

## Appendix C. Avian Data to Support Guild Selection

Life history characteristics were summarized for the top fifty avian species which were found in field studies evaluating the effects of pesticide on non-target wildlife species in corn and alfalfa ( Best *et al.* 1989, MRID 41110601, MRID 40149501, MRID 41742701, MRID 41110701) . There was complete overlap in the species for each crop, so the number of birds profiled totaled fifty exactly. Of the fifty bird species researched, one was of the order Anseriformes, one Charadriiformes, two Columbiformes, one Cuculiformes, two Galliformes, four Piciformes, and the remaining forty were of the order Passeriformes. The information collected for each included the food source, feeding habits, nesting characteristics, nesting timeline, body weight, habitat preferences, and the range in which the bird forages.

The food source information all came from the Patuxent Bird Identification InfoCenter, which contains photographs, songs, identification tips, maps and life history for all North American birds. Listed in the life history information for all birds were their primary and supplementary food preferences. The source of information from this section was cited as was requested by the website.

The feeding strategy information was derived from a few separate sources. The primary source that encompassed a majority of the focal bird species, was the 1989 paper “Use of cornfields by birds during the breeding season: the importance of edge habitat” by Louis Best. In this paper, an appendix included a list of significant bird species and their feeding strategies, such as ground feeding or aerial. Those species which were not included in the appendix of Best’s paper had to be researched individual, and the source is appropriately documented in the reference section of the list of bird profiles.

All nesting information, including both habits and timeline, was found at the Patuxent Bird Identification InfoCenter and California’s Department of Fish and Game’s database of bird information. The Patuxent information was cited as coming from Erlich’s 1988 book The Birder’s Handbook: A Field Guide to the Natural History of North American Birds, as this was indicated as the original source for this data and the requested method of citing it. In the California Wildlife database, the nesting information did not have individual literature cited for those pieces of data selected, as the database does for most other categories of the database. It is requested that the original citation be listed where available, but since the individual sources were not available for nesting data, the database was cited as requested on the main page. The bird species inadequately covered under these two sources had to be researched individually, and their sources are cited appropriately.

The body weights of the birds were all taken from the same source, that being the 1984 article by Dunning on the “Body weights of 686 species of North American birds.”

For the preferred habitat for each species, the California Bird profile database and the University of Michigan Animal Diversity Web database were the primary sources. For each, where original sources were able to be cited as requested, they were. The information at the University of Michigan Animal Diversity Web provided the original literature source for each species' habitat information. The information from the California Bird's database included the habitat information in the general profile of the bird and did not include specific references, so the general database citation was used for these.

It was not always possible to find the foraging range data for each bird species. Therefore, territory range had to be substituted as a proxy for foraging range, and in the life history summaries it is clearly states which value was available. For most of the bird species listed in the California Birds database, range data was available and was able to be cited by original source. For the species not included or not adequately covered in the database, individual literature searches had to be conducted for each, and their sources are documented and cited appropriately.

## **Anseriformes (Swans/Geese/Ducks)**

### **Canada Goose (*Branta canadensis*)**

Feeding: almost exclusively plant matter with lesser quantities of aquatic invertebrates (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: low, 25-30 day incubation, 40-73 days to fledge (Erlich 1988)

Month of Nesting: March to June, 1 brood (Erlich 1988)

Body Weight: F 2800g (940-5902g), M 3261g (1240-6265g) (Dunning 1984)

Habitat: swamps, marshes, meadows, lakes (Van Wormer 1968)

Range: forage up to 1.6-8km (105mi) from nest (Williams and Sooter 1941)

## **Charadriiformes (Shorebirds)**

### **Killdeer (*Charadrius vociferus*)**

Feeding: insects (Gough et al 1998)

Feeding Strategy: ground or herbaceous vegetation (Best 1989)

Nesting: ground nesting, 24-28d incubation, 25 days to fledge (Erlich 1988)

Month of Nesting: February to August, 2 broods (Zeiner 1988)

Body Weight: F 101g (87.7-121g), M 92.1±10.4g (83.9-109g) (Dunning 1984)

Habitat: shorelines, savannahs, parks, agricultural (Hayman et al, 1986)

Range: May travel to feeding locations up to 1.5km (0.9mi) from nest (Phillips 1972)

## **Columbiformes (Doves)**

### **Mourning Dove (*Zenaida macroura*)**

Feeding: almost exclusively seeds (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: aboveground in tree branches (Best 1989), 13-14d incubation, 12-14d to fledge (Erlich 1988)

Month of Nesting: February-September eggs, March-October nestlings, peak May-June, 2-6 broods (Zeiner 1988)

Body Weight: F 115±1.76g, M 123±1.85g (Dunning 1984)

Habitat: farms, small towns, open wood, scrub, roadsides, grasslands (Baskett 1993)

Range: most feed within 1.6km (1 mi) of nests, with a home range of no more than 10km<sup>2</sup> (4 mi<sup>2</sup>). (Tomlinson et al 1960)

**Rock Dove (*Columba livia*)**

Feeding: mostly seeds (corn up to 92% of diet), lesser amounts of green plant matter and insects (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: above ground usually human-made structures, 16-19d incubation, 25-26d to fledge (Erlich 1988)

Month of Nesting: year-round, peak in March-September, several broods (Erlich 1988)

Body Weight: 542±37.2g (Dunning 1984)

Habitat: agriculture or open shrub vegetation, rural, urban (Johnston 1992)

Range: nests in very close proximity to foraging area, usually foraging in a 150ft radius of the nest (Nicholson 1937)

**Cuculiformes ( Cuckoos, Roadrunners and Anis)**

**Yellow-billed Cuckoo (*Coccyzus americanus*)**

Feeding: exclusively insects (Gough et al 1998)

Feeding Strategy: gleans insects from foliage (Bent 1940)

Nesting: woodland, with ground nesting, 9-11d incubation, 7-8d to fledge (Erlich 1988)

Month of Nesting: June-July (Zeiner 1988)

Body Weight: 64±9.07g (50.0-85.5g) (Dunning 1984)

Habitat: woodlands, forest, thickets (Erlich 1988)

Range: need at least 10ha (Gaines 1974)

**Galliformes (Grouse/Turkey/Quail)**

**Northern Bobwhite (*Colinus virginianus*)**

Feeding: primarily seeds (85%), lesser quantities of green plant matter, fruit and insects (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: successional shrub, ground nesting, 23-24d incubation, 6-7d to fledge (Erlich 1988)

Month of Nesting: March-September eggs, April-October nestlings, June peak, 2

brood (Zeiner 1988)

Body Weight: 178g (Dunning 1984)

Habitat: temperate forest and grassland (Dimmick 1992)

Range: in good habitat, one bird can be supported by an acre (Zeiner 1988)

**Ring-necked Pheasant (*Phasianus colchicus*)**

Feeding: almost exclusively plant matter, lesser quantities of insects, worms, snails (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: grassland on ground, 23-25d incubation, 12d to fledge (Erlich 1988)

Month of Nesting: March-April, one brood (Zeiner 1988)

Body Weight: female 953g (1453g max), male 619g (1861g max) (Dunning 1984)

Habitat: fertile cropland and grain fields, grasslands (Zeiner 1988)

Range: may forage over an area as large as 3km<sup>2</sup> (1.2 mi<sup>2</sup>) (Johnsgard 1973)

**Passeriformes (Perching birds)**

**American goldfinch (*Carduelis tristis*)**

Feeding: primarily seeds, lesser quantities of insects (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: successional scrub with midstory/canopy nest, 10-12d incubation, 11-17d to fledge (Erlich 1988)

Month of Nesting: July-August eggs, July-September nestlings, one brood (Zeiner 1988)

Body Weight: F 12.6±0.81g (10.0-17.1g), M 13.2±1.13g (8.6-20.7g) (Dunning 1984)

Habitat: weedy fields, early successional growth, flood plains, cultivated lands, roadsides, orchards, gardens (Middleton 1993)

