Sampling Protocols for the American Kestrel (*Falco sparverius*) and Eastern Screech-Owl (*Otus asio*)

USDA Forest Service
National Forests in Mississippi
Homochitto Ranger District
Meadville, MS

Sampling Protocols for the American Kestrel and Eastern Screech-Owl

Species Account

American Kestrel *Falco sparverius*

American Kestrel is the smallest of the falcons and can bee seen often along roadsides perched on a wire or post in an erect posture (Turcotte, W.H. and D.L. Watts, 1999). While hunting, it often hovers before pouncing on its prey of large insects, small rodents, small reptiles, frogs, and occasionally small birds. Usually this bird prefers hunting from a high perch, scanning the ground for insects, then sailing down to pounce on prey in the manner of shrikes and bluebirds (Turcotte, W.H. and D.L. Watts, 1999).

The American kestrel is one of the most widespread and abundant falcons in North America (Cade 1982, Johnsgard 1990). Distribution of the American kestrel is believed to be limited by combination of nest-site availability, suitable foraging habitat, perch and roost-site availability, and food supply, all of which are required in proximity (Balgooyen 1976, Cade 1982, Macrander 1983, Stys 1993).

American kestrel territory size varies dependent upon habitat quality (e.g., prey abundance and nest –site availability) (Bird and Palmer 1998). Hoffman (1983) reported territory size was approximately 50 ha (124 acres) in sandhill woodlands, whereas in disturbed or cleared sandhill woodlands, a breeding pair may require 116 to 317 ha (287 to 783 acres) (Bohall 1984, Hoffman and Collopy 1987). Breeding densities also are highly variable, depending on nest-site availability, habitat type, and prey abundance (Bohall-Wood and Collopy 1987, Stys 1993). Hoffman and Collopy (1987) reported breeding densities of 0.41 pairs/km2 (1.06 pairs/mile2) in longleaf pine-turkey oak habitats and 0.49 pairs/km2 (1.27 pairs/mile2) in hardwood hammock vegetation.

Kestrels hunt most frequently in areas having short grass or sparse ground cover and high perch sites, including pastures, roadside berms, mown hayfields, open orchards, and lawns in parkland areas (Smallwood 1987, 1990). Smallwood (1987) reported that most hunting attempts (97.5 percent) occurred over substrates of grasses and weedy forbs <25 cm in height. Kestrels readily hunt in open woodlands, especially during winter (Smallwood 1990). However, woody canopy cover is negatively correlated with suitable hunting substrate, with trees and shrubs forming a visual barrier restricting available hunting sites (Smallwood 1987). Smallwood (1987) reported that wintering kestrels most often used woodland areas averaging 20-percent woody canopy cover. Bohall (1984)

reported that kestrels rarely used pine plantations because of the dense understory vegetation.

Perch sites are an important component of kestrel foraging habitat. Kestrels are opportunistic in perch-site use, frequently using trees, utility poles and lines, and fence posts. Perch sites that provide the most unobstructed view of the greatest area of the foraging habitat are preferred (Smallwood 1990). Smallwood (1987, 1990) reported an average perch height of 8.1 m (26.5 ft), and pounces were usually made within a 56-m (184-ft) radius of perch sites.

Kestrels are secondary cavity nesters, using abandoned nest cavities excavated by woodpeckers (Raphael 1985), primarily northern flickers or pileated woodpeckers. However, kestrels are not dependent on any single cavity nesting species to provide suitable nest sites (Hoffman 1983). In north-central Florida, kestrels frequently nest in longleaf pine, and occasionally in turkey oak and live oak. Turkey oak snags may be alternate nest sites in Florida, especially as longleaf pine decreses in abundance (Hoffman and Collopy 1987). Longleaf pine trees used for nesting in Florida typically are >22.7 cm (9 in.) diameter at breast height (DBH) and 6.7 m (22 ft) tall (Bohall-Wood et al. 1996). In some areas, the majority of nest sites may be located in abandoned or occupied buildings (Hamerstrom et al. 1973, Toland and Elder 1987).

Most nest cavities are located in snags (Lane and Fischer 1997). Hoffman (1983) reported that kestrels disproportionately used nest cavities in dead trees in an intermediate stage of decay (twigs absent, a few main limbs >1 m (33 ft) in lenth, <50 percent of the treetop intact,, and approximately 33 percent of the bark left intact). Most nest trees in north-central Florida were associated with pastures or cultivated farmland or within longleaf pine-turkey oak woodlands. Nests most frequently occurred in longleaf pine, turkey oak, or live oak snags (Hoffman and Collopy 1987).

