APPENDIX B: Focal species for core areas, hubs, and corridors

Native vertebrate species found in Cecil County, and associated habitat

(note: a separate spreadsheet is available with home range size, dispersal distance, separation distance for suitable habitat, separation distance for unsuitable habitat, dispersal barriers, dispersal conduits, watershed sensitivity, and other information.)

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Mammal	*Blarina brevicauda*	Northern short-tailed shrew	Specialist	Most abundant in hardwood forests with deep leaf-litter and abundant food; avoids areas with little cover and extremes of temperature and moisture.
Mammal	*Canis latrans*	Coyote	Generalist	Highly adaptable
Mammal	*Castor canadensis*	Beaver	Specialist	Forest along 2nd - 4th order streams, ponds, or lakes, with gradient <15% and valleys not too narrow
Mammal	*Cryptotis parva*	Least shrew	Intermediate	Generally occurs in open country with dense herbaceous vegetation. Also brushy areas, forest edges, and sometimes salt and freshwater marshes.
Mammal	*Didelphis virginiana*	Virginia opossum	Generalist	Highly adaptable
Mammal (bat)	*Eptesicus fuscus*	Big brown bat	Generalist	Various wooded and semi-open habitats, including cities. Much more abundant in deciduous forest than in coniferous forest. Summer roosts generally are in buildings; also hollow trees, rock crevices, tunnels, and cliff swallow nests; prefers sites that do not get hot. Typically roosts in twilight part of cave. Maternity colonies form in attics, barns and occasionally tree cavities.
Mammal	*Glaucomys volans*	Southern flying squirrel	Intermediate	Mature deciduous and mixed forest, particularly beech-maple, oak-hickory and poplar.
Mammal (bat)	*Lasiurus borealis*	Eastern red bat	Generalist	Wide range of forested and semi-forested areas
Mammal	*Lontra canadensis*	River otter	Specialist	Open water (e.g., perennial streams, ponds) with riparian forest
Mammal	*Lynx rufus*	Bobcat	Intermediate	Primarily large tracts of forest, including edges. Primarily terrestrial. When inactive, occupies rocky cleft, cave, hollow log, space under fallen tree, etc.; usually changes shelter daily. Young are born in a den in a hollow log, under a fallen tree, in a rock shelter, or similar site. Hess: Requires large area of habitat with relatively low levels of human activity.
Mammal	*Marmota monax*	Woodchuck	Generalist	Open habitats (meadows, pastures, old fields, orchards) that often border wooded areas, which may be used for hibernation
Mammal	*Mephitis mephitis*	Striped skunk	Generalist	Prefers semi-open country with woodland and meadows interspersed, brushy areas, bottomland woods. Frequently found in suburban areas.
Mammal	*Microtus pennsylvanicus*	Meadow vole	Generalist	Found in a wide variety of habitats from dry pastures and wooded swamps to marshes and orchards. Needs loose organic soils for tunneling.
Mammal	*Microtus pinetorum*	Woodland vole	Specialist	Upland wooded areas with a thick layer of loose soil and humus. Spends most of time underground in shallow burrow systems.
Mammal	*Mustela frenata*	Long-tailed weasel	Generalist	Found in a wide variety of habitats, usually near water
Mammal	*Myotis lucifugus*	Little brown bat	Generalist	Uses human-made structures for resting and maternity sites; also uses caves and hollow trees. Foraging habitat requirements are generalized; usually forages in woodlands near water. In winter, a relatively constant temperature of about 40 F and 80% relative humidity is required; uses caves, tunnels, abandoned mines, and similar sites. Maternity colonies commonly are in warm sites in buildings and other structures; also infrequently in hollow trees.
Mammal	*Neovison vison*	American mink	Intermediate	Wetlands and riparian areas
Mammal	*Odocoileus virginianus*	White-tailed deer	Generalist	Various habitats from forests to fields with adjacent cover.
Mammal	*Ondatra zibethicus*	Common muskrat	Intermediate	Marsh
Mammal	*Oryzomys palustris*	Marsh rice rat	Intermediate	Marsh

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Mammal	*Peromyscus leucopus*	White-footed mouse	Generalist	Old fields, marshes, and wet meadows.
Mammal	*Procyon lotor*	Raccoon	Generalist	Various habitats; usually in moist situations, often along streams and shorelines
Mammal	*Scalopus aquaticus*	Eastern mole	Generalist	Most commonly occurs in open areas with moist soils
Mammal	*Sciurus carolinensis*	Eastern gray squirrel	Generalist	Mature tree canopy
Mammal	*Sorex cinereus*	Masked shrew	Generalist	Occupies most terrestrial habitats excluding areas with very little or no vegetation. Thick leaf litter in damp forests may represent favored habitat, although appears adaptable to major successional disturbances.
Mammal	*Sylvilagus floridanus*	Eastern cottontail	Generalist	Very adaptable
Mammal	*Tamias striatus*	Eastern chipmunk	Intermediate	Prefers deciduous woodlands with ample cover. Also found in brushlands and hedgerows.
Mammal	*Urocyon cinereoargenteus*	Gray fox	Intermediate	Forest. Usually avoids open areas.
Mammal	*Vulpes vulpes*	Red fox	Generalist	Very adaptable
Mammal	*Zapus hudsonius*	Meadow jumping mouse	Intermediate	Moist lowland habitats; prefers relatively thick vegetation of open grassy and brushy areas of marshes, meadows, swamps, and streamsides.
Bird	*Accipiter cooperii*	Cooper's hawk	Intermediate	Robbins: Intermediate or mature forest. NatureServe: Primarily mature broadleaf interior forest. Generally inhabits deep woods, utilizing thick cover both for nesting and hunting.
Bird	*Agelaius phoeniceus*	Red-winged blackbird	Intermediate	Fresh-water and brackish marshes, bushes and small trees along watercourses, and upland cultivated fields. Usually nests near water, in cattails, rushes, sedges; occasionally in shrubs or trees.
Bird	*Aix sponsa*	Wood duck	Specialist	Robbins: Wetlands or riparian areas with old trees. NatureServe: Quiet inland waters near woodland, such as wooded swamps, flooded forest, ponds, marshes, and along streams. Nests in holes in large trees in forested wetlands, and in bird boxes, usually within 0.5 km of water and near forest canopy openings, sometimes 1 km or more from water. Elms and maples are important habitat components in most areas because they provide protein-rich samaras in spring and suitable nest cavities. Shallowly flooded habitat with good understory cover is important cover for broods.
Bird	*Ammodramus savannarum*	Grasshopper sparrow	Specialist	Robbins: Short fields. NatureServe: Grasslands of intermediate height and often with clumped vegetation interspersed with patches of bare ground. Other habitat requirements include moderately deep litter and sparse coverage of woody vegetation.
Bird	*Anas crecca*	Green-winged Teal		Does not normally breed in Cecil County
Bird	*Anas discors*	Blue-winged Teal		Does not normally breed in Cecil County
Bird	*Anas platyrhynchos*	Mallard duck	Generalist	Pretty much any place with open water
Bird	*Anas rubripes*	Black duck	Intermediate	Shallow margins of lakes, streams, bays, mud flats, and open waters. Nests in both dry and wet woodlands. Wide variety of wetland habitats in both freshwater and marine situations, in and around marshes, swamps, ponds, lakes, bays, estuaries, and tidal flats. Frazer et al. (1990) recommended maintaining large (30-50 ha) marshes containing dense emergent vegetation near a complex of diverse wetland types.
Bird	*Antrostomus carolinensis*	Chuck-will's-widow	Specialist	Robbins: Nesting occurs in well-drained portions of coniferous and mixed coniferous-deciduous woodlands with little underbrush. Eggs are laid on fallen leaves. Forages over fields and clearings.
Bird	*Archilochus colubris*	Ruby-throated hummingbird	Generalist	
Bird	*Ardea herodias*	Great Blue Heron	Specialist	Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows. Nests commonly high in trees in swamps and forested areas
Bird	*Baeolophus bicolor*	Tufted Titmouse	Generalist	
Bird	*Bombycilla cedrorum*	Cedar Waxwing	Generalist	
Bird	*Branta canadensis*	Canada goose	Generalist	
Bird	*Bubo virginianus*	Great horned owl	Intermediate	Robbins: Medium to large blocks of forest with large trees and nearby fields.
Bird	*Buteo jamaicensis*	Red-tailed hawk	Generalist	