Range: have been noted to feed between 274m (900ft) from nest (Nickell 1951) up to 0.8km (0.5mi) from nest (Coutlee 1967)

**American Robin (*Turdus migratorius*)**

Feeding: mostly fruit (60%), lesser quantities of worms and insects (40%) (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: 5-15' high midstory/canopy nest, 12-14d incubation, 14-16d to fledge (Erlich 1988)

Month of Nesting: April-August, 2 broods (Zeiner 1988)

Body Weight: 77.3±0.36g (63.5-103g) (Dunning 1984)  
Habitat: woodlands, gardens, orchards, lawns, fields; needs fields to forage, but trees to build nest (Zeiner 1988)  
Range: home range 400m (1320ft) around the nest (Hirth et al 1969)

**Barn Swallow (*Hirundo rustica*)**

Feeding: exclusively insects (98.8%) (Gough et al 1998)  
Feeding Strategy: aerial (Best 1989)  
Nesting: midstory/canopy nests, prefer buildings, 13-17d incubation, 18-23d to fledge (Erlich 1988)  
Month of Nesting: April-July eggs, April-August nestlings, peak in May/June, 2 broods (Zeiner 1988)  
Body Weight: 18.6±1.49g (13.4-23.4g) (Dunning 1984)  
Habitat: attracted to manmade structures for nesting, prefer open habitats of all types (Bent)  
Range: most foraging done within 400m (1300ft) of nest (Snapp 1976)

**Black-capped Chickadee (*Poecile atricapilla*)**

Feeding: mostly insects (70%) with lesser quantities of fruit and seeds (30%) (Gough et al 1998)  
Feeding Strategy: shrubs or lower canopy of trees (Best 1989)  
Nesting: woodland with midstory/canopy nest, 11-13d incubation, 14-18d to fledge (Erlich 1988)  
Month of Nesting: April-July, peak in May, (Zeiner 1988)  
Body Weight: 10.8±1.38g (8.2-13.6g) (Dunning 1984)  
Habitat: deciduous woodlands, open woods and parks, prefer edge of wooded areas (Smith 1993)  
Range: territory averages 4.5ha (Smith 1976) to 5.3ha (Odum 1941)

**Blue-grey Gnatcatcher (*Poliophtila caerulea*)**

Feeding: exclusively insects (Gough et al 1998)  
Feeding Strategy: gleans insects, spiders and other small invertebrates from foliage of shrubs and low trees, searching the outermost foliage. Will make short flights to capture airbourne prey (Root 1967)  
Nesting: woodland with midstory/canopy nest, 13d incubation, 10-13d to fledge (Erlich 1988)

Month of Nesting: May-June, 2 broods (Erlich 1988)  
Body Weight:  $6.0 \pm 0.13$ g (4.8-8.9g) (Dunning 1984)  
Habitat: woodland, shrubland, forests, prefer habitat edges (Ellison 1992)  
Range: ranges of nesting pairs is 0.5-0.9ha (Fitch 1958)

**Blue Jay (*Cyanocitta cristata*)**

Feeding: mostly nuts and seeds, with lesser quantities of fruit, insects and eggs  
(Gough et al 1998)

Feeding Strategy: ground or herbaceous vegetation (Best 1989)

Nesting: midstory/canopy nest, 16-18d incubation, 17-21d to fledge (Erlich 1988)

Month of Nesting: March-July eggs, March,-August nestlings, peak in May (Zeiner 1988)

Body Weight:  $86.8 \pm 8.08$ g (64.1-109g) (Dunning 1984)

Habitat: evergreen forests, farmlands, groves, suburbs (Reilly 1968)

Range: territory up to 0.5mi across (Palmer et al 1995)

**Brown-headed Cowbird (*Molothrus ater*)**

Feeding: mostly seeds (75%), lesser quantities of insects (25%) (Gough et al 1998)

Feeding Strategy: ground or herbaceous vegetation (Best 1989)

Nesting: parasitizes aboveground nests, incubation 10–13d, 10-11d to fledge (Erlich 1988)

Month of Nesting: April-August eggs, April-August nestlings, 30 eggs per season,  
1-2 in each host nest (Zeiner 1988)

Body Weight: F  $38.3 \pm 1.93$ g (30.5-51.2g), M  $49.0 \pm 1.77$ g (32.4-58.0g) (Dunning 1984)

Habitat: grassland, prairies, fields, pastures, orchards, prefer edge habitat (Lowther 1993)

Range: will commute up to 2.7mi (6.7km) to feeding sites (Rothstein et al 1984)

**Brown Thrasher (*Toxostoma rufum*)**

Feeding: mostly fruit with lesser quantities of insects, fruit, reptiles or amphibians  
(Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: successional scrub with low or ground nest, 11-14d incubation, 9-13d to  
fledge (Erlich 1988)

Month of Nesting: March-July eggs, April-August nestlings, peak May-June, 2  
brood (Erlich 1988)

Body Weight:  $68.8 \pm 2.96$ g (57.6-89.0g) (Dunning 1984)

Habitat: shrubby vegetation broods (Zeiner 1988)

Range: average 1.4ha territory (Kingery 1962)

**Carolina Wren (*Thryothorus ludovicianus*)**

Feeding: almost exclusively insects with lesser quantities of seeds and fruits  
(Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: successional shrub with low/ground nesting, 12-14d incubation, 12-14d to fledge (Erlich 1988)

Month of Nesting: March-July eggs, April-September nestlings, peak May-July, 2 broods (Erlich 1988)

Body Weight: 21.0±1.15g (Dunning 1984)

Habitat: dense shrub, brush, forest, wooded suburban areas broods (Zeiner 1988)

Range: home range and territory ranges 0.6 to 0.8ha (Armstrong 1955)

**Cedar Waxwing (*Bombycilla cedrorum*)**

Feeding: almost exclusively fruit with lesser quantities of insects (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: midstory/canopy nesting, 12d incubation, 16d to fledge (Erlich 1988)

Month of Nesting: June, 2 broods (Zeiner 1988)

Body Weight: F 33.1±1.07g (28.0-40.2g), M 30.8±1.72g (25.5-39.6g) (Dunning 1984)

Habitat: open woodlands, overgrown fields, farms, orchards, plantations, suburbs broods (Zeiner 1988)

Range: does not defend a feeding territory, only a small area around the nest.

Territory range is from 0.02 to 0.09ha with an average of 0.04ha (Putnam 1949)

**Common Grackle (*Quiscalus quiscula*)**

Feeding: mostly seeds, lesser quantities of insects, fruit, worms, eggs, reptile and amphibians (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: midstory/canopy nest, 13-14d incubation, 16-20d to fledge (Erlich 1988)

Month of Nesting: March-July eggs, April-July nestlings, May-June peak, 2 brood (Zeiner 1988)

Body Weight: F 100g, M 127g (Dunning 1984)

Habitat: open areas with scattered trees, farmlands, orchards, swamps, common in developed areas (Peer and Bollinger 1997)

Range: forages in radius of 45m around nest (Kok 1972)

**Common Yellowthroat (*Geothlypis trichas*)**

Feeding: primarily insects, lesser quantities of seeds (Gough et al 1998)  
Feeding Strategy: shrubs or lower canopy of trees (Best 1989)  
Nesting: successional scrub with ground/low nesting, 12d incubation, 10d to fledge (Erlich 1988)  
Month of Nesting: April-July, peak May/June (Zeiner 1988)  
Body Weight: F  $9.9 \pm 0.78\text{g}$  (7.6-15.3g), M  $10.3 \pm 0.66\text{g}$  (7.6-15.5g) (Dunning 1984)  
Habitat: briars, weeds or grasses, agricultural (Fisher and Acorn 1998)  
Range: home ranges for single is 1.4ha, pairs average 0.5ha, varying from 0.3 to 0.7ha (Stewart 1953)

