

Memorandum

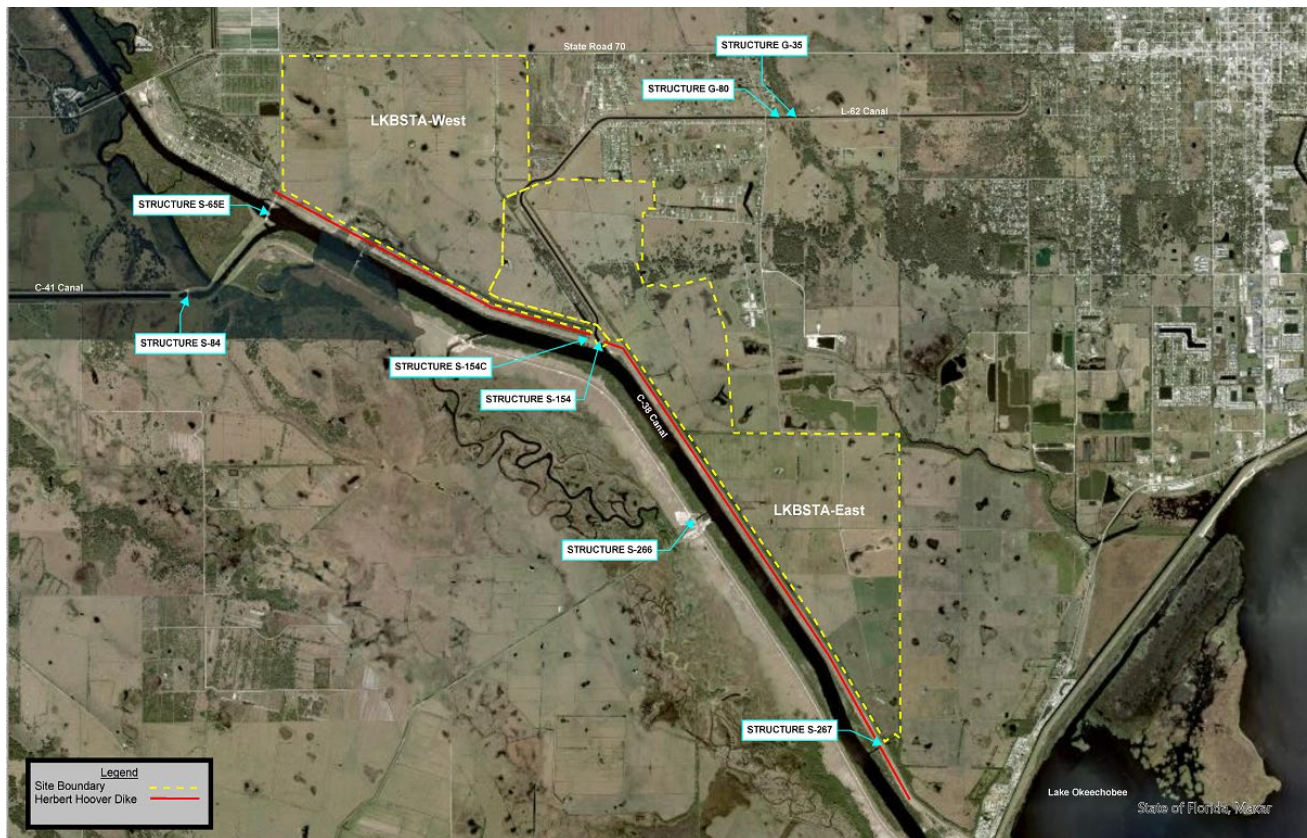
DATE: October 30, 2023

TO: Jeremy McBryan, PE, CFM, ENV SP – Ecosystem Investment Partners

FROM: Julie Sullivan, FAA Qualified Wildlife Biologist
 Brendon Quinton, FAA Qualified Wildlife Biologist

PROJECT: Wildlife Hazard Review – Proposed Lower Kissimmee Basin Stormwater Treatment Area

ESA was retained to provide an independent review of a proposed project identified as the Lower Kissimmee Basin Stormwater Treatment Area (LKBSTA) in Okeechobee County. The project includes the development of a regional STA which entails creation of several interconnected herbaceous freshwater wetlands designed to reduce nutrients, specifically phosphorus, from stormwater runoff and help achieve the State of Florida’s Total Phosphorus Total Maximum Daily Load for Lake Okeechobee. It is understood that the proposed project will be constructed in two phases with the western phase (LKBSTA-W) being constructed first.