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Bird	*Buteo lineatus*	Red-shouldered hawk	Specialist	Robbins: Mature forest, esp. along streams. NatureServe: Mature forest with a well-developed high canopy, variable amounts of understory vegetation, and near streams, swamps, or other water.
Bird	*Buteo platypterus*	Broad-winged hawk	Specialist	Hess: "Requires extensive forested uplands." NatureServe: Broadleaf and mixed forest with large trees. Robbins: Large blocks of mature deciduous forest containing streams or other sources of water.
Bird	*Butorides virescens*	Green heron	Intermediate	Swamps, mangroves, marshes, and margins of ponds, rivers, lakes, and lagoons. Eggs are laid in platform nest in tree, thicket, or bush over water or sometimes in dry woodlands or orchards
Bird	*Caprimulgus vociferus*	Whip-poor-will	Intermediate	Robbins: Mature upland deciduous woods with fields nearby. NatureServe: Forest and open woodland with well spaced trees and a low canopy.
Bird	*Cardinalis cardinalis*	Northern Cardinal	Generalist	
Bird	*Cathartes aura*	Turkey vulture	Generalist	
Bird	*Catharus fuscescens*	Veery	Specialist	Extensive moist forests with mature trees and a dense shrub layer. In the Piedmont, Veeries breed most abundantly in deep wet ravines (Robbins)
Bird	*Certhia americana*	Brown Creeper	Specialist	Preferred habitat includes forest, woodlands, forested floodplains and swamps. Nests usually behind loose slab of bark still attached to living or dead tree, average of 1.5-5 m above ground. A component of dead trees is essential for nesting, so brown creepers tend to be associated with older forests.
Bird	*Chaetura pelagica*	Chimney swift	Generalist	
Bird	*Charadrius vociferus*	Killdeer	Generalist	Habitat includes various open areas such as fields, meadows, lawns, pastures, mudflats, and shores of lakes, ponds, rivers, and seacoasts. Nests are on the ground ground in open dry or gravelly situations, sometimes in similar situations on roofs, driveways, etc.
Bird	*Chordeiles minor*	Common Nighthawk	Generalist	Nests in bare open areas and gravel rooftops
Bird	*Cistothorus palustris*	Marsh wren	Specialist	Robbins: marsh. NatureServe: Freshwater and brackish marshes in cattails, tule, bulrush, and reeds. Nesting success may be greatest in marshes with relatively dense vegetation and deep water.
Bird	*Coccyzus americanus*	Yellow-billed cuckoo	Generalist	Open woodland (especially where undergrowth is thick), parks, deciduous riparian woodland. Nests in deciduous woodlands, moist thickets, orchards, overgrown pastures.
Bird	*Coccyzus erythropthalmus*	Black-billed cuckoo	Intermediate	Forest edge and open woodland, both deciduous and coniferous, with dense deciduous thickets. Nests in groves of trees, forest edges, moist thickets, overgrown pastures; in deciduous or evergreen tree or shrub. Is a low or ground nesting species.
Bird	*Colaptes auratus*	Northern flicker	Generalist	
Bird	*Colinus virginianus*	Northern Bobwhite	Intermediate	Hess: "Needs abandoned fields, thickets, and woodland margins. Sensitive to development." Robbins: Forest-field or shrub-field edges. NatureServe: Heterogeneous, patchy landscapes comprised of moderate amounts of row crops and grasslands and abundant woody edges.
Bird	*Contopus virens*	Eastern wood-pewee	Generalist	
Bird	*Coragyps atratus*	Black Vulture	Generalist	Nearly ubiquitous except in heavily forested regions; more common in lowland than in highland habitats. In Maryland/Pennsylvania, nested in areas that were roadless, forested, and undeveloped.
Bird	*Corvus brachyrhynchos*	American crow	Generalist	
Bird	*Corvus ossifragus*	Fish crow	Generalist	
Bird	*Cyanocitta cristata*	Blue jay	Generalist	
Bird	*Dendroica cerulea*	Cerulean warbler	Specialist	Large tracts of mature, semi-open deciduous interior forest, particularly in floodplains or other mesic conditions. In MD, rarely nests in forest <250 ha; in TN, not found in forest <1600 ha. TN DNR: not found within 1/4 mile of clearcut.
Bird	*Dendroica discolor*	Prairie warbler	Intermediate	Scrub-shrub or early successional forest
Bird	*Dendroica dominica*	Yellow-throated warbler	Intermediate	Robbins: Riparian forest. NatureServe: Pine forest, sycamore-bald cypress swamp, riparian woodland, floodplain forest, live oak woodland. Nests in tall trees.
Bird	*Dendroica pinus*	Pine warbler	Specialist	Highest densities in pine forest at least 40 years old
Bird	*Dolichonyx oryzivorus*	Bobolink	Intermediate	Native and tame grasslands, haylands, lightly to moderately grazed pastures, no-till cropland, small-grain fields, old fields, wet meadows, and planted cover

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Bird	*Dryocopus pileatus*	Pileated Woodpecker	Intermediate	Hess: "Requires large area of mature forest and large snags for breeding." NatureServe: Deciduous or mixed forest with a tall closed canopy and a high basal area. Most often in areas of extensive forest or minimal isolation from extensive forest. Robbins: Mature deciduous forest and woodlands
Bird	*Dumetella carolinensis*	Gray Catbird	Generalist	
Bird	*Empidonax traillii*	Willow flycatcher	Intermediate	Moist old-field habitats with willows and other shrubs or small trees (Robbins)
Bird	*Empidonax virescens*	Acadian flycatcher	Specialist	Robbins: Interior, mature riparian forest. NatureServe: Moist deciduous forests, primarily mature, with a moderate understory, generally near a stream. Requires a high dense canopy and an open understory. Tends to be scarce or absent in small forest tracts, unless the tract is near a larger forested area. Floodplain forests must be >400-500 feet wide for nesting.
Bird	*Eremophila alpestris*	Horned lark	Generalist	Flat areas with areas of exposed soil (Robbins)
Bird	*Falco sparverius*	American kestrel	Generalist	
Bird	*Geothlypis trichas*	Common Yellowthroat	Intermediate	Marshes (especially cattail), thickets near water, bogs, brushy pastures, old fields, and, locally, undergrowth of humid forest.
Bird	*Haliaeetus leucocephalus*	Bald Eagle	Intermediate	Breeding habitat most commonly includes areas close to (within 4km) coastal areas, bays, rivers, lakes, or other bodies of water. Typically roosts in larger, more accessible trees. Robbins: Wooded tidal shorelines
Bird	*Helmitheros vermivorum*	Worm-eating warbler	Specialist	Robbins: Large (>150 ha) blocks of upland deciduous forest. B&T: mature forest. NatureServe: Well-drained upland deciduous forest with understory patches of mountain laurel or other shrubs, drier portions of stream swamps with an understory of mountain laurel, deciduous woods near streams; almost always associated with hillsides. Most abundant in mature woods but also may be in young and medium-aged stands.
Bird	*Hirundo rustica*	Barn swallow	Generalist	
Bird	*Hylocichla mustelina*	Wood thrush	Intermediate	Deciduous or mixed forests with a dense tree canopy and a fairly well-developed deciduous understory, especially where moist. Bottomlands and other rich hardwood forests are prime habitats. Also frequents pine forests with a deciduous understory and well-wooded residential areas. Thickets and early successional woodland generally not suitable. Vulnerable to edge predators and cowbirds. Nest survival positively correlated with forest area, interior forest area, and % forest within 2 km.
Bird	*Icteria virens*	Yellow-breasted chat	Specialist	Early successional shrub-scrub. “Although chats will tolerate moderate amounts of grass and other herbaceous plant cover, a considerable amount of dense woody vegetation in the shrub/sapling successional stage must be present. These conditions generally develop from clear-cutting within two years, but abandoned agricultural fields often take several years to reach a shrub/young tree dominated successional stage. With either situation, the shrubland habitat created persists no longer than five-ten years. Shrubland habitats typically have a good diversity of wildlife due to the mix of grasses, herbs, small trees, and shrubs. However, once the canopy closes and the growing space becomes dominated by trees, the habitat is no longer suitable for chats. In clear-cut situations, where all the trees are of equal age, this phase occurs when the canopy reaches approximately three meters in height.” (Esley)
Bird	*Icterus galbula*	Baltimore Oriole	Generalist	
Bird	*Icterus spurius*	Orchard Oriole	Generalist	
Bird	*Ixobrychus exilis*	Least bittern	Specialist	Unimpaired marsh at least 5 contiguous ha, with 30m upland buffer
Bird	*Lophodytes cucullatus*	Hooded merganser	Intermediate	Streams, lakes, swamps, marshes, and estuaries. Nests usually in tree cavities in forested regions near water, often near fast-flowing streams, also forest ponds and lakes, flooded forest, riverside swamps.
Bird	*Megaceryle alcyon*	Belted kingfisher	Intermediate	Along water with adjacent trees
Bird	*Megascops asio*	Eastern screech owl	Generalist	
Bird	*Melanerpes erythrocephalus*	Red-headed woodpecker	Intermediate	Open woodland, especially with beech or oak, open situations with scattered trees, parks, cultivated areas and gardens.
Bird	*Meleagris gallopavo*	Wild turkey	Intermediate	NatureServe: Mature forest with clearings or fields nearby. Robbins: forest