**Eastern Bluebird (*Sialia sialis*)**

Feeding: mostly insects (68%), lesser quantities of fruit (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: midstory/canopy nests, shrubland, 12-14d incubation, 15-20d to fledge (Erlich 1988)  
Month of Nesting: April-July, 2 broods (Zeiner 1988)  
Body Weight:  $31.8 \pm 0.92\text{g}$  (Dunning 1984)  
Habitat: open land with scattered trees, parks, gardens, hedges (Terres 1980)  
Range: will travel up to 1,320ft (400m) from the nest on feeding trips (Goldman 1975)

**Eastern Kingbird (*Tyrannus tyrannus*)**

Feeding: primarily insects, lesser quantities of fruit (Gough et al 1998)  
Feeding Strategy: aerial (Best 1989)  
Nesting: midstory/canopy nest, 16-18d incubation, 16-18d to fledge (Erlich 1988)  
Month of Nesting: May-July eggs, May-August nestlings (Erlich 1988)  
Body Weight:  $39.5 \pm 1.85\text{g}$  (35.8-40.8g) (Dunning 1984)  
Habitat: prairie, oak savanna, agricultural and residential (Zeiner 1988)  
Range: foraging reported to be at least 400m (1300ft) from the nest (Hespenheide 1964)

**Eastern Meadowlark (*Sturnella magna*)**

Feeding: primarily insects, lesser quantities of seeds (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: grassland, low/ground nests, 13-15d incubation, 11-12d to fledge (Erlich 1988)

Month of Nesting: April-August eggs, May-August nestlings, 2 broods (Zeiner 1988)

Body Weight: F 78.0g, M 102±11.2g (Dunning 1984)

Habitat: grassland, pastures, hayfields (Zeiner 1988)

Range: territory varies from 1.2 to 6.1ha, but the average range is 2.8-3.2ha (Lanyon 1956b)

**Eastern Wood Pewee (*Contopus virens*)**

Feeding: almost exclusively insects (Gough et al 1998)

Feeding Strategy: aerial (Best 1989)

Nesting: woodland midstory/canopy nesting, 12-13d incubation, 14-18d to fledge (Erlich 1988)

Month of Nesting: May-August eggs, May-September nestlings, 1 brood (Zeiner 1988)

Body Weight: 14.1±0.91g (10.4-18.2g) (Dunning 1984)

Habitat: lowland forest, orchards, woodland edge habitat (Zeiner 1988)

Range: territories range from 2-6 acres (Fergus 2001)

**European Starling (*Sturnus vulgaris*)**

Feeding: mostly insects, lesser quantities of fruit (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: midstory/canopy nest, shrubland, 12-14d incubation, 18-21d to fledge (Erlich 1988)

Month of Nesting: April, 2 broods (Zeiner 1988)

Body Weight: F 79.9g, M 84.7g (Dunning 1984)

Habitat: any non-mountainous terrain, requires fields of vegetation (Feare 1984)

Range: in agricultural areas will forage up to 1.2km (0.75mi) from nest (Kessel 1957)

**Field Sparrow (*Spizella pusilla*)**

Feeding: mostly seeds, lesser quantities of insects (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: successional-scrub ground/low nest, 12d incubation, 7-8d to fledge (Erlich 1988)

Month of Nesting: April-September, 2-3 broods (Zeiner 1988)

Body Weight: 12.5±1.47g (10.2-16.5g) (Dunning 1984)

Habitat: areas with scattered trees, brush and thorn shrubs (Zeiner 1988)

Range: territory ranges 0.3-2.4ha (Dechant et al 1999)

**Gray Catbird (*Dumetella carolinensis*)**

Feeding: mostly fruit, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: successional-scrub ground/low nest, 12-13d incubation 10-11d to fledge  
(Erlich 1988)  
Month of Nesting: May-July eggs, May-August nestlings, peak May/June, 2 or  
more broods (Hamel 1982)  
Body Weight:  $38.9 \pm 3.12$ g (28.6-56.5g) (Dunning 1984)  
Habitat: woodland, shrubland, residential, forest edge (National Geographic Society 1999)  
Range: territory of one nest per 3.2ha (DeGraas and Rudis 1986)

**Great-crested Flycatcher (*Myiarchus crinitus*)**

Feeding: almost exclusively insects, lesser quantities of fruits (Gough et al 1998)  
Feeding Strategy: aerial (Best 1989)  
Nesting: woodland, midstory/canopy nest, 13-15d incubation, 12-21d to fledge  
(Erlich 1988)  
Month of Nesting: May-July eggs and nestlings, breeding peak in July (Zeiner 1988)  
Body Weight:  $33.5 \pm 3.01$ g (27.2-39.6g) (Dunning 1984)  
Habitat: wooded areas, groves (Zeiner 1988)  
Range: 2.3ha (DeGraaf 1975)

**Horned Lark (*Eremophila alpestris*)**

Feeding: primarily seeds, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: ground or herbaceous vegetation (Best 1989)  
Nesting: grassland, low/ground nest, 11-12d incubation, 9-12d to fledge (Erlich 1988)  
Month of Nesting: February-July eggs, March-August nestlings, peak in May, 2  
broods (Zeiner 1988)  
Body Weight: F 30.8, M 31.9g (Dunning 1984)  
Habitat: open areas such as prairies, fields and shoreline beaches (Zeiner 1988)  
Range: in midwestern farmland, territory reported as 0.4 to 5.3ha (Beason  
and Franks 1974)

**House Sparrow (*Passer domesticus*)**

Feeding: almost exclusively seeds (96%), lesser quantities of insects (4%) (Gough  
et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: midstory/canopy nesting, buildings, 10-13d incubation, 14-17d to fledge

(Erlich 1988)

Month of Nesting: March, 2-3 broods (Zeiner 1988)

Body Weight: F  $27.4 \pm 2.24g$  (20.1-34.5g), M  $28.0 \pm 1.55g$  (20.0-34.0g) (Dunning 1984)

Habitat: farms, residential, urban, preference of human-modified (Lowther 1992)

Range: nonbreeders range as far as 3.2km (2mi) from nest to feed, nesters seldom travel more than 30m (100ft) from nest (Will 1973)

**House Wren (*Troglodytes aedon*)**

Feeding: primarily insects (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: successional scrub, midstory/canopy nest, 13d incubation, 12-18d to fledge (Erlich 1988)

Month of Nesting: April-August, peak May/June, 2 broods (Zeiner 1988)

Body Weight:  $10.9 \pm 0.80g$  (8.9-14.2g) (Dunning 1984)

Habitat: open shrubby woodlands, prefer suburbs and edge habitat (Johnson 1998)

Range: territory range averaged 0.4ha with a range of 0.03 to 1.5ha (Kendeigh 1941b)

**Indigo Bunting (*Passerina cyanea*)**

Feeding: mostly insects, lesser quantities of seeds and fruits (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: successional scrub, ground/low nesting, 12-13d incubation, 9-10d to fledge (Erlich 1988)

Month of Nesting: May-September eggs, June-September nestlings, July peak (Zeiner 1988)

Body Weight: F  $14.1 \pm 1.41g$  (11.2-18.6g), M  $14.9 \pm 1.39g$  (12.3-21.4g) (Dunning 1984)

Habitat: brush, grasslands, fields, open deciduous woods, swamps (Payne 1992)

Range: territory sizes average 1.4ha but vary from 0.4 to 8ha (Payne 1992)

**Lark Sparrow (*Chondestes grammacus*)**

Feeding: primarily insects and seeds (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: successional scrub, low/ground nesting, 11-12d incubation, 9-10d to fledge (Erlich 1988)

Month of Nesting: April-July eggs, April-August nestlings, peak May, single brood (Zeiner 1988)

Body Weight: 29.0±1.94g (24.7-33.3g) (Dunning 1984)  
Habitat: prairie, farmland, open woodland, brushy fields (Rising 1996)  
Range: territories typically poorly defended, range of 1.4 to 3.6ha (Fitch 1958)

**Northern Cardinal (*Cardinalis cardinalis*)**

Feeding: mostly seeds and fruit (90%), lesser quantities of insects (10%) (Gough et al 1998)

Feeding Strategy: ground or low herbaceous vegetation (Best 1989)

Nesting: successional-scrub, ground/low nesting, 12-13d incubation, 9-10d to fledge (Erlich 1988)

Month of Nesting: March-July eggs, April-August nestlings, peak May/June, multiple broods (Erlich 1988)

Body Weight: F 43.9±4.53g (33.6-64.9g), M 45.4±4.29g (33.7-63.2g) (Dunning 1984)

Habitat: wood edges, hedgerows, vegetation around houses (Zeiner 1988)

Range: 4 acres per pair (Texas 2000).