LKBSTA Proposed Development Area



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Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5200-33C *Hazardous Wildlife Attractants on or near Airports* provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. There is one public-use airport (Okeechobee County Airport - OBE) located in the vicinity of the proposed project, and comments from Okeechobee County led to the applicant's request for this independent review.

OBE is a general aviation facility located approximately 4.5 miles from the proposed project site. As a facility serving piston-powered aircraft, this is within the recommended separation distance (5 miles) for specified land uses. ESA reviewed the proposed STA in the context of the existing landscape and the relevant FAA guidance (ACs, manuals, publications and other guidance). Further, a review of the likely species use of the proposed facility and the hazardous ranking and status of those species (or guilds) is included in this memorandum.

Existing Conditions:

In addition to thorough review of online information and site-specific studies, on Wednesday, October 18, 2023, one of ESA's FAA qualified wildlife biologists conducted a site visit of the proposed project and surrounding areas. The purpose of the site visit was to review the proposed project site and to also review similarly situated existing STA(s) to identify existing conditions and to gauge potential wildlife usage and changes expected to occur with the development of the proposed project.

LKBSTA Site and Vicinity:

The proposed STA site is primarily improved pasture with evidence of cattle use. A thorough review of the existing land cover classifications and wildlife observations was completed by Common Ground Ecology and detailed in the *Lower Kissimmee Basin Stormwater Treatment Area – West Listed Species Assessment* (June 2023). This study identified ~195 acres of wetlands within the proposed project area and documented the occurrence of listed wildlife and their habitats within the site. While that study focused on listed species, additional studies of similar projects led to the development of a list of likely avian species that would be expected in the STA. In addition to the wading birds, cranes, bald eagles, Audubon's Crested Caracara and other species documented in the Listed Species Assessment, common species utilizing the existing land cover include vultures, cattle egrets, and raptors. Vultures are a species of concern for aircraft because they take advantage of rising columns of warm air (thermals) soaring high in the sky searching for food. This hunting technique puts vultures at higher altitudes for longer durations than other birds and therefore more likely to have interactions with aircraft.



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The proposed project is adjacent (and will be hydraulically connected to) the Kissimmee River. The Kissimmee River, which was ditched in the 1960's as a flood control project, has been subject to extensive habitat restoration since 1999. This has led to the recovery of hundreds of species and the river and its floodplain provide forage, nesting (including rookeries) and full life cycle habitat for hundreds of avian species. Additionally, the proposed project is in the vicinity of Lake Okeechobee, which is also less than 5 miles from OBE.

During the site visit, the FAA Qualified Biologist confirmed the land cover and existing conditions documented in prior studies and observed the following wildlife in the proposed project footprint: Eastern Meadowlark, greater yellowlegs, great egret, American kestrel, Eastern phoebe, white ibis, anhinga, sandhill crane, pied-billed grebe, red tailed hawk, great blue heron, and others.

Review of Existing STAs

In addition to the existing natural features, it was noted that there are existing (previously developed) STAs in the vicinity of OBE. The Taylor Creek STA is located approximately 2 miles northeast of OBE in the departure/approach of the main runway (5-23). The Lakeside Ranch STA is located on the eastern side of Lake Okeechobee, more than 12 miles from OBE, but it is located directly off the approach / departure of a private airstrip (Flying Cow Air Ranch – FD39) which has a single turf runway. While private use airports are not subject to the FAA AC for Hazardous Wildlife, Lakeside Ranch STA was reviewed because it provided a good comparison for the wildlife species likely to utilize the LKBSTA.

The Lakeside Ranch STA has been constructed in two phases which allowed the qualified biologist to observe similar wildlife activity to that likely anticipated at the proposed LKBSTA. The first phase of the existing Lakeside Ranch STA was heavily vegetated with dense cattails with drivable embankments between them. It is understood that this is the expected cover (dense cattail) for the STAs in the Lake Okeechobee watershed due to high nutrient content in the source water. While the dense vegetation provided a limited view in many areas, the biologist listened for and noted avian vocalizations coming from the vegetation. Wildlife activity was low in this area and consisted of observations of red-shouldered hawk, osprey, cattle egret, anhinga, and wading birds. It was noted this habitat cover took approximately two years to achieve.

