and woodland; dens are located in brushy areas and in hollow logs, under large brush piles, under large rocks, or in underground burrows often under roots of blown-over trees; daytime resting sites are generally thickets and brushy areas

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative vegetation begins to compete with native vegetation and decrease habitat quality for red fox and their prey

Edge Feathering: will enhance cover in woods around fields for red fox and their prey

Field Borders: will enhance cover around crop fields for red fox and their prey

Forest Management: *Forest Regeneration* (especially *Clearcut* and *Forest Stand Improvement*) in relatively large areas of mature forest will temporarily enhance cover for prey and may provide increased denning sites (down logs and debris) and daytime resting sites; *Forest Road Maintenance* may involve daylighting roads and planting forages to enhance habitat for prey species

Livestock Management: grazing should be managed to maintain suitable cover for prey

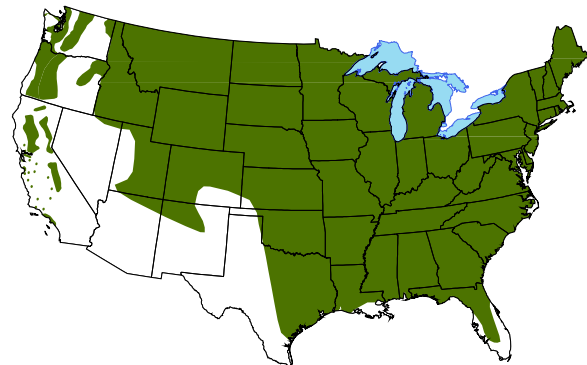
Plant Native Grasses and Forbs: where planting is necessary to provide herbaceous cover for prey

Plant Shrubs: in relatively large open areas where brushy cover or thickets for denning and resting sites is limiting

Set-back Succession: *Prescribed Fire* is recommended



Ronald Laubenstein



to maintain early successional areas and enhance understory structure in savannas and woodlands; *Chainsawing*, *Dozer-clearing*, and *Root-plowing* may be used to convert forest cover to herbaceous openings and shrublands; *Drum-chopping* may be used to enhance shrublands when shade limits herbaceous growth

Decrease Harvest: when the population is declining in response to trapping or hunting pressure and an increase in population is desired

Increase Harvest: when the population can sustain additional harvest for additional recreational trapping or hunting; to promote increased abundance of prey species, such as waterfowl (nests) or cottontails, if red fox has been identified as limiting those populations; increasing harvest also may reduce damage issues associated with poultry

Wildlife Damage Management: exclusion practices can discourage red foxes from denning under human structures; exclusion practices and trapping can limit predation on small livestock, such as chickens

Wildlife or Fish Survey: track counts, scent stations, and trapper harvest data are used to estimate population trends