**Northern Mockingbird (*Mimus polyglottos*)**

Feeding: exclusively insects and fruit (Gough et al 1998)

Feeding Strategy: will drop from perch to take prey on ground, gleans from foliage, hawks from air, and will pick fruit from trees and shrubs (Grinnell and Miller 1944)

Nesting: urban, ground/low nesting, 12-13d incubation, 11-13d to fledge (Erlich 1988)

Month of Nesting: February-August eggs, March-September nestlings, May/June peak, 2 broods (Zeiner 1988)

Body Weight: 48.5g (36.2-55.7g) (Dunning 1984)

Habitat: wood edge habitat, farmland, brush, streamside thickets, urban (Zeiner 1988)

Range: home range average 1.1ha with a range of 0.6 to 2.5ha (Howard 1974)

**Orchard Oriole (*Icterus spurius*)**

Feeding: almost exclusively insects, lesser quantities of fruit (Gough et al 1998)

Feeding Strategy: upper canopy of trees (Best 1989)

Nesting: midstory/canopy nesting, 12d incubation, 11-14d to fledge (Erlich 1988)

Month of Nesting: June-July eggs, June-August nestlings, peak June (Zeiner 1988)

Body Weight: 19.6±1.77g (16.0-25.1g) (Dunning 1984)

Habitat: open woodlands, orchards (Zeiner 1988)

Range: home range of about 0.85ha (Fitch 1958)

**Palm Warbler (*Dendroica palmarum*)**

Feeding: almost exclusively insects, lesser quantities of fruit (Gough et al 1998)  
Feeding Strategy: feeds in shrubbery and low canopy (Slud 1964)  
Nesting: successional scrub, low/ground nest, 12d incubation, 12d to fledge (Erlich 1988)  
Month of Nesting: May-June, 2 broods (Erlich 1988)  
Body Weight:  $10.3 \pm 0.47\text{g}$  (7.0-12.9g) (Dunning 1984)  
Habitat: shrubs, thickets, lowland mixed coniferous and deciduous (Zeiner 1988)  
Range: 816ha (Degraaf et al 1975)

**Red-Winged Blackbird (*Agelaius phoeniceus*)**

Feeding: primarily seeds, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: shrubland, ground/low nest, 10-12d incubation, 11-14d to fledge (Erlich 1988)  
Month of Nesting: March-July eggs, April-August nestlings, 2-3 broods (Zeiner 1988)  
Body Weight: F  $41.5 \pm 2.74\text{g}$  (29.0-55.0g), M  $63.6 \pm 4.43\text{g}$  (52.9-81.1g) (Dunning 1984)  
Habitat: marsh or prairie (Zeiner 1988)  
Range: 1,625m<sup>2</sup> in marsh, 2,895m<sup>2</sup> in upland are mean averages of territory size  
from combination of many studies (Searcy and Yasukawa 1995)

**Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)**

Feeding: mostly insects, lesser quantities of fruits, seeds and flowers (Gough et al 1998)  
Feeding Strategy: upper canopy of trees (Best 1989)  
Nesting: woodland, midstory/canopy nesting, 13-14d incubation, 9-12d to fledge  
(Erlich 1988)  
Month of Nesting: May-July (Zeiner 1988)  
Body Weight:  $45.6 \pm 0.40\text{g}$  (35.4-65.0g) (Dunning 1984)  
Habitat: open woods, edge habitat, brush (Zeiner 1988)  
Range: territory can be as large as 6.2ha (Odum and Kuenzler 1955)

**Savannah Sparrow (*Passerculus sandwichensis*)**

Feeding: mostly seeds, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: grassland, low/ground nests, 12-13d incubation, 7-10d to fledge (Erlich 1988)  
Month of Nesting: April-July, May/June peak, 2 brood (Zeiner 1988)  
Body Weight: F  $19.5 \pm 2.29\text{g}$ , M  $20.6 \pm 1.35\text{g}$  (Dunning 1984)  
Habitat: prairie, oak savanna, agricultural, residential, sand/mud marine shoreline

(Zeiner 1988)

Range: 0.05-1.25ha reported (Wheelwright and Rising 1993)

**Song Sparrow (*Melospiza melodia*)**

Feeding: mostly seeds, lesser quantities of insects (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: successional scrub, ground/low nesting, 12-14d incubation, 9-12d to fledge (Erlich 1988)

Month of Nesting: April, typically 2 broods (Zeiner 1988)

Body Weight: F 20.5±1.54g (11.9-26.1g), M 21.0±1.17g (18.2-29.8g) (Dunning 1984)

Habitat: open brush, pastures, woodland edge (Ryser 1985)

Range: home range averages 2.8ha (Fitch 1958)

**Swainson's Thrush (*Catharus ustulatus*)**

Feeding: mostly insects, lesser quantities of fruit and worms (Gough et al 1998)

Feeding Strategy: searches litter under shrubs and on forest floor, gleans from shrubs, rarely flycatches (Zeiner 1988)

Nesting: woodland, low/ground nest, 12-14d incubation, 10-13d to fledge (Erlich 1988)

Month of Nesting: April-August, May/June (Zeiner 1988)

Body Weight: 30.8±1.83g (21.9-50.7g) (Dunning 1984)

Habitat: mixed forest, shrubs, thickets, deciduous or riparian forest (Zeiner 1988)

Range: territory 0.5-0.9ha (Johnston 1949)

**Tufted Titmouse (*Baeolophus bicolor*)**

Feeding: mostly insects, lesser quantities of nuts, seeds and fruit (Gough et al 1998)

Feeding Strategy: shrubs or lower canopy of trees (Best 1989)

Nesting: woodland, midstory/canopy nest, 13-14d incubation, 15-18d to fledge (Erlich 1988)

Month of Nesting: eggs April-June, nestlings May-June, breeding peak April-May, single brood (Zeiner 1988)

Body Weight: 21.6g (17.5-26.1g) (Dunning 1984)

Habitat: deciduous woodlands, residential woods (Terres 1980)

Range: home range and territory averages 1.2ha (Laudenslayer and Balda 1976)

**White-Breasted Nuthatch (*Sitta carolinensis*)**

Feeding: mostly insects, lesser quantities of nuts and seeds (Gough et al 1998)

Feeding Strategy: gleans from trunks and branches of live trees and snags (Zeiner 1988)  
Nesting: woodland, midstory/canopy nest, 12d incubation, 14d to fledge (Erlich 1988)  
Month of Nesting: eggs April-June, nestlings May-June, May breeding peak, 1 brood (Zeiner 1988)  
Body Weight:  $21.1 \pm 2.39\text{g}$  (18.5-26.7g) (Dunning 1984)  
Habitat: mixed deciduous/coniferous forests, prefers edge habitat (Pravosudov 1993)  
Range: foraging territory of breeding pairs 0.7-0.9ha (Hering 1948)

**White-Crowned Sparrow (*Zonotrichia leucophrys*)**

Feeding: primarily seeds, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: successional scrub, ground/low nesting, 12d incubation, 7-12d to fledge (Erlich 1988)  
Month of Nesting: May-September, 2-3 broods (Zeiner 1988)  
Body Weight:  $28.2 \pm 1.72\text{g}$  (21.0-38.5g) (Dunning 1984)  
Habitat: highly variable but needs coniferous trees of edge of grassland or open area (Chilton et al 1995)  
Range: pairs occupy home ranges 1.5 to 2.0ha (Morton et al 1972)