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Bird	*Melospiza georgiana*	Swamp sparrow	Intermediate	Robbins: Marshes, or wet meadows with scattered shrubs and small trees. NatureServe: Marshes, wet brushy fields, meadows, lakeshores, stream borders, swamps, pine barrens shrub-sedge bogs; also brackish marshes along mid-Atlantic coast. Nests in tussock of grass, sedge, or in low bush, commonly over water.
Bird	*Melospiza melodia*	Song Sparrow	Generalist	
Bird	*Mimus polyglottos*	Northern Mockingbird	Generalist	
Bird	*Mniotilta varia*	Black-and-white warbler	Intermediate	Robbins: Large blocks (>300 ha) of intermediate or mature forest. NatureServe: young, medium-aged and mature deciduous and mixed forests. Forest-interior, area sensitive species
Bird	*Molothrus ater*	Brown-headed Cowbird	Generalist	
Bird	*Myiarchus crinitus*	Great crested flycatcher	Generalist	Robbins: Mature deciduous forest (although adaptable). NatureServe: Deciduous (mainly), mixed, or pine woodland or somewhat open forest, parks, orchards, wooded residential areas, areas of scattered trees in cultivated regions, clearings and edges of wooded areas, and swamps. Prefers semi-open habitats and edges.
Bird	*Nycticorax nycticorax*	Black-crowned night heron	Intermediate	Marshes, swamps, wooded streams, shores of lakes, ponds, lagoons; salt water, brackish, and freshwater situations.
Bird	*Oporornis formosus*	Kentucky warbler	Specialist	Robbins: Large blocks of mature, diverse, deciduous forest with a heavy shrub layer. NatureServe: Rich, moist deciduous forest; bottomland hardwoods and woods near streams are ideal as long as they have a dense hardwood understory. Being a ground-nester, requires well-developed ground cover, and a thick understory is essential. Occurs in stands of various ages but is most common in medium-aged forests.
Bird	*Pandion haliaetus*	Osprey	Intermediate	Primarily along rivers, lakes, reservoirs, and seacoasts. Nests in dead snags, living trees, cliffs, utility poles, wooden platforms on poles, channel buoys, chimneys, windmills, etc.; usually near or above water.
Bird	*Parula americana*	Northern parula	Specialist	Bushman and Therres (1988): mature interior forest (>100 m from edge). Robbins: Large blocks of mature floodplain or moist forest. NatureServe: Primarily a riparian species associated with epiphytic growth. Found in open deciduous, coniferous, or mixed forest, woodland, floodplain and swamp forest. Prefers mature forest but also occurs in young deciduous woods. Favors woods with a very dense understory of saplings and shrubs near slow or non-flowing water; canopy may range from poorly developed to mainly closed.
Bird	*Passerculus sandwichensis*	Savannah sparrow	Intermediate	Habitat with short to intermediate vegetation height, intermediate vegetation density, and a well developed litter layer. These preferred habitats cover a wide range of vegetation types, including coastal salt marshes, sedge bogs, grassy meadows, and native prairie.
Bird	*Passerina caerulea*	Blue Grosbeak	Generalist	
Bird	*Passerina cyanea*	Indigo Bunting	Generalist	
Bird	*Petrochelidon pyrrhonota*	Cliff swallow	Generalist	
Bird	*Phalacrocorax auritus*	Double crested cormorant	Intermediate	Lakes, ponds, rivers, lagoons, swamps, coastal bays, marine islands, and seacoasts; usually within sight of land. Nests on the ground or in trees in freshwater situations, and on coastal cliffs.
Bird	*Picoides pubescens*	Downy woodpecker	Generalist	
Bird	*Picoides villosus*	Hairy woodpecker	Specialist	Large blocks of mature deciduous forest (>7 ha). Most abundant in mature woods with large old trees suitable for cavity nesting; also common in medium-aged forests; prefers woods with a dense canopy.
Bird	*Pipilo erythrophthalmus*	Eastern Towhee	Generalist	
Bird	*Piranga olivacea*	Scarlet tanager	Specialist	Robbins: Blocks at least 10ha of mature deciduous forest (preferably oak). NatureServe: Deciduous forest and mature deciduous woodland, including deciduous and mixed swamp and floodplain forests and rich moist upland forests; prefers oak trees. Most common in areas with a relatively closed canopy, a dense understory with a high diversity of shrubs, and scanty ground cover; able to breed in relatively small patches of forest. Breeds in various forest stages but most abundant in mature woods.
Bird	*Piranga rubra*	Summer tanager	Intermediate	Robbins: Dry open pine, oak, and pine-oak woods. NatureServe: Deciduous woods (often near gaps and edges).

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Bird	*Podilymbus podiceps*	Pied-billed grebe	Specialist	Ponds or streams with open water, some aquatic vegetation, and little wave action (Robbins)
Bird	*Poecile carolinensis*	Carolina Chickadee	Generalist	
Bird	*Polioptila caerulea*	Blue-gray gnatcatcher	Intermediate	Robbins: Most common in extensive forests with a high canopy. Common victim of cowbird parasitism. NatureServe: Deciduous forest, open woodland, second growth, scrub, brushy areas, often near water.
Bird	*Progne subis*	Purple martin	Generalist	
Bird	*Protonotaria citrea*	Prothonotary warbler	Specialist	Mature swamp or floodplain forest with standing water (Robbins), at least 300m wide (Mason et al, 2003). Bushman and Therres (1988) cite a minimum area of 100 ha, preferring interior forest (>100 m from edge). NatureServe: Mature deciduous floodplain, river, and swamp forests; wet lowland forest. Primary habitats are almost always near standing water; swamps that are somewhat open with scattered dead stumps are preferred. Bottomland forests and extensive willow thickets near lakes or ponds are also quite suitable. Requires dense underbrush along streambanks. Nests in cavity, in snag or living tree, often or always near or over water, at average height of 1.5-3 m.
Bird	*Quiscalus quiscula*	Common Grackle	Generalist	
Bird	*Rallus elegans*	King rail	Specialist	NatureServe: marsh. Largest minimum area required (60 ha) of marsh-dependent birds in PA GAP habitat models (Pennsylvania GAP Analysis Project, 2000).
Bird	*Rallus limicola*	Virginia rail	Intermediate	Freshwater and occasionally brackish marshes, mostly in cattails, reeds, and deep grasses, also in or close to other emergent vegetation. Inhabits shallow, freshwater, emergent wetlands of every size and type, from roadside ditches and borders of lakes and streams to large cattail marshes. Capable of using very small marshes (e.g., 5 nests have been found in a half-acre marsh). Interspersion of open water and vegetation is an important habitat component.
Bird	*Riparia riparia*	Bank swallow	Intermediate	Robbins: River valleys with sandy banks. NatureServe: Nests in steep sand, dirt, or gravel banks, in a burrow dug near the top of the bank, along the edge of inland water or along the coast, or in gravel pits, road embankments, etc.
Bird	*Sayornis phoebe*	Eastern phoebe	Generalist	
Bird	*Scolopax minor*	American woodcock	Generalist	Young forests and abandoned farmland mixed with forested land. Generally considered an edge species. Robbins: Early successional forest with bare ground; damp woodlands
Bird	*Seiurus aurocapilla*	Ovenbird	Specialist	Hess: "Prefers mature uplands with well-developed understory." Robbins: Large blocks of tall upland forest. B&T: mature forest. NatureServe: Typically nests in mid-late successional, closed-canopied deciduous or deciduous-coniferous forests that have deep leaf litter and limited understory.
Bird	*Seiurus motacilla*	Louisiana waterthrush	Specialist	Riparian deciduous forest along natural perennial streams at least 300m wide. Bushman and Therres (1988) cite a minimum area of 100 ha, preferring interior forest (>100 m from edge). NatureServe: Moist forest, woodland, and ravines along streams; mature deciduous and mixed floodplain and swamp forests. Prefers areas with moderate to sparse undergrowth near rapid-flowing water of hill and mountain streams. Nests on the ground along stream banks, hidden in the underbrush or among the roots of fallen trees, in crevices or raised sites in tree roots, or in rock walls of ravines over water.
Bird	*Setophaga petechia*	Yellow Warbler	Generalist	
Bird	*Setophaga ruticilla*	American redstart	Intermediate	NatureServe: most abundant in mature deciduous forest, but also may occur in young woods <15 years old; requires closed canopy and prefers dense midstory and understory and well-developed undergrowth. Robbins: Large blocks of deciduous forest with an extensive understory. B&T: mature forest.
Bird	*Sialia sialis*	Eastern Bluebird	Generalist	
Bird	*Sitta carolinensis*	White-breasted nuthatch	Intermediate	Robbins: Extensive tall deciduous forest. NatureServe: Most frequent in open woodlands of mature trees (primarily oak or pine). Also in clearings, forest edges, parks, and partly open situations with scattered trees.
Bird	*Spinus tristis*	American Goldfinch	Generalist	
Bird	*Spiza americana*	Dickcissel	Intermediate	Grassland, meadows, savanna, cultivated lands, brushy fields
Bird	*Spizella passerina*	Chipping Sparrow	Generalist	