As discussed previously the American kestrel territory size varies dependent upon habitat quality (Bird and Palmer 1988). Consequently densities are variable, depending on nest-site availability, habitat type, and prey abundance (Bohall-Wood and Collopy 1987, Stys 1993). In ideal kestrel habitat (mature timber will herbaceous understory, or grassy/herbaceous opening with snags) there is approximately 1 and in some areas close to 2 breeding pair per square mile. In unsuitable habitat, density has been found to be as low as approx. 0.4 breeding pair per square mile. National Breeding Bird Surveys, have not yet recorded a kestrel sighting for the Homochitto National Forest, nevertheless, surveys are done mainly by listening for calls with sightings recorded. District personnel have frequently seen kestrel within the Forest Service boundaries, but exact locations and habitats have not been recorded. However, because of these seemingly small densities, and the protocol being limited in time and space, expectations of kestrel sightings are low due to amount and juxtaposition of suitable kestrel habitat located on the Homochitto National Forest.

Inventory and Monitoring Protocol

The most effective census method for kestrels consists of roadside transects (Stys 1993). Roadside transects should intersect potential kestrel habitat (Stys 1993). Transects will be distributed across the Homochitto National Forest. Each transect will have a minimum of five points placed adjacent to potential kestrel habitat. These points are subject to change over time as habitat changes. The observer will remain 15 minutes at each designated point; if kestrel is sighted during the 15 minutes, information such as gender, vocalization, and behavior (see attached data sheet) will be recorded. Habitat will be described in detail at each point. Weather information including precipitation, % cloud cover, and wind speed (using the Beaufort scale) will be recorded at each site. In between points along transect, the observer will record any additional kestrel sightings and pertinent information (i.e. habitat, behavior, vocalization, etc). Personnel performing surveys should observe both sides of the road, searching for kestrels perched on fence rows, utility lines and poles, and trees, and kestrels in flight (Stys 1993). When kestrel is sighted, the vehicle should be stopped, and binoculars should be used to verify identification and an attempt made to identify sex (Stys 1993). Habitat type will be recorded at any new kestrel sightings. Required equipment includes binoculars, map, and vehicle (Stys 1993).

Abundance, local abundance, frequency of occurrence and trends over time will be examined. Abundance was defined as the number of individuals counted per point (sum of counts/sum of points). Local abundance was defined as the number of individuals counted per point where $\geq$ 1 individual was observed (sum of counts / sum of points where $\geq$ 1 individual was observed). Frequency of occurrence was defined as the percent of the total points in a given year on which an individual was detected (sum of points on which $\geq$ 1 individual was observed / sum of points). Yearly means of these three values were calculated for each district.

(Protocol based on Stys 1993)
Surveys must be performed during the spring and summer (i.e., April to August). Surveys conducted during spring may enhance the ability to sight kestrels, which are more conspicuous when performing courtship behaviors. Surveys should be performed during the morning for 3 to 4 hours beginning at sunrise, on calm, clear days. Driving speeds of 10 to 25 mph, altered in response to road conditions, topography, and visibility, are recommended. Surveys should be conducted twice per year, once in the spring and once in summer. Direction of travel should be reversed along transects on alternate days to eliminate bias. When possible, the same individual should conduct all surveys to eliminate observer bias.

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Species Account

Eastern Screech-Owl *Otus asio*

The eastern screech-owl is a fairly common permanent resident throughout Mississippi and is the only small owl with prominent ear tufts or "horns" occurring here (Turcotte and Watts 1999). There are three color phases that appear in about equal proportions in the population; the gray and reddish brown color phases are the opposite extremes of coloration with an intermediate brown phase (Turcotte and Watts 1999). In all color phases the upper and lower parts are heavily streaked lengthwise. This owl is commonly known by its calls, a quavering whistle or "whinny" and a series of short, tremulous notes given in the same pitch (Turcotte and Watts 1999) or a "bounce". Experiments using playback recordings of the screech-owl call has revealed tentatively that bounce songs are used in both aggressive and nonaggressive contexts while whinny songs are used in aggressive contexts (Ritchison et. al. 1988).