**Yellow-rumped Warbler (*Dendroica coronata*)**

Feeding: primarily insects, lesser quantities of seeds (Gough et al 1998)  
Feeding Strategy: forages from all canopy levels by hawking insects from air, gleaning from foliage, twigs and branches, and by searching for food on ground (Zeiner 1988)  
Nesting: woodland, midstory/canopy nesting, 12-13d incubation, 10-12d to fledge (Erlich 1988)  
Month of Nesting: May-June (Zeiner 1988)  
Body Weight: F  $12.2 \pm 1.29\text{g}$  (9.9-15.3g), M  $12.9 \pm 0.76\text{g}$  (10.6-16.7g) (Dunning 1984)  
Habitat: coniferous deciduous or mixed forest, and forest edges (Stokes and Stokes 1996)  
Range: territory averages about 0.8ha (Morse 1976)

**Yellow Warbler (*Dendroica petechia*)**

Feeding: almost exclusively insects, lesser quantities of fruit (Gough et al 1998)  
Feeding Strategy: shrubs or lower canopy of trees (Best 1989)  
Nesting: successional-scrub, midstory/canopy nest, 11-12d incubation, 9-12d to fledge (Erlich 1988)  
Month of Nesting: April-August, peak June (Zeiner 1988)

Body Weight: F  $9.2 \pm 0.59\text{g}$  (7.4-16.0g), M  $9.8 \pm 0.68\text{g}$  (7.9-12.8g) (Dunning 1984)  
Habitat: swamp/marsh edge, farmland, forest edge, orchards, suburban (USGS et al 2000)  
Range: individuals regularly move up to 488m (1600ft) to feed (Kendeigh 1941)

## **Piciformes (Woodpeckers)**

### **Downy Woodpecker (*Picoides pubescens*)**

Feeding: primarily insects, lesser quantities of seeds and fruit (Gough et al 1998)  
Feeding Strategy: bark of trees (Best 1989)  
Nesting: woodland in trees, 12d incubation, 20-25d to fledge (Erlich 1988)  
Month of Nesting: March-September, May/June peak, 2 brood (Zeiner 1988)  
Body Weight:  $27 \pm 0.19\text{g}$  (20.7-32.2g) (Dunning 1984)  
Habitat: woodlands and woodland edge (Winkler et al 1995)  
Range: home range observed to be between 2.0 and 3.2ha (Lawrence 1967)

### **Northern Flicker (*Colaptes auratus*)**

Feeding: mostly insects, lesser quantities of fruits (Gough et al 1998)  
Feeding Strategy: ground or low herbaceous vegetation (Best 1989)  
Nesting: elevated nest in tree, 11-14d incubation, 25-28d to fledge (Erlich 1988)  
Month of Nesting: April-July eggs, May-August nestlings (Zeiner 1988)  
Body Weight: F  $129 \pm 7.67\text{g}$  (106-164g), M  $135 \pm 6.37\text{g}$  (114-160g) (Dunning 1984)  
Habitat: open woodlands, farmlands and pastures (Winkler et al 1995)  
Range: home range estimated to be 16ha for a pair (Lawrence 1967)

### **Red-Bellied Woodpecker (*Melanerpes carolinus*)**

Feeding: mostly nuts and fruit, lesser quantities of insects (Gough et al 1998)  
Feeding Strategy: bark of trees (Best 1989)  
Nesting: woodland in trees, 12-14d incubation, 24-27d to fledge (Erlich 1988)  
Month of Nesting: April-July eggs, May-July nestlings (Zeiner 1988)  
Body Weight: F 56g, M  $67 \pm 5.86\text{g}$  (Dunning 1984)  
Habitat: deciduous forest, cultivated areas near woods, riverine woodlands (Zeiner 1988)  
Range: one pair per 14 acres (Texas 2000)

### **Red-headed Woodpecker (*Melanerpes erythrocephalus*)**

Feeding: mostly nuts and seeds, lesser quantities insects and fruits (Gough et al 1998)  
Feeding Strategy: aerial (Best 1989)  
Nesting: dead trees, 12-13d incubation, 27-30d to fledge (Erlich 1988)

Month of Nesting: June-August (Erlich 1988)  
 Body Weight: 71.6±7.57g (56.1-90.5g) (Dunning 1984)  
 Habitat: forest edges, orchards, open pine woods, groves (Zeiner 1988)  
 Range: average territory 6.1ha (Thomas 1979)

**Appendix C. Avian Data to Support Guild Selection  
 Insectivore Nesting Behavior**

Species	Nesting Habit	Nesting Location	Start nesting w/ eggs	End nesting w/ eggs	Start nesting w/ nestlings	End nesting w/ nestling	Peak of nesting season	Brood Numbers	Habitat
<b>Species that are In-Field Habitat Users feeders/nesters</b>									
Common Nighthawk	ground	low vegetation	May	July	May	July			savanna, grassland, fields, riparian, terrestrial, lowland
Eastern Meadowlark	ground/low	grassland	April	August	May	August		2	grassland, pastures, hayfields
Killdeer	ground/low	low vegetation	February	August	February	August		2	savannahs, agricultural, shorelines
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>									
Barn Swallow	above-ground	buildings	April	July	April	August	May/June	2	open habitats of all kinds
Eastern Kingbird	above-ground	woodland	May	July	May	August			prairie, agricultural, residential, savannah
Arcadian Flycatcher	above-ground	midstory/canopy in woodland	May	July	May	July	May/June		riparian habitat, woodland edge
Scissor-Tailed Flycatcher	above-ground	midstory/canopy in woodland	April	July	April	August	May/June		prairies, shrubland

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<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Downy Woodpecker	above-ground	woodland	March	September	March	September	May/June	2	woodlands, woodland edge
Northern Rough-Winged Swallow	above-ground	midstory/canopy in woodland	May	July	May	August	May/June		brushland, woodland, forest, grassland, meadows, pasture, croplands
Eastern Phoebe	above-ground	midstory/canopy in woodland	April	July	April	August	May/June		woodlands, edge
Blue Grosbeak	ground/low	successional shrub	May	August	May	September	June/July		low riparian, croplands, herbaceous habitats
Chimney Swift	above-ground	woodland or on manmade structures	May	July	May	August			woodlands, edges, grasslands, shrubs, fields, human structures
Cliff Swallow	above-ground	midstory/canopy in woodland	April	August	April	August			open habitats
Eastern Bluebird	above-ground	shrub or woodland	April	July	April	July		2	open land, parks, gardens, hedges
European Starling	above-ground	shrub or woodland	April	April	April	April	April	2	fields with vegetation
Common Yellowthroat	ground/low	successional scrub	April	July	April	July	May/June		briars, weeds, agricultural
Yellow Warbler	above-ground	successional scrub	April	August	April	August	June		farmland, forest edge, suburb, marsh edge

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<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Black-Capped Chickadee	above-ground	woodland	April	July	April	July	May		woodlands, prefer edge habitat
Blue-Grey Gnatcatcher	above-ground	woodland	May	June	May	June		2	woodland, shrubland, prefer edges
House Wren	above-ground	successional scrub	April	August	April	August	May/June	2	woodlands, suburbs, edge habitat
Indigo Bunting	above-ground	successional scrub	May	September	June	September	July		scrub, deciduous woods, swamp
Prairie Warbler	ground/low	successional scrub							shrubland habitat
Red-Eyed Vireo	above-ground	midstory/canopy in woodland	April	August	April	August	June		prairies, shrubland
<b>Orchards and Tree Crops Species</b>									
Eastern Wood Pewee	above-ground	woodland	May	August	May	September		1	forest, orchards, woodland edge habitat
Great-Crested Flycatcher	above-ground	woodland	May	July	May	July	July		wooded areas, groves
Downy Woodpecker	above-ground	woodland	March	September	March	September	May/June	2	woodlands, woodland edge
White-Breasted Nuthatch	above-ground	woodland	April	June	May	June	May	1	mixed deciduous/coniferous forest, edge
Yellow-Billed Cuckoo	ground/low	woodland	June	July	June	July			woodlands, forests, thickets
Wood Thrush	above-ground	midstory/canopy in woodland	March	July	May	August	June/July		deciduous and mixed forests