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Bird	*Spizella pusilla*	Field sparrow	Intermediate	Old fields with some woody vegetation, or adjacent shrubs
Bird	*Stelgidopteryx serripennis*	Northern rough-winged swallow	Generalist	
Bird	*Strix varia*	Barred owl	Specialist	Hess: "Nests in mature, large trees; rarely forages far from bottomland." Rubino and Hess: "Barred owls occupy bottomland hardwood forests, which we identified using land cover, soils, and wetlands data. We eliminated from consideration bottomland forest habitat within 100 m of a road and within 60 m of open vegetative cover. Patches of the remaining bottomland forest larger than 86 ha in size were considered large enough to meet all barred owl habitat needs. Simple presence/absence surveys detected barred owls in approximately 65% of patches identified by our model as suitable habitat. Robbins: Mature deciduous forest, esp. along streams
Bird	*Sturnella magna*	Eastern meadowlark	Intermediate	Robbins: Fields or pastures that are undisturbed during breeding. NatureServe: Grasslands, savanna, open fields, pastures, cultivated lands, sometimes marshes. Nests on the ground in concealment.
Bird	*Tachycineta bicolor*	Tree swallow	Generalist	Robbins: Shorelines with nearby snags. NatureServe: Open situations near water, including streams, lakes, ponds, marshes and coastal regions; savanna, pastures, etc. Nests usually near water in a natural tree cavity or abandoned woodpecker hole, less frequently in open woodland away from water. Also nests in bird boxes or in a crevice in a building.
Bird	*Thryothorus ludovicianus*	Carolina Wren	Generalist	
Bird	*Toxostoma rufum*	Brown Thrasher	Generalist	
Bird	*Troglodytes aedon*	House Wren	Generalist	
Bird	*Turdus migratorius*	American Robin	Generalist	
Bird	*Tyrannus tyrannus*	Eastern kingbird	Generalist	
Bird	*Tyto alba*	Barn owl	Intermediate	Need large grassland habitats including herbaceous wetlands for foraging and nest in cavities (which also could occur in wetlands).
Bird	*Vermivora cyanoptera*	Blue-winged warbler	Specialist	Early successional shrubby areas, such as brushy hillsides, young forest (<7m, and preferably <3m), partly open situations with saplings, bogs, woodland edge and clearings, stream edges, overgrown pastures, swamps, shrubby powerline corridors.
Bird	*Vireo flavifrons*	Yellow-throated vireo	Specialist	Robbins: Floodplain forest. B&T: mature forest. NatureServe: Primarily open deciduous forest and woodland, riparian woodland, tall floodplain forest, lowland swamp forest, and less frequently, mixed forest. Most abundant in mature woods but also occurs in medium-aged forests and some pioneer stands; requires a high, partially open canopy and prefers woods with an intermediate tree density or basal area. Relatively low tolerance to forest fragmentation, though this may depend on forest quality and proximity to other forested areas.
Bird	*Vireo gilvus*	Warbling vireo	Generalist	
Bird	*Vireo griseus*	White-eyed vireo	Intermediate	Robbins: Scrub-shrub wetlands or riparian areas. NatureServe: Inhabits early-late successional, shrubby habitats such as deciduous scrub, old fields, abandoned pastures, regenerating clearcuts or other heavily logged areas, drainage and streamside thickets, forest edges, and reclaimed strip mines.
Bird	*Vireo olivaceus*	Red-eyed vireo	Specialist	B&T: mature forest. NatureServe: Most abundant in mature deciduous forest with sapling undergrowth. In much of the range, prefers shady oak forests with a high, well-developed closed canopy and a fairly open understory with scanty ground cover. Most common in forest tracts of at least 15-20 ha but may occur in patches as small as a few hectares. Prefers closed canopy but tolerates a wide range of canopy closures. In PA, more sensitive than other area-dependent birds to increased fragmentation via forest clear-cutting.
Bird	*Wilsonia citrina*	Hooded warbler	Specialist	Robbins: Extensive mature deciduous forest with dense shrub layers, often on floodplains. NatureServe: Nests in understory of deciduous forest, especially along streams and ravine edges, and thickets in riverine forests. Most abundant in mature forest. A dense shrub layer is important. Generally favors large tracts of uninterrupted forest, but sometimes nests in forest patches as small as 5 ha, probably where these are close to larger forested areas.
Bird	*Zenaida macroura*	Mourning dove	Generalist	

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Reptile (turtle)	*N/A*	Turtles	N/A	Data from Burke and Gibbons (1995) indicated that freshwater turtles require a 275 m upland buffer zone to protect 100% of the nest and hibernation sites. Insulating 90% of the sites required a 73 m buffer zone.
Reptile (turtle)	*Chelydra serpentina*	Snapping turtle	Intermediate	Fresh water. Nests in soft soil in open area, often hundreds of meters from water. Also nests in muskrat houses.
Reptile (turtle)	*Chrysemys picta*	Painted turtle	Intermediate	Slow-moving, shallow water with soft bottom, basking sites, and aquatic vegetation: streams, marshes, ponds, lakes, creeks. May colonize seasonally flooded areas near permanent water. Hibernates in water in bottom mud. Nests in soft soil in open area up to several hundred meters from water (1-621 m, average 90 m, in Quebec; 1-164 m, average 60 m, in Michigan).
Reptile (turtle)	*Clemmys guttata*	Spotted turtle	Specialist	Mostly unpolluted, small, shallow bodies of water such as small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, and vernal pools; also occurs in brackish tidal streams. Ponds surrounded by relatively undisturbed meadow or undergrowth are most favorable. Favors waters with soft bottom and aquatic vegetation. Eggs laid in open areas up to hundreds of meters away.
Reptile (turtle)	*Glyptemys insculpta*	Wood turtle	Specialist	Perennial streams and riparian areas within 150-300m
Reptile (turtle)	*Graptemys geographica*	Map turtle	Specialist	Slow rivers and lakes with mud bottoms, basking logs, and abundant aquatic vegetation. Often in mill ponds, oxbows, and river overflow ponds.
Reptile (turtle)	*Glyptemys muhlenbergii*	Bog turtle	Specialist	Generally inhabit small, open canopy, herbaceous sedge meadows and fens, bordered by more thickly vegetated and wooded areas. Includes slow, shallow, muck-bottomed rivulets of sphagnum bogs, calcareous fens, marshy/sedge-tussock meadows, spring seeps, wet cow pastures, and shrub swamps; the habitat usually contains an abundance of sedges or mossy cover. The turtles depend on a mosaic of microhabitats for foraging, nesting, basking, hibernation, and shelter. Unfragmented riparian systems that are sufficiently dynamic to allow the natural creation of open habitat are needed to compensate for ecological succession. Beaver, deer, and cattle may be instrumental in maintaining the essential open-canopy wetlands.
Reptile (turtle)	*Kinosternon subrubrum*	Eastern mud turtle	Intermediate	Wetlands + adjacent (135m) upland
Reptile (turtle)	*Pseudemys rubriventris*	Red-bellied cooter	Intermediate	Relatively large deep bodies of water: creeks, rivers, marshes, ponds, lakes. Soft bottom and abundant aquatic vegetation preferred. Wanders on land, fall and spring. Eggs are laid in nests dug in soft soil in open areas usually within 100m of water. Often nests in tilled or disturbed soil.
Reptile (turtle)	*Sternotherus odoratus*	Eastern musk turtle/Stinkpot turtle	Intermediate	Inhabits virtually any permanent body of freshwater having a slow current and soft bottom. Eggs are laid up to about 50 m (average 7 m in Pennsylvania) from water in soil; under logs, stumps, and vegetable debris; and in walls of muskrat houses; sometimes on open ground.
Reptile (turtle)	*Terrapene carolina*	Eastern box turtle	Intermediate	Forests, fields with nearby cover, and wetlands. Eggs are laid in sandy or loamy soil in open areas. In Maryland, females extended home range from bottomlands to lay eggs in drier and warmer upland sites; moved several hundred meters from center of bottomland range.
Reptile (turtle)	*Trachemys scripta*	Red-eared slider	Intermediate	Usually in quiet water with abundant aquatic vegetation, soft bottom, and basking sites.
Reptile (snake)	*Agkistrodon contortrix*	Copperhead	Intermediate	Deciduous forest
Reptile (snake)	*Carphophis amoenus*	Eastern wormsnake	Generalist	Mesic, wooded or partially wooded areas (hardwood or pine), often along edges or ecotones
Reptile (snake)	*Coluber constrictor constrictor*	Northern black racer	Generalist	Wide range of habitats
Reptile (snake)	*Diadophis punctatus edwardsii*	Northern ring-necked snake	Intermediate	Prefers moist wooded areas, but also found in field edges or backyards
Reptile (snake)	*Elaphe obsoleta*	Black rat snake	Generalist	Habitats include hardwood forest and woodland, wooded canyons, swamps, rocky timbered upland, wooded areas of streams and rivers, farmland near woods, old fields, barnyards, and rural buildings in wooded areas. Often occurs where wooded and open habitats (such as fields or farmland) are intermixed.