The newer phase of Lakeside Ranch STA showed the greatest potential for wildlife activity. Vegetation was patchy and thin, although several areas had been planted to expedite vegetation coverage in those areas. The open water in the lightly vegetated areas appeared to attract species including glossy ibis, cormorant, with wading birds the most prevalent. While waterfowl were not observed, the open water areas could be an attractant for that guild.



FAA Qualified Biologist Review

In addition to the site reviews and analysis of previously collected data, the ESA FAA Qualified Biologists reviewed existing strike data and compared that with the expected avian species / families at the proposed STA and the observations during the field review. The review of the FAA strike data¹ for OBE for a 10-year period (10-27-2013 to 10-27-2023) identified a total of six (6) strike reports with annual operations of ~50,000. This included 4 “unknown birds” (small to medium), one vulture and one crow. While it is not possible to determine whether the “unknown birds” would occur at the proposed STA, neither of the other species would be more likely to occur than in the site’s existing condition. Several of the “top 10” from the list of species hazardous to aircraft (Table 1 – AC 150/5200-32B – **Exhibit 1**)² currently occur at the proposed project location.

Wildlife is attracted to a variety of different features and the extent of the wildlife hazard risk for an individual airport depends on many factors including number and type of operations, local and migratory wildlife populations, and habitat conditions. OBE averages ~50,000 operations per year, of which the majority (~45,000) are general aviation (GA) aircraft. According to a letter from the FAA’s Orlando Airports District Office (ADO) dated September 27, 2023, OBE completed wildlife surveys in one month (September) in 2016 and identified ~2,900 observations of 27 different avian species. ESA’s biologists have not reviewed that data and it is not clear whether those observations represent ~2,900 birds or repeat observations, but it was reported in this FAA letter that 71% of the observations were wading birds. While the FAA establishes separation criteria as a guideline for perimeters within which hazardous wildlife attractants should be avoided off airport, it is acknowledged that the majority of wildlife strikes occur within the immediate airport environment (74% of all strikes occur at or below 500 feet above ground level (AGL)³). It is not known if OBE has a current Wildlife Hazard Management Plan (WHMP) nor what measures OBE is using to address the wildlife hazard concern on airport property, but management for the hazardous species on airport should be the primary focus for risk management related to wildlife.

Based on our understanding of the proposed STA design and field review of existing similarly situated STAs, the site will be heavily vegetated with emergent wetland vegetation, primarily cattails once it is fully established.

¹ FAA Strike Database (<https://wildlife.faa.gov/search>) accessed 10/27/2023

² AC No. 150/5200-32B - Reporting Wildlife Aircraft Strikes (2013)

³ Wildlife Hazard Management at Airports – A Manual for Airport Personnel (Cleary and Dolbeer, July 2005)



Lakeside Ranch STA (ESA photo 10-18-2023)

Based on this and a knowledge of the habitat and life cycle needs of regional wildlife, a summary table of the avian species likely to utilize the developed STA site was compiled by Common Ground Ecology Inc. (**Exhibit 2**). It is likely that the mature STA will restrict use by some of the more hazardous species as identified in AC 150/5200-32B including cattle egrets and white ibis which the FAA letter (September 27, 2023) identifies were considered the most hazardous species at OBE at the time of the 2016 OBE survey(s) due to their large flock size. The species most likely to utilize the STA once it is fully established include rails, gallinules and their allies, woodcock and snipe, bitterns and green heron. Species including limpkin, cranes, and black- and yellow-crowned herons either utilize thick vegetation for hunting or are widely variable in their habitat use and may occur at this proposed STA.

Conclusions:

The existing condition at the proposed STA site is improved pasture with intermittent wetlands. A large number of avian species on the list of most hazardous species to aircraft currently utilize the site including turkey vulture, sandhill crane, bald eagle, wading birds and cattle egret. Based on thorough review of the proposed design, similar STAs, understanding of anticipated wildlife use, and the distance from OBE (~4.5 miles), it is the conclusion of the FAA Qualified Biologists that the mature STA, if vegetated as designed, does not represent a significantly greater wildlife hazard to aircraft at OBE than the existing condition.



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While the habitat of the mature STA is not likely to create a greater risk to aviation than the existing condition, it is acknowledged that it may take up to ~2 years for the STA vegetation to fully establish. It should be acknowledged that the interim phase (between construction and habitat maturity) may attract a greater diversity of wildlife than the mature STA system. Therefore, it is the recommendation of the FAA Qualified Biologists that wildlife monitoring should be conducted during and after construction and continue until the STA vegetation has fully established. If monitoring indicates that wildlife activity deviates from expectations, mitigative actions such as additional plantings to accelerate vegetative coverage of the STA or wildlife deterrent activities may be employed to reduce attractiveness.