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Insectivore Nesting Behavior**

<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Carolina Chickadee	above-ground	midstory/ canopy in woodland	February	May	March	June	March-May		dense woodlands
Scarlet Tanager	above-ground	midstory/ canopy in woodland	May	August	May	August			deciduous and mixed forests
Yellow-Throated Vireo	above-ground	midstory/ canopy in woodland	May	July	June	July	June		water/woodland ecotone
Summer Tanager	above-ground	midstory/ canopy in woodland	April	August	May	September	June		riparian habitat
Bell's Vireo	ground/ low	successional shrub	April	July	April	August	May/June		dense riparian thickets
Yellow-Breasted Chat	ground/ low	successional shrub	May	August	May	August	June		thickets near water, riparian woodlands
Chipping Sparrow	above-ground	midstory/ canopy in woodland	April	May	April	May	April/May		wooded habitats with low herbaceous or shrub layer
Northern Parula	above-ground	midstory/ canopy in woodland	April	July	April	August	May/June		riparian, mature forest
Kentucky Warbler	ground/ low	shrub, low tree or ground	May	June	May	June	May/June		woodlands
Northern Flicker	above-ground	woodland	April	July	May	August			woodland, woodland edge

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Insectivore Nesting Behavior**

<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Purple Martin	above-ground	midstory/ canopy in woodland	April	June	May	August	May		open forest and woodland, riparian
Tree Swallow	above-ground	midstory/ canopy in woodland	May	June	May	July	May/June		riparian habitat, woodlands
Hairy Woodpecker	above-ground	midstory/ canopy in woodland	March	April	March	April	May/June		tree/shrub, tree/herbaceous, shrub/herbaceous ecotones
Pileated Woodpecker	above-ground	midstory/ canopy in woodland	May	June	May	July	May/June		mature conifer forest
Ladderbacked Woodpecker	above-ground	midstory/ canopy in woodland	May	June	May	June			habitats that provide large shrubs or trees
Blue-Grey Gnatcatcher	above-ground	woodland	May	June	May	June		2	woodland, shrubland, prefer edges
Carolina Wren	ground/ low	successional scrub	March	July	April	September	May/June	2	dense shrub, brush, forest, wooded suburb
Palm Warbler	ground/ low	successional scrub	May	June	May	June		2	shrub, thicket, mixed coniferous/deciduous
Swainson's Thrush	ground/ low	woodland	April	August	April	August	May/June		mixed forest, shrub, thicket
Tufted Titmouse	above-ground	woodland	April	June	May	June	April/May	1	deciduous woodland, residential woods
Orchard Oriole	above-ground	woodland	June	July	June	August	June		open woodlands, orchards

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Insectivore Nesting Behavior**

<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Rose-Breasted Grosbeak	above-ground	woodland	May	July	May	July			open woods, edge habitat, brush
Yellow-Rumped Warbler	above-ground	woodland	May	June	May	June			mixed deciduous/coniferous forest, edge
White-Eyed Vireo	ground/low	successional shrub	April	July	April	August	May/June		riparian, deciduous forestland, residential areas

<b>Insectivore Body Weight</b>								
<b>Species</b>	<b>Female Weight (g)</b>				<b>Male Weight (g)</b>			
	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<b>Species that are In-Field Habitat Users feeders/nesters</b>								
Common Nighthawk	64				60			
Eastern Meadowlark	78				102	11.2		
Killdeer	101		87.7	121	92.1	10.4	83.9	109
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>								
Barn Swallow	18.6	1.49	13.4	23.4	19.6	1.49	13.4	23.4
Eastern Kingbird	39.5	1.85	35.8	40.8	39.5	1.85	35.8	40.8
Arcadian Flycatcher	12.9	0.77	9.9	16.1	12.9	0.77	9.9	16.1
Scissor-Tailed Flycatcher	43.2	4.5	36.3	56.3	43.2	4.5	36.3	56.3
Downy Woodpecker	27	0.19	20.7	32.2	27	0.19	20.7	32.2
Northern Rough-Winged Swallow	15.9	0.58	10.3	18.3	15.9	0.58	10.3	18.3
Eastern Phoebe	19.8	7.47	11.4	24.4	19.8	7.47	11.4	24.4
Blue Grosbeak	27.5		26.1	29.8	29.3	1.42	27	31.4
Chimney Swift	23.6	0.3	17	29.8	23.6	0.3	17	29.8
Cliff Swallow	21.6	2.04	17.5	26.7	21.6	2.04	17.5	26.7
Eastern Bluebird	31.8	0.92			31.8	0.92		
European Starling	79.9				84.7			
Common Yellowthroat	9.9	0.78	7.6	15.9	10.3	0.66	7.6	15.5
Yellow Warbler	9.2	0.59	7.4	16	9.8	0.68	7.9	12.8
Black-Capped Chickadee	10.8	1.38	8.2	13.6	10.8	1.38	8.2	13.6
Blue-Grey Gnatcatcher	6	0.13	4.8	8.9	6	0.13	4.8	8.9
House Wren	10.9	0.8	8.9	14.2	10.9	0.8	8.9	14.2
Indigo Bunting	14.1	1.41	11.2	18.6	14.9	1.39	12.3	21.4
Prairie Warbler	7.3	0.88	5.7	10.8	8	0.87	6.1	10.1
Red-Eyed Vireo	17.9	0.66	16	21.1	17.9	0.66	16	21.1
<b>Orchards and Tree Crops Species</b>								
Eastern Wood Pewee	14.1	0.91	10.4	18.2	14.1	0.91	10.4	18.2

<b>Insectivore Body Weight</b>								
<b>Species</b>	<b>Female Weight (g)</b>				<b>Male Weight (g)</b>			
	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Great-Crested Flycatcher	33.5	3.01	27.2	39.6	33.5	3.01	27.2	39.6
Downy Woodpecker	27	0.19	20.7	32.2	27	0.19	20.7	32.2
White-Breasted Nuthatch	21.1	2.39	18.5	26.7	21.1	2.39	18.5	26.7
Yellow-Billed Cuckoo	64	9.07	50	85.5	64	9.07	50	85.5
Wood Thrush	47.4	4.17	39.2	57.7	47.4	4.17	39.2	57.7
Carolina Chickadee	9.8	0.59			10.5	0.72		
Scarlet Tanager	28.6	0.22	17.5	35.2	28.6	0.22	17.5	35.2
Yellow-Throated Vireo	18	1.63	15.6	21.4	18	1.63	15.6	21.4
Summer Tanager	29.8	1.2			29.8	1.2		
Bell's Vireo	8.5	0.55	7.4	9.8	8.5	0.55	7.4	9.8
Yellow-Breasted Chat	25.1	1.54	20.2	33.9	25.5	1.43	20.3	31.7
Chipping Sparrow	12				12			
Northern Parula	8.6		7.1	10.2	8.6		7.1	10.2
Kentucky Warbler	13.7	0.59	11.4	16.5	14.3	0.59	12	20.6
Northern Flicker	129	7.67	106	164	135	6.37	114	160
Purple Martin	49.4	1.49			49.4	1.49		
Tree Swallow	20.1	1.58	15.6	25.4	20.1	1.59	15.6	25.4
Hairy Woodpecker	62.5	1.98	59.3	65.9	70.3	3.2	60.8	79.6
Pileated Woodpecker	266		250	284	308		308	309
Ladderbacked Woodpecker	30.3	3.55	25	41.4	30.3	3.55	25	41.4
Blue-Grey Gnatcatcher	6	0.13	4.8	8.9	6	0.13	4.8	8.9
Carolina Wren	21	1.15			21	1.15		
Palm Warbler	10.3	0.47	7	12.9	10.3	0.47	7	12.9
Swainson's Thrush	30.8	1.83	21.9	50.7	30.8	1.83	21.9	50.7
Tufted Titmouse	21.6		17.5	26.1	21.6		17.5	26.1
Orchard Oriole	19.6	1.77	16	25.1	19.6	1.77	16	25.1
Rose-Breasted Grosbeak	45.6	0.4	35.4	65	45.6	0.4	35.4	65