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Reptile (snake)	*Heterodon platirhinos*	Eastern hog-nosed snake	Generalist	Openly wooded upland hills, forest edges, fields, woodland meadows, prairies, forest-grassland ecotones, sand plains, barrier islands, fire-managed pinelands, river valleys, riparian zones, and various other habitats with loose soils and amphibian prey.
Reptile (snake)	*Lampropeltis getula*	Eastern kingsnake	Generalist	Wide range of habitats
Reptile (snake)	*Lampropeltis triangulum*	Milksnake	Generalist	Wide range of habitats
Reptile (snake)	*Nerodia sipedon*	Northern water snake	Intermediate	Water, wetlands and riparian banks
Reptile (snake)	*Opheodrys aestivus*	Northern rough green snake	Intermediate	Dense vegetation (vines, shrubs, trees) near water; often at forest edges or in fairly open forests
Reptile (snake)	*Regina septemvittata*	Queen snake	Specialist	Occurs only where crayfish are present and fairly abundant, generally in moderate to fast-flowing streams with ample cover, wooded or open conditions, and good exposure to sun.
Reptile (snake)	*Storeria dekayi*	Dekay's brownsnake	Generalist	Wide range of habitats
Reptile (snake)	*Storeria dekayi dekayi*	Northern brownsnake	Generalist	Wide range of habitats
Reptile (snake)	*Storeria occipitomaculata*	Northern red-bellied snake	Generalist	Wide range of habitats
Reptile (snake)	*Thamnophis sauritus*	Eastern ribbon snake	Intermediate	Wet meadows, marshes, seasonally flooded prairies, bogs, ponds, lake shorelines, swamps, and shallow slow streams; also hardwood hammocks and other wet or moist forest in some areas; usually this snake is in or near vegetative cover (often shrubs or clumps of sedges or grasses) in sun-exposed sites along the edge of standing or flowing water; it climbs into low vegetation, rarely into tree canopy.
Reptile (snake)	*Thamnophis sirtalis*	Common gartersnake	Generalist	Wide range of habitats
Reptile (snake)	*Virginia valeriae*	Eastern smooth earthsnake	Generalist	Wide range of habitats
Reptile (lizard)	*Plestiodon fasciatus*	Five-lined skink	Intermediate	Forest
Reptile (lizard)	*Plestiodon laticeps*	Broad-headed skink	Intermediate	Wooded areas and woodland edges
Reptile (lizard)	*Sceloporus undulatus*	Eastern fence lizard	Generalist	In most areas these lizards are arboreal in wooded landscapes. They usually occur in open/sunny situations.
Amphibian (salamander)	*N/A*	Salamander spp.	N/A	Semlitsch and Jensen (2001) said that upland buffer zones 164m from a breeding wetland would encompass 95% of salamanders. The authors also recommended a 50m terrestrial buffer beyond this.
Amphibian (salamander)	*Ambystoma maculatum*	Spotted salamander	Specialist	vernal pools + adjacent hardwood or mixed forest (>200-250m)
Amphibian (salamander)	*Ambystoma opacum*	Marbled salamander	Intermediate	vernal pools + adjacent hardwood forest (>200-250m). More tolerant of dry habitats than are most salamanders; can be found on rocky bluffs and slopes and wooded sand dunes. Adults terrestrial; usually under surface objects or underground. Eggs laid in forest depressions such as vernal pool basins and sometimes at the edges of permanent ponds, swamps, and slow-moving streams; in areas likely to be flooded by fall rains.
Amphibian (salamander)	*Cryptobranchus alleganiensis*	Eastern Hellbender	Specialist	Rocky, clear creeks and rivers, usually where there are large shelter rocks. Usually avoids water warmer than 20 C. Males prepare nests and attend eggs beneath large flat rocks or submerged logs. Maintenance of unpolluted, free-flowing rivers with a rocky substrate is the primary management need. Buffer zones around streams should be maintained.
Amphibian (salamander)	*Desmognathus fuscus*	Dusky salamander	Intermediate	forested floodplains

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Amphibian (salamander)	*Eurycea bislineata*	Northern two-lined salamander	Intermediate	Rocky brooks, springs, seepages; may disperse into wooded terrestrial habitats in wet warm weather
Amphibian (salamander)	*Eurycea longicauda*	Long-tailed salamander	Specialist	Streamsides, spring runs, cave mouths, abandoned mines; also ponds in northern New Jersey. May disperse into wooded terrestrial habitats in wet weather.
Amphibian (salamander)	*Hemidactylium scutatum*	Four-toed salamander	Intermediate	forested or scrub-shrub wetlands
Amphibian (salamander)	*Notophthalmus viridescens*	Eastern newt	Intermediate	Ponds, swamps, and quiet stream pools with adjacent forest
Amphibian (salamander)	*Plethodon cinereus*	Eastern red-backed salamander	Specialist	Riparian forest
Amphibian (salamander)	*Plethodon glutinosus*	Slimy salamander	Intermediate	Wooded slopes, ravines, floodplains, shalebanks, and cave entrances; most often in hardwood forest, sometimes in pinelands.
Amphibian (salamander)	*Pseudotriton ruber*	Northern Red Salamander	Specialist	Cold, clear, rocky streams and springs in wooded or open areas. Adults occur in or near water in leaf litter and under rocks, and in crevices and burrows near water. Adults sometimes disperse into woods. Eggs are attached to underside of rocks in water. Larvae occur in still pools.
Amphibian (frog)	*Acris crepitans*	Northern cricket frog	Intermediate	marsh and pond edges
Amphibian (frog)	*Anaxyrus americanus*	American toad	Generalist	Wide variety of habitats
Amphibian (frog)	*Anaxyrus fowleri*	Fowler's toad	Generalist	Wooded areas, river valleys, and floodplains, including agricultural and residential areas, usually in areas with deep friable soils, up to at least several hundred meters from breeding sites.
Amphibian (frog)	*Hyla chrysoscelis*	Cope's gray treefrog	Intermediate	wetlands or other water + adjacent forest (few hundred meters)
Amphibian (frog)	*Hyla cinerea*	Green treefrog	Intermediate	Wetlands
Amphibian (frog)	*Hyla versicolor*	Gray treefrog	Intermediate	Forest with wetlands, vernal pools, or other standing water
Amphibian (frog)	*Pseudacris crucifer*	Spring peeper	Intermediate	Forest with wetlands, vernal pools, or other standing water
Amphibian (frog)	*Pseudacris kalmi*	New Jersey chorus frog	Intermediate	Various moist habitats, including grassy floodplains and wet woodlands containing shallow wetlands (ephemeral pools, ditches, wooded swamps, freshwater marshes) in which breeding occurs.
Amphibian (frog)	*Rana catesbeiana*	American bullfrog	Generalist	still, permanent water
Amphibian (frog)	*Rana clamitans*	Green frog	Generalist	permanent or temporary water
Amphibian (frog)	*Rana palustris*	Pickerel frog	Intermediate	Wetlands and riparian areas
Amphibian (frog)	*Rana sylvatica*	Wood frog	Specialist	Forest with wetlands, vernal pools, or other standing water
Amphibian (frog)	*Rana utricularia*	Southern leopard frog	Intermediate	Vicinity of virtually any freshwater habitat; also slightly brackish marshes. In summer disperses from water into moist vegetation.
Amphibian (frog)	*Scaphiopus holbrookii*	Eastern spadefoot toad	Generalist	Areas of sandy, gravelly, or soft, light soils in wooded or unwooded terrain. Burrows underground when inactive. Eggs and larvae develop in temporary pools formed by heavy rains.
Fish	*Alosa aestivalis*	Blueback herring	Intermediate	Spawning occurs in fresh or brackish water, in tidally influenced portions of coastal rivers. Larvae occur in or slightly downstream from spawning areas; juveniles may exhibit net upstream movement until emigration from freshwater in summer or fall (or, in some areas, the next spring).