The eastern screech-owl can frequently be found in forested areas, orchards, and shade trees around urban residences. In daylight hours, it spends most of the time hiding in a tree cavity, a leafy brown bush, or in a dense, evergreen thicket (Turcotte and Watts 1999). It nests in a wide variety of woods and forests; preferring open to medium growth woods, both in residential areas and in rural country; pine woods or mixed woods are favored over bottomlands and swamps (Hamel 1992). Screech-owl foraging habitat includes open to medium growth woods, and open areas, such as fields, clearings and wood margins (Hamel 1992). Eastern screech-owls are the most common raptor in suburban-rural and urban open-space habitats in southern Connecticut and little is known of their local abundance because of their nocturnal activity patterns and their habit of roosting in concealment during the day (Lynch and Smith 1984).

Screech-owls are a nocturnal predator that have a varied diet that includes almost every class of animal food (Belthoff et. al. 1993, Turcotte and Watts 1999). It sits on perches, usually in woods, and drops to the ground when food is seen or (at night) heard (Hamel 1992). Its diet of food includes insects such as large beetles, crickets, grasshoppers, and large moths (Turcotte and Watts 1999). Screech-owls also feed on rodents, herps, birds, and other invertebrates (Hamel 1992).

Relatively little is known about the about the abundance and population trends of most species of nocturnal owls in North America (Takats et al. 2001). The Breeding Bird Surveys take place outside of the breeding season for most owls, and at a time of day (early to mid-morning) when most owls are relatively silent (Takats et al. 2001). Some studies have found densities of eastern screech-owls ranging from approximately 1

screech-owl per square mile to approximately 0.03 screech-owls per square mile (Lynch and Smith 1984). These densities were recorded in urban open-space areas with higher densities in areas with a high mix of habitats, including a comparatively high percentage of undisturbed successional communities. Because screech-owl transects will be conducted within National Forest lands, which contain no urban areas (urban areas are, however, scattered within and adjacent to the Forest Service boundaries) expected numbers of reported densities are low. Nevertheless, densities may be higher in areas that have a mix of habitat with a major portion being in older forests. If the protocol is performed at the proper time and if a screech-owl is within hearing range of the playback recording, then the owl should vocalize and be recorded.

Inventory and Monitoring Protocol

The most effective method for determining owl distribution is the use of road side transects in conjunction with broadcast surveys (Johnson, *et al*. 1981, Takats, *et al*. 2001). Broadcast surveys are one of the most widely used techniques to locate and survey owls (Bondrup-Nielsen 1978, Johnson, *et al*. 1981, Smith 1987, Mosher *et al*. 1990) and can be used to determine habitat associations (Laidig and Dobkin 1995, Lehmkuhl and Raphael 1993, Mazur *et al*. 1997, Proudfoot *et al*. 1997, Duncan and Kearns 1997, Takats 1988). Owls vocalize to communicate with their mates and delineate territory (Johnsgard 1988, Ritchison *et al.* 1988), therefore the use of broadcast recordings can invoke a vocal response.

The following protocol is adapted from "Guidelines for Nocturnal Owl Monitoring in North America" (Takats, et al 2001). Five transects were chosen at random to represent the Homochitto National Forest (see map). Each transect will have 10 points distributed at intervals of at least 1.6 km to reduce the chances of recording the same individual at multiple points. Exceptions to this will occur when the point falls on private or non-USFS land. Surveys will be performed once per year between one half an hour after sunset and midnight. Surveys will occur between June and mid-August. At each point, the observer will record environmental conditions (wind velocity, precipitation, and percent cloud cover), level of noise interference, and abundance and location data for all animals heard. Surveys will only be conducted under favorable environmental conditions as stated: Beaufort wind scale rating of 3 or less, precipitation rating of 1or less (see attached data sheet for scales), and temperatures within normal seasonal averages. If there is an inordinate level of noise interference at a point, surveys will be paused until a more conducive listening state is achieved or cancelled if the noise source is permanent. Broadcast surveys will include a 2-minute silent listening period followed by 35 seconds of call and 1 minute listening repeated twice followed by 35 seconds of call and a final 2 minutes of listening (CD enclosed). Total time spent at each site will be 7 minutes 45 seconds. The 2-minute silent listening period is sufficient to detect any spontaneously calling birds. Owls heard during each of these periods will be recorded separately on the data sheet. All other species heard will also be recorded.

Abundance, local abundance, frequency of occurrence and trends over time will be examined. Abundance was defined as the number of individuals counted per point (sum of counts/sum of points). Local abundance was defined as the number of individuals counted per point where ≥ 1 individual was observed (sum of counts / sum of points where ≥ 1 individual was observed). Frequency of occurrence was defined as the percent of the total points in a given year on which an individual was detected (sum of points on which ≥ 1 individual was observed / sum of points). Yearly means of these three values were calculated for each district.

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