<b>Insectivore Body Weight</b>								
<b>Species</b>	<b>Female Weight (g)</b>				<b>Male Weight (g)</b>			
	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Yellow-Rumped Warbler	12.2	1.29	9.9	15.3	12.9	0.76	10.6	16.7
White-Eyed Vireo	11.4		10	14.3	11.4		10	14.3

Insectivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge <sup>1</sup>	% Time found in fields <sup>1</sup>	Habitat
			Avg	Min	Max			
<b>Species that are In-Field Habitat Users feeders/nesters</b>								
Common Nighthawk	insects	flycatches		1183	3724	16	84	savanna, grassland, fields, riparian, terrestrial, lowland
Eastern Meadowlark	insects	ground or in low herbaceous vegetation	322	200	459	11	89	grassland, pastures, hayfields
Killdeer	insects	ground or in low herbaceous vegetation			4752	0	100	savannahs, agricultural, shorelines
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>								
Barn Swallow	insects	aerial	1300			71	29	open habitats of all kinds
Eastern Kingbird	insects	aerial	1300			55	45	prairie, agricultural, residential, savannah
Arcadian Flycatcher	insects	hawks aerially	190	144	230	100	0	riparian habitat, woodland edge
Scissor-Tailed Flycatcher	insects	hawks aerially		220	298	50	50	prairies, shrubland
Downy Woodpecker	insects	bark of trees		264	333	93	7	woodlands, woodland edge
Northern Rough-Winged Swallow	insects	flycatches				0	100	brushland, woodland, forest, grassland, meadows, pasture, croplands
Eastern Phoebe	insects	flycatches	525			100	0	woodlands, edge
Blue Grosbeak	insects	forages on ground or in low shrub/trees	458	275	461	71	29	low riparian, croplands, herbaceous habitats
Chimney Swift	insects	gleans from canopy				30	70	woodlands, edges, grasslands, shrubs, fields, human structures
Cliff Swallow	insects	gleans from ground, low foliage		10560	21120	1	99	open habitats
Eastern Bluebird	insects	ground or in low herbaceous vegetation	1320			24	76	open land, parks, gardens, hedges

<b>Insectivore Feeding Behavior</b>								
<b>Species</b>	<b>Primary Food</b>	<b>Feeding Strategy</b>	<b>Forage Range (ft)</b>			<b>% Time found in edge<sup>1</sup></b>	<b>% Time found in fields<sup>1</sup></b>	<b>Habitat</b>
			<b>Avg</b>	<b>Min</b>	<b>Max</b>			
European Starling	insects	ground or in low herbaceous vegetation			3960	49	51	fields with vegetation
Common Yellowthroat	insects	shrubs or low canopy of trees	222			83	17	briars, weeds, agricultural
Yellow Warbler	insects	shrubs or low canopy of trees			1600	100	0	farmland, forest edge, suburb, marsh edge
Black-Capped Chickadee	insects	shrubs or low canopy of trees		391	428	92	8	woodlands, prefer edge habitat
Blue-Grey Gnatcatcher	insects	shrubs or low canopy of trees		132	175			woodland, shrubland, prefer edges
House Wren	insects	shrubs or low canopy of trees	116	32	227	83	17	woodlands, suburbs, edge habitat
Indigo Bunting	insects	shrubs or low canopy of trees	222	116	523	70	30	scrub, deciduous woods, swamp
Prairie Warbler	insects					100	0	shrubland habitat
Red-Eyed Vireo	insects					100	0	prairies, shrubland
<b>Orchards and Tree Crops Species</b>								
Eastern Wood Pewee	insects	aerial		169	290			forest, orchards, woodland edge habitat
Great-Crested Flycatcher	insects	aerial	280			96	4	wooded areas, groves
Downy Woodpecker	insects	bark of trees		264	333	93	7	woodlands, woodland edge
White-Breasted Nuthatch	insects	bark of trees		153	174			mixed deciduous/coniferous forest, edge
Yellow-Billed Cuckoo	insects	foliage		581				woodlands, forests, thickets

Insectivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge <sup>1</sup>	% Time found in fields <sup>1</sup>	Habitat
			Avg	Min	Max			
		Wood Thrush	insects	gleans and probes ground		52	310	100
Carolina Chickadee	insects	gleans food from foliage				92	8	dense woodlands
Scarlet Tanager	insects	gleans from canopy, shrubs or ground				100	0	deciduous and mixed forests

Insectivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge <sup>1</sup>	% Time found in fields <sup>1</sup>	Habitat
			Avg	Min	Max			
Yellow-Throated Vireo	insects	gleans from foliage and branches			425	100	0	water/woodland ecotone
Summer Tanager	insects	gleans from foliage/bark, hawks aerially	241			100	0	riparian habitat
Bell's Vireo	insects	gleans from foliage and branches		167	204	100	0	dense riparian thickets
Yellow-Breasted Chat	insects	gleans from ground, low foliage and shrubs		131	185	91	9	thickets near water, riparian woodlands
Chipping Sparrow	insects	gleans from ground/low foliage		82	118	100	0	wooded habitats with low herbaceous or shrub layer
Northern Parula	insects	gleans from vegetation		117	144	100	0	riparian, mature forest
Kentucky Warbler	insects	gleans insects from shrubs and small trees	70			100	0	woodlands
Northern Flicker	insects	ground or in low herbaceous vegetation	739			71	29	woodland, woodland edge
Purple Martin	insects	hawks aerially				0	100	open forest and woodland, riparian
Tree Swallow	insects	hawks aerially				0	100	riparian habitat, woodlands
Hairy Woodpecker	insects	probes bark	310	288	333	100	0	tree/shrub, tree/herbaceous, shrub/herbaceous ecotones
Pileated Woodpecker	insects	probes bark		2633	4079	100	0	mature conifer forest
Ladderbacked Woodpecker	insects	probes trees, gleans from vegetation				100	0	habitats that provide large shrubs or trees
Blue-Grey Gnatcatcher	insects	shrubs or low canopy of trees		132	175			woodland, shrubland, prefer edges
Carolina Wren	insects	shrubs or low canopy of trees		143	164	83	17	dense shrub, brush, forest, wooded suburb

Insectivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge <sup>1</sup>	% Time found in fields <sup>1</sup>	Habitat
			Avg	Min	Max			
Palm Warbler	insects	shrubs or low canopy of trees	5370			84	16	shrub, thicket, mixed coniferous/deciduous
Swainson's Thrush	insects	shrubs or low canopy of trees		132	174			mixed forest, shrub, thicket
Tufted Titmouse	insects	shrubs or low canopy of trees	200			96	4	deciduous woodland, residential woods
Orchard Oriole	insects	upper canopy of trees	169			67	33	open woodlands, orchards
Rose-Breasted Grosbeak	insects	upper canopy of trees			459	50	50	open woods, edge habitat, brush
Yellow-Rumped Warbler	insects	variable	164			83	17	mixed deciduous/coniferous forest, edge
White-Eyed Vireo	insects					98	2	riparian, deciduous forestland, residential areas