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Fish	*Alosa pseudoharengus*	Alewife	Intermediate	Spawn in quiet portions of rivers or streams. Larvae occur in or slightly downstream from spawning areas; juveniles may exhibit net upstream movement until leaving nursery areas in summer or fall (or, in some areas, in spring of the next year).
Fish	*Alosa sapidissima*	American shad	Intermediate	dults occur in marine waters except during the breeding season. Larvae summer in rivers, enter sea by fall; return to fresh water when mature. Premigratory juveniles appear to be habitat generalists, whereas earlier life stages and spawning adults are more selective.
Fish	*Ambloplites rupestris*	Rock Bass	Intermediate	Pools and brushy margins in creeks and small to medium rivers
Fish	*Ameiurus catus*	White Catfish	Intermediate	Sluggish lower reaches of coastal streams, sloughs, warmwater lakes, reservoirs, farm ponds, and tidal freshwater estuaries
Fish	*Ameiurus natalis*	Yellow bullhead	Generalist	Shallow, soft-bottomed, weedy parts of clear warm lakes, ponds, reservoirs, or slow-moving streams or canals. It is more tolerant of pollution than are most other ictalurids.
Fish	*Ameiurus nebulosus*	Brown bullhead	Generalist	Ponds, lakes, sluggish creeks and small to large rivers, sloughs, backwaters, and reservoirs.
Fish	*Anchoa mitchilli*	Bay anchovy	Intermediate	Lower freshwater and estuarine reaches of coastal rivers, bays, sounds, and high salinity nearshore marine waters; usually it occurs in shallow waters, at depths of less than 20 meters.
Fish	*Anguilla rostrata*	American Eel	Generalist	
Fish	*Carpiodes cyprinus*	Quillback	Intermediate	Pools, backwaters, and main channels of clear to turbid waters of creeks, small to large rivers, and lakes. It spawns over sand and mud bottoms in quiet waters of streams or overflow areas in bends of rivers or bays of lakes.
Fish	*Campostoma anomalum*	Central Stoneroller	Intermediate	Headwater creeks and small to medium rivers with cool clear water, moderate or sometimes rapid current, and gravel or rubble bottoms; it commonly occurs in pools with current, riffles of small rocky streams; also in medium to large rivers, and sometimes in slow-moving, turbid water
Fish	*Catostomus commersonii*	White Sucker	Generalist	Wide variety of lake and stream habitats.
Fish	*Clinostomus funduloides*	Rosyside Dace	Intermediate	Small to medium streams with clear to turbid water and moderate current, and rocky flowing pools of headwaters, creeks, and small rivers; this fish is most common in small clear streams.
Fish	*Cottus caeruleomentum*	Blue Ridge Sculpin	Specialist	Rocky riffles of headwaters and creeks, and springs. Habitat on the coastal plain is limited to cold, spring-fed streams.
Fish	*Cyprinella analostana*	Satinfin Shiner	Specialist	Rocky and sandy runs (less often pools) of creeks and small to medium rivers, usually near riffles
Fish	*Cyprinella spiloptera*	Spotfin Shiner	Intermediate	Moderate to large streams and rivers of low to high turbidity, with bottom of sand, gravel, mud or rubble
Fish	*Erimyzon oblongus*	Creek Chubsucker	Intermediate	Small rivers and creeks of various types; seldom in impoundments
Fish	*Dorosoma cepedianum*	Gizzard shad	Intermediate	Medium to large rivers, reservoirs, lakes, swamps, bays, sloughs, and similar quiet open waters, from clear to very silty; this is an open water species; it often ascends creeks and small rivers that have well-developed pools; it commonly enters brackish water. Juveniles occur in quiet surface waters, adults in deeper water or near bottom. Spawning occurs in shallow water usually over sandy/rocky substrates; eggs are scattered, adhere to objects. This fish may ascend smaller streams or ditches to spawn.
Fish	*Enneacanthus gloriosus*	Bluespotted sunfish	Intermediate	Common over sand or mud in pools and backwaters of heavily vegetated sluggish creeks and medium-sized rivers, and similar situations in ponds, lakes, and small impoundments.
Fish	*Enneacanthus obesus*	Banded sunfish	Specialist	Occurs over sand or mud in sluggish, acidic, heavily vegetated waters, including ponds, pools and backwaters of creeks, small to large rivers, and boggy brooks
Fish	*Esox americanus*	Redfin pickerel	Intermediate	Small, quiet, heavily vegetated waters: pools and backwaters of streams, canals, ponds, and bays of small lakes; this fish more often occurs in streams than in lakes.
Fish	*Esox niger*	Chain pickerel	Intermediate	Vegetated lakes, swamps, and backwaters and quiet pools of creeks and small to medium rivers.
Fish	*Etheostoma olmstedi*	Tessellated Darter	Intermediate	Sand- and mud-bottomed pools, slow runs, and backwaters of headwaters, creeks, and small to large rivers.
Fish	*Exoglossum maxillingua*	Cutlip Minnow	Intermediate	Clear creeks and small to medium rivers with gravel, rubble, and boulder bottom relatively free of rooted plants; usually under or near boulders in quiet pools and runs

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Fish	*Fundulus diaphanus*	Banded Killifish	Intermediate	Habitat includes quiet waters of lakes, ponds, and sluggish streams, usually over sand, gravel, or detritus-covered bottom where there are patches of submerged aquatic plants.
Fish	*Fundulus heteroclitus*	Mummichog	Specialist	Salt marsh flats, estuaries, and tidal creeks, especially where there is abundant submergent and emergent vegetation.
Fish	*Gambusia holbrooki*	Eastern mosquitofish	Generalist	Often in shallow, often stagnant, ponds and shallow edges of lakes and streams where predatory fishes are largely absent and temperatures are high. It also can be found in brackish sloughs and coastal saltwater habitats.
Fish	*Hybognathus regius*	Eastern Silvery Minnow	Intermediate	Quiet weedy inshore waters of lakes, and pools and backwaters of low gradient creeks and small to large rivers
Fish	*Hypentelium nigricans*	Northern Hogsucker	Specialist	Rocky riffles, runs, and pools of clear creeks and small rivers; occasionally large rivers and impoundments
Fish	*Lampetra aepyptera*	Least brook lamprey	Specialist	Clean, clear gravel riffles and runs of creeks and small rivers; larvae burrow in bottom of quiet water.
Fish	*Leiostomus xanthurus*	Spot	Intermediate	Shallow coastal waters and estuaries, prefers mud or sand bottoms. Juveniles especially abundant in estuaries throughout year, return to more saline waters as they grow older. Adults tend to move offshore for winter. Reported to occur in freshwater as far as 23 miles upstream from brackish water.
Fish	*Lepomis auritus*	Redbreast Sunfish	Intermediate	Rocky and sandy pools and margins of creeks and small to medium rivers, including tidal freshwater areas; also rocky and vegetated lake margins.
Fish	*Lepomis cyanellus*	Green Sunfish	Intermediate	Sluggish warm streams, ponds, and shallow weedy margins of lakes. Usually in vicinity of weed beds. Tolerates both clear and turbid water.
Fish	*Lepomis gibbosus*	Pumpkinseed	Intermediate	Lakes, reservoirs, ponds, sloughs, and sluggish streams; prefers quiet, clear water with aquatic vegetation and some organic debris.
Fish	*Lepomis macrochirus*	Bluegill	Generalist	Warm shallow lakes, reservoirs, ponds, swamps, sloughs, and slow-flowing rivers and streams. Bluegill often are associated with rooted aquatic plants and with bottoms of silt, sand, or gravel.
Fish	*Luxilus cornutus*	Common Shiner	Intermediate	Creeks and small to medium rivers with clear cool weedless water, moderate to swift current, gravel to rubble bottom, and alternating pools and riffles (usually avoids riffles). Also lakes and reservoirs.
Fish	*Menidia beryllina*	Inland Silverside	Generalist	Coastal and freshwater habitats.
Fish	*Micropterus dolomieu*	Smallmouth Bass	Intermediate	Large clear lakes and clear midorder streams with many large pools, abundant cover (rocks, shelves, logs, etc.), and cool summer temperatures.
Fish	*Morone americana*	White Perch	Intermediate	Occurs predominately in brackish water and generally close to shore in saltwater. It is common in quiet water, usually over mud, far up medium to large rivers in fresh water.
Fish	*Morone saxatilis*	Striped Bass	Intermediate	Marine and estuarine coastal species that moves far upstream in channels of medium to large rivers during spawning migrations.
Fish	*Moxostoma macrolepidotum*	Shorthead Redhorse	Intermediate	Rocky pools, runs, and riffles of small to large rivers, natural lakes, and impoundments. Spawns usually over gravel in runs and riffles
Fish	*Nocomis micropogon*	River Chub	Specialist	Swift current and flowing pools of small to medium rivers with high to moderate gradient, usually clear warm water, and gravel to boulder bottoms.
Fish	*Notemigonus crysoleucas*	Golden Shiner	Intermediate	Usually occupies clean, quiet, vegetated water with access to extensive shallows. It is generally common to abundant in ponds and lakes, and often inhabits sluggish sections of streams and rivers. It spawns over beds of submerged vegetation
Fish	*Notropis hudsonius*	Spottail Shiner	Intermediate	Large sluggish coastal rivers and brackish water to small clear rapidly flowing montane streams.
Fish	*Notropis procne*	Swallowtail Shiner	Generalist	Warm, moderate to low gradient, clear to often turbid, creeks and small to large rivers; usually occupies pools and slow runs with sand, gravel, or rock bottom
Fish	*Notropis rubellus*	Rosyface Shiner	Specialist	Typically in clear, swift, large creeks and small rivers with bottoms of clean gravel or rubble; usually in or around riffles
Fish	*Noturus gyrinus*	Tadpole madtom	Intermediate	Typically in quiet or slow-moving waters, especially over soft muddy bottom with extensive vegetation; lakes, reservoirs, sloughs, swamps, backwaters, lowland creeks and small to large rivers. Usually in fairly clear water.

Species type	Scientific Name	Common Name	Landscape Specificity	Habitat (unless general)
Fish	*Noturus insignis*	Margined madtom	Specialist	Chiefly in clearwater streams of moderate current; usually about riffles of gravel and rubble. Also rocky riffles and runs of clear, fast creeks and small to medium rivers.
Fish	*Perca flavescens*	Yellow Perch	Intermediate	Usually in clear weedy backwaters or pools of creeks and small to large rivers, shallow waters of lakes, and large ponds. They occur and spawn in brackish water in some areas.
Fish	*Percina bimaculata*	Chesapeake Logperch	Intermediate	Common logperch: Small creeks to rivers, lakes, and reservoirs. Prefers clean riffles and runs over mixed sand and gravel.
Fish	*Percina caprodes*	Logperch	Intermediate	Small creeks to rivers, lakes, and reservoirs. Prefers clean riffles and runs over mixed sand and gravel.
Fish	*Percina peltata*	Shield Darter	Specialist	Moderate gradient riffles and runs of creeks and small to medium rivers. Most common over fine gravel on downstream side of rubble riffles. Sometimes aggregates in summer and fall in beds of aquatic plants. In same habitat all year. Eggs are buried in gravel.
Fish	*Petromyzon marinus*	Sea lamprey	Intermediate	Adults migrate from the ocean or lake to spawning streams
Fish	*Pimephales notatus*	Bluntnose Minnow	Generalist	Lakes, ponds, rivers, and creeks in a variety of habitats. Most common in clear rocky streams.
Fish	*Rhinichthys atratulus*	Eastern Blacknose Dace	Intermediate	Typically in cool, gravelly or rocky headwaters, creeks, and small rivers of high to moderate gradient; generally found in pools and slower runs. Often rests on bottom under or beside stones. Under banks in deepest water in winter. Spawns over gravel in fast water of shallow riffles.
Fish	*Rhinichthys cataractae*	Longnose Dace	Intermediate	Clean, swiftly flowing, gravel or bouldery creeks and small to medium rivers; also in inshore waters of lakes over gravel or boulder bottoms. May move offshore to deeper water in summer in warm lakes.
Fish	*Sander vitreus*	Walleye	Intermediate	Lakes; pools, backwaters, and runs of medium to large rivers; generally in moderately deep waters.
Fish	*Semotilus atromaculatus*	Creek Chub	Intermediate	Clear headwaters, creeks, and small rivers; prefers streams less than 12 m wide and with gravel-sand-silt substrate; occasionally in shallows of small clear lakes. Spawns in small gravelly streams in smooth water near a riffle, or over littoral areas of gravel in lakes.
Fish	*Semotilus corporalis*	Fallfish	Specialist	Clear, flowing, gravel- to rubble-bottomed small to medium rivers; lake margins. Young occur in more rapid water upstream but large adults seem to seek large pools and expanded regions of the lower reaches.
Fish	*Umbra pygmaea*	Eastern Mudminnow	Intermediate	Quiet, mud-bottomed, often heavily vegetated streams, sloughs, swamps, and ponds, particularly along margins, over sand, mud, and debris.

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Core area focal species

Core area type	Landscape feature	Focal species (may not overlap exactly) or criteria	Optimal habitat	Size	GIS delineation
aquatic	Nontidal streams	Pollution-sensitive fish and invertebrates	Stream reaches with "Good" combined (fish + benthic macroinvertebrate) IBI scores (>4), which can indicate good water quality and stream habitat.		Stream reaches with (a) "Good" combined (fish + benthic macroinvertebrate) MBSS IBI scores, or (b) MDE Tier II designation; plus associated 500 year floodplain
aquatic	Coldwater streams	Brown trout (non-native), coldwater benthic macroinvertebrates (Tallaperla spp. and Sweltsa spp.)	Cold water natural streams with good water quality		Stream reaches containing reproducing brown trout or coldwater benthic macroinvertebrates, plus associated 500 year floodplain
aquatic	Rivers with rare species	Yellow lampmussel	Larger streams and rivers with a moderate-to-fast stream flow, especially in riffles. Negatively affected by eutrophication and siltation.		Stronghold watersheds (Bohemia River)
aquatic	Chesapeake logperch locations	Chesapeake logperch	Found in Susquehanna River and some of the flats and tributaries		Chesapeake logperch locations
aquatic	Tidal streams and rivers	Anadromous fish, Mummichog, native submerged grasses	High Priority Blue Infrastructure		Stream reaches in High Priority Blue Infrastructure catchments, plus associated 500 year floodplain
aquatic	Offshore water	Striped bass, native submerged grasses	High Priority Blue Infrastructure		Open water in High Priority Blue Infrastructure catchments, plus associated shoreline
aquatic	Streams and rivers connected to ocean	Anadromous fish	Natural streams and rivers with stable hydrology and geomorphology, riffles and pools, minimal pollution, high D.O., low sedimentation, unimpounded, unchannelized, riparian forest on both banks, and connected to ocean.	<500 km from ocean, without dams or other barriers	Streams supporting anadromous fish, plus associated 500 year floodplain
forest	Mature broadleaf forest	Forest interior breeding birds	Presence of 100+ yr old trees, a variety of ages and sizes of trees, a mix of native species dominated by oak in the canopy (25% oak), presence of herbaceous and shrub layers in patches/variability, presence of standing dead trees/snags, downed logs and woody debris, thick leaf litter/organic matter in duff, and occasional canopy gaps due to tree fall.	>100 ha of interior forest (>100 m from edges), preferably >700 meters maximum depth, and preferably >80% forest cover within 2 km of centroid.	Forest blocks with >100 ha of interior forest (>100 m from edges)
forest	Mature broadleaf forest	Cooper's hawk, Red-shouldered hawk, Broad-winged hawk, Pileated Woodpecker, Worm-eating warbler, Wood thrush, Black-and-white warbler, Kentucky warbler, Hairy woodpecker, Scarlet tanager, Ovenbird, American redstart, Yellow-throated vireo, Red-eyed vireo	Mature broadleaf interior forest, preferably containing streams or other surface water, with large trees, a tall closed canopy, a mix of native hardwood species (including oaks), structural complexity (including some areas with thick subcanopies, some with thick shrub layers, and some with thick herbaceous layers), presence of snags, downed logs and woody debris, deep leaf litter, and occasional canopy gaps due to tree falls.	>100-300 ha (the larger, the better), with most >100m from edge. Blocks >4000 ha are optimal for all spp.	Forest blocks containing nests of these indicator birds
forest	Mature broadleaf forest	Cerulean warbler	Large tracts of mature, semi-open deciduous interior forest, particularly in floodplains or other mesic conditions.	>4000 ha, with most >400m from edge	Forest blocks containing Cerulean warbler nests