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<b>Granivore Nesting Behavior</b>									
<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
<b>Species that are In-Field Habitat Users feeders/nesters</b>									
Horned Lark	ground/low	grassland	February	July	March	August	May	2	prairies, fields, shoreline beaches
Savannah Sparrow	ground/low	grassland	April	July	April	July	May/June	2	prairie, agricultural, residential, oak savanna
<b>Upland Gamebird Subsection</b>									
Ring-Necked Pheasant	ground/low	grassland	March	April	March	April		1	cropland, grain fields, grasslands
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>									
Painted Bunting	ground/low	successional shrub	April	August	April	August	May-July		open areas with brush, thickets and shrub
American Crow	above-ground	shrub or midstory/canopy	March	July	March	July	May/June		woodlands, riparian, orchards, pastures, grassland, cropland
Common Ground-Dove	ground/low	shrub, low tree or ground	January	November	January	November			shrubland, agricultural, undeveloped areas
White Throated Sparrow	ground/low	successional shrub	May	August	May	August			riparian areas, weedy fields, residential gardens
Abert's Towhee	ground/low	successional shrub	March	August	April	September	May-July		dense riparian thickets
Lazuli Bunting	ground/low	successional shrub	April	August	April	August			open brushlands, thickets, shrublands
Brown-Headed Cowbird	above-ground	paratizes above-ground nests	April	August	April	August		30 eggs/season	grassland, fields, pasture, prefer edges

<b>Granivore Nesting Behavior</b>									
<b>Species</b>	<b>Nesting Habit</b>	<b>Nesting Location</b>	<b>Start nesting w/ eggs</b>	<b>End nesting w/ eggs</b>	<b>Start nesting w/ nestlings</b>	<b>End nesting w/ nestling</b>	<b>Peak of nesting season</b>	<b>Brood Numbers</b>	<b>Habitat</b>
Common Grackle	above-ground	woodland	March	July	April	July	May/June	2	farmlands, orchards, swamps, open areas
House Sparrow	above-ground	buildings or woodland	March	March	March	March	March	2 or 3	farms, residential, urban, human-modified
Mourning Dove	above-ground	shrub or woodland	February	September	March	October	May/June	2 to 6	farms, scrub, grassland, roadsides
Rock Dove	above-ground	buildings or woodland	year-round	year-round	year-round	year-round	March-September	multiple	agricultural, open shrub, urban, rural
Field Sparrow	ground/low	successional scrub	April	September	April	September		2 or 3	brush, shrubs, areas with scattered trees
Northern Bobwhite	ground/low	successional scrub	March	September	April	October	June	2	temperate forest, grassland
Red-Winged Blackbird	ground/low	shrub or woodland	March	July	April	August		2 or 3	marsh, prairie
White-Crowned Sparrow	ground/low	successional scrub	May	September	May	September		2 or 3	coniferous trees at edge of open area
Northern Cardinal	ground/low	successional scrub	March	July	April	August	May/June	multiple	wood edges, hedgerows, vegetation in suburb
Yellow-Headed blackbird	low/ground	dense emergent vegetation	April	July	April	July			wetlands, shorelines and in nearby open fields
American Goldfinch	above-ground	successional scrub	July	August	July	September		1	weedy fields, cultivated lands, roadsides
Song Sparrow	ground/low	successional scrub	April	April	April	April	April	2	open brush, pastures, woodland edge

<b>Granivore Body Weight</b>								
<b>Species</b>	<b>Female Weight (g)</b>				<b>Male Weight (g)</b>			
	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<b>Species that are In-Field Habitat Users feeders/nesters</b>								
Horned Lark	30.8				31.9			
Savannah Sparrow	19.5	2.29			20.6	13.5		
<b>Upland Gamebird Subsection</b>								
Ring-Necked Pheasant	953			1453	619			1861
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>								
Painted Bunting	15		12.9	19	16.1		13.3	19
American Crow	438				458			
Common Ground-Dove	30.1	0.35	22.4	41.2	30.1	0.35	22.4	41.2
White Throated Sparrow	29.5	2.18	19	35.4	25.9	2.18	19	35.4
Abert's Towhee	44.8	2.9	39.5	51	47.1	3.29	40	54.1
Lazuli Bunting	15		12.7	18.9	16		13	19.5
Brown-Headed Cowbird	38.8	1.93	30.5	51.2	49	1.77	32.4	58
Common Grackle	100				127			
House Sparrow	27.4	2.24	20.1	34.5	28	1.55	20	34
Mourning Dove	115	1.76			123	1.85		
Rock Dove	54.2	37.2			542	37.2		
Field Sparrow	12.5	1.47	10.2	16.5	12.5	1.47	10.2	16.5
Northern Bobwhite	178				178			
Red-Winged Blackbird	41.5	2.74	29	55	63.6	4.43	52.9	81.1
White-Crowned Sparrow	28.2	1.72	21	38.5	28.2	1.72	21	38.5
Northern Cardinal	43.9	4.53	33.6	64.9	45.4	4.29	33.7	63.2
Yellow-Headed Blackbird	49.3	4	42.4	56	79.7		72.5	85.5
American Goldfinch	12.6	0.81	10	17.1	13.2	1.13	8.6	20.7
Song Sparrow	20.5	1.54	11.9	26.1	21	1.17	18.2	29.8

Granivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge	% Time found in fields	Habitat
			Avg	Min	Max			
<b>Species that are In-Field Habitat Users feeders/nesters</b>								
Horned Lark	seeds	ground or in low herbaceous vegetation		116	428	18	82	prairies, fields, shoreline beaches
Savannah Sparrow	seeds	ground or in low herbaceous vegetation		42	206	72	28	prairie, agricultural, residential, oak savanna
<b>Upland Gamebird Subsection</b>								
Ring-Necked Pheasant	seeds	ground or in low herbaceous vegetation			3263	96	4	cropland, grain fields, grasslands
<b>Edge Species —May feed in or above fields but likely nest in edge habitats</b>								
Painted Bunting	seeds	forages on ground				72	28	open areas with brush, thickets and shrub
American Crow	seeds	gleans from ground			13123	100	0	woodlands, riparian, orchards, pastures, grassland, cropland
Common Ground-Dove	seeds	gleans from ground		83	131	100	0	shrubland, agricultural, undeveloped areas
White Throated Sparrow	seeds	gleans from ground	185	83	331	100	0	riparian areas, weedy fields, residential gardens
Abert's Towhee	seeds	gleans from ground and shrubs		193	298	50	50	dense riparian thickets
Lazuli Bunting	seeds	gleans from low foliage or ground, also hawks aerially				50	50	open brushlands, thickets, shrublands
Brown-Headed Cowbird	seeds	ground or in low herbaceous vegetation			14256	40	60	grassland, fields, pasture, prefer edges
Common Grackle	seeds	ground or in low herbaceous vegetation	148			56	44	farmlands, orchards, swamps, open areas
House Sparrow	seeds	ground or in low herbaceous vegetation		100	10560	91	9	farms, residential, urban, human-modified
Mourning Dove	seeds	ground or in low herbaceous vegetation	5280			68	32	farms, scrub, grassland, roadsides

Granivore Feeding Behavior								
Species	Primary Food	Feeding Strategy	Forage Range (ft)			% Time found in edge	% Time found in fields	Habitat
			Avg	Min	Max			
Rock Dove	seeds	ground or in low herbaceous vegetation	150			0	100	agricultural, open shrub, urban, rural
Field Sparrow	seeds	ground or in low herbaceous vegetation		100	285	89	11	brush, shrubs, areas with scattered trees
Northern Bobwhite	seeds	ground or in low herbaceous vegetation	106			75	25	temperate forest, grassland
Red-Winged Blackbird	seeds	ground or in low herbaceous vegetation	100			42	58	marsh, prairie
White-Crowned Sparrow	seeds	ground or in low herbaceous vegetation		227	264	3	97	coniferous trees at edge of open area
Northern Cardinal	seeds, fruit	ground or in low herbaceous vegetation	116			66	34	wood edges, hedgerows, vegetation in suburb
Yellow-Headed Blackbird	seeds	often hawks flying insects, gleans from vegetation			5280	70	30	wetlands, shorelines and in nearby open fields
American Goldfinch	seeds	shrubs or low canopy of trees		900	2640	62	38	weedy fields, cultivated lands, roadsides
Song Sparrow	seeds	shrubs or low canopy of trees	312			73	27	open brush, pastures, woodland edge

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