Core area type	Landscape feature	Focal species (may not overlap exactly) or criteria	Optimal habitat	Size	GIS delineation
forest	Riparian forest	Stream salamanders	Streams (perennial or intermittent) with good water quality and riparian hardwood forest.	At least 93m of forest on each side of stream (salamanders)	Riparian forest at least 93 m from stream reaches with (a) "Good" combined (fish + benthic macroinvertebrate) MBSS IBI scores, or (b) MDE Tier II designation (see aquatic cores)
forest	Riparian forest	Acadian flycatcher	Large tracts of mature riparian deciduous forest, with a high dense canopy and a relatively open understory.	>30-120 ha, and >150m wide	Riparian deciduous forest >30 ha, and >150m wide
forest	Riparian forest	Louisiana waterthrush	Riparian deciduous forest along natural perennial streams at least 300m wide.	>100 ha of interior forest (>100 m from edges)	Forest blocks containing Louisiana waterthrush nests
forest	Riparian forest	Hooded warbler	Large tracts of mature deciduous forest with a dense shrub layer, and containing streams.	>30-600 ha of forest, mostly interior (>100 m from edges)	Forest blocks containing Hooded warbler nests
forest	Riparian forest	Wood turtle	Riparian forest along natural perennial streams	2km of streams with 150-300m of natural buffer	Forest blocks containing Wood turtles
forest	Pine forest	Pine warbler	Pine forest at least 40 years old	>=30 ha	Forest blocks containing Pine warbler nests
forest	Young deciduous forest	Whip-poor-will	Young to mid-aged deciduous forest with fields nearby	>120-400 ha (pref. 64,000 ha)	Forest blocks containing Whip-poor-will nests
forest	Scrub-shrub	Blue-winged warbler, Prairie warbler	Scrub-shrub or early successional forest (preferably <3m tall)	10-15 ha	Forest blocks containing Blue-winged warbler or Prairie warbler nests
forest	Natural forest (in general)	Natural forest communities	Large enough and far enough from edges, roads, and trails to provide resistance against invasive plants.	>400m from forest edges or trails and >1 km from developed land.	Forest blocks with interior area(s) >400m from forest edges or trails and >1 km from developed land
wetland	Wetlands of special concern		Wetlands of special state concern	N/A	Wetlands of special state concern plus min. 100 ft buffer
wetland	Forested wetland	Northern parula, Prothonotary warbler, Barred owl	Large blocks of mature bottomland hardwood forest (floodplains or swamps) containing standing water, and usually with streams	>100 ha of interior forest (>100 m from edges)	Forest blocks containing Northern parula, Prothonotary warbler, or Barred owl nests
wetland	Forested wetland	Wood duck	Large blocks of mature bottomland hardwood forest (floodplains or swamps) and adjacent open water	>200 ha	Forest blocks containing productive wood duck nests
wetland	Vernal pools	mole salamanders, wood frog	Unpolluted ephemeral pools (vernal pools) with at least 215m of surrounding forest.	>=215m of surrounding forest	Forest blocks containing vernal pools at least 215 m from the nearest edge
wetland	Fens and sedge meadows	Bog turtle	Unpolluted herbaceous sedge meadows and fens, usually spring-fed, bordered by more thickly vegetated and wooded areas. Includes slow, shallow, muck-bottomed rivulets of sphagnum bogs, calcareous fens, marshy/sedge-tussock meadows, spring seeps, wet cow pastures, and shrub swamps; the habitat usually contains an abundance of sedges or mossy cover.	>0.2 ha on natural or agricultural land	Bog turtle locations and catchments

Core area type	Landscape feature	Focal species (may not overlap exactly) or criteria	Optimal habitat	Size	GIS delineation
wetland	Marsh	Least bittern, King rail, Marsh wren, Marsh rice rat, Muskrat	Unimpaired freshwater or brackish marshes with tall emergent vegetation.	>5 ha, with 30m upland buffer	Marsh blocks >5 ha, with 30m upland buffer
wetland	Open water with turtle nesting areas nearby	Freshwater turtles	Unpolluted wetlands, ponds, and other bodies of open water, with open nesting areas with sandy or loamy soil within 100m. The nesting sites should not be subject to frequent disturbance.	>=100m buffer (preferably >=275m)	Turtle nesting sites and nearby water bodies and intervening land
grassland	Open fields and meadows	Grasshopper sparrow, Eastern meadowlark	Grasslands of intermediate height and often with clumped vegetation interspersed with patches of bare ground. Other habitat requirements include moderately deep litter and sparse coverage of woody vegetation. Undisturbed during breeding.	>=30 ha	Grassland patches containing Grasshopper sparrow or Eastern meadowlark nests
grassland	Old fields	Breeding grassland bird diversity	Old fields with some woody vegetation, or adjacent shrubs	>=30 ha	Grassy patches not mowed between spring and fall, and >=30 ha

Hub focal species

Landscape feature	Focal species	Habitat	Hub size (ha)
Forest hubs	Gray fox	Forest. Usually avoids open areas.	hundreds
Riparian forest hubs	River otter	Open water (e.g., perennial streams, ponds) with riparian forest	hundreds
Riparian forest hubs	Beaver	Riparian forest (2nd - 4th order streams or ponds)	>125
Forest hubs with nearby fields	Bobcat	Primarily large tracts of non-flooded forest, including edges. Requires relatively low levels of human activity.	hundreds
Forest hubs with nearby fields	Wild turkey	Mature forest with clearings or fields nearby	hundreds
Forest hubs with nearby fields	Great horned owl	Medium to large blocks of forest with large trees and nearby fields	hundreds
Wetland hubs with nearby fields	Barn owl	Need large grassland or wet meadow areas for foraging and nest in tree cavities (which also could occur in wetlands).	hundreds
Aquatic hubs	Pollution-sensitive fish and invertebrates	Catchments containing core aquatic areas	

Connectivity focal species

Core areas	Focal species	Best linkages	Search radius (km)
All core forest	Forest mammals, wild turkey, five-lined skink	Forest cover with interior habitat	10
Riparian forest and wetlands	River otter, mink, beaver, turtles, semi-aquatic snakes, salamanders, frogs	Wide riparian forest and wetlands preferred. Other wetlands and forest are generally better than open areas.	5
Wetlands (forested wetlands or vernal pools)	Salamanders, frogs, turtles	Moist woods with vernal pools, wetlands, and unpolluted streams	5
Wetlands (marsh)	Muskrat, marsh rice rat, meadow jumping mouse	Marsh, waterways	3
Wetlands (herbaceous fens, bogs, and sedge meadows)	Bog turtle	Clean streams in sedge meadows, fens, bogs, etc.	3
Streams and rivers	Fish and mussels	Unblocked perennial streams with unpolluted water	10
Meadows	Meadow butterflies	Old fields, pasture, or powerline corridors	10

Note: For all target species, urban areas and major roads (except under bridges) were considered barriers. Some species like turtles may avoid steep slopes (e.g., ravine sides). Linkages should pass through hubs and protected land where possible; hubs because they represent larger, more intact natural areas, and protected land to ease corridor implementation