Table 1. Composite ranking (1 = most hazardous, 50 = least hazardous) and relative hazard score of 50 wildlife species with at least 100 reported strikes with civil aircraft based on three criteria (damage, major damage, and effect-on-flight). Data were derived from the FAA National Wildlife Strike Database.

Wildlife species	% of strikes with:			Mean hazard level ⁴	Composite ranking	Relative hazard score ⁵
	Damage ¹	Major damage ²	Effect on flight ³			
White-tailed deer	84	36	46	55	1	100
Snow goose	77	41	39	53	2	95
Turkey vulture	51	19	35	35	3	63
Canada goose	50	17	28	31	4	57
Sandhill crane	41	13	27	27	5	48
Bald eagle	41	12	28	27	6	48
D.-crested cormorant	34	15	24	24	7	44
Mallard	23	9	13	15	8	27
Osprey	22	7	15	15	9	26
Great blue heron	21	6	16	15	10	26
American coot	24	7	11	14	11	25
Coyote	9	2	21	11	12	19
Red-tailed hawk	15	5	11	10	13	19
Cattle egret	10	3	15	9	14	17
Great horned owl	15	3	6	8	15	14
Herring gull	10	5	9	8	16	14
Rock pigeon	10	4	10	8	17	14
Ring-billed gull	8	3	8	6	18	11
American crow	8	3	8	6	18	11
Peregrine falcon	8	2	5	5	20	9
Laughing gull	5	2	7	5	21	8
American robin	7	1	4	4	22	7
Snow bunting	1	1	9	4	23	7
Red fox	3	0	8	4	23	7
European starling	4	1	5	3	25	6
Amer. golden-plover	4	2	4	3	26	6
Barn owl	4	2	3	3	27	5
Upland sandpiper	4	1	4	3	27	5
Purple martin	5	1	2	3	29	5

Wildlife species	% of strikes with:			Mean hazard level ⁴	Composite ranking	Relative hazard score ⁵
	Damage ¹	Major damage ²	Effect on flight ³			
Mourning dove	3	1	4	3	30	5
Red-winged blackbird	3	0	5	3	31	5
Woodchuck	2	0	4	2	32	4
Northern harrier	2	1	2	2	33	3
Chimney swift	2	0	2	1	34	2
Killdeer	1	0	2	1	35	2
House sparrow	2	0	1	1	35	2
Blk-tailed jackrabbit	1	1	1	1	37	2
American kestrel	1	<1	2	1	38	2
Eastern meadowlark	1	<1	2	1	38	2
S.-tailed flycatcher	0	0	2	1	40	1
Horned lark	1	<1	1	1	41	1
Pacific golden-plover	1	0	1	1	41	1
Barn swallow	1	0	1	1	43	1
Savannah sparrow	1	0	<1	1	43	1
Common nighthawk	1	0	1	1	45	1
Tree swallow	0	0	1	<1	46	1
Burrowing owl	1	0	0	<1	46	1
Western kingbird	0	0	1	<1	48	0
Virginia opossum	1	0	0	<1	48	0
Striped skunk	0	0	0	0	50	0

¹ Aircraft incurred at least some damage (destroyed, substantial, minor, or unknown) from strike.

² Aircraft incurred damage or structural failure, which adversely affected the structure strength, performance, or flight characteristics, and which would normally require major repair or replacement of the affected component, or the damage sustained made it inadvisable to restore aircraft to airworthy condition.

³ Aborted takeoff, engine shutdown, precautionary landing, or other negative effect on flight.

⁴ Based on the mean value for percent of strikes with damage, major damage (substantial damage or destroyed), and negative effect-on-flight.

⁵ Mean hazard level (see footnote 4) was scaled down from 100, with 100 as the score for the species with the maximum mean hazard level and thus the greatest potential hazard to aircraft.

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

This list was compiled using data from eBird (a vetted, citizen-science-based online database). Two reference sites in or near Okeechobee County were used: Lakeside Ranch STA and Taylor Creek STA. This list is not a complete list of expected species but includes the species that are most likely to occur based on the detections at the other nearby STAs. Further, some species listed may not occur at LKB STA-W.

Waterbirds with Potential for Occurrence in Okeechobee County				
<i>Waterbirds are listed and grouped based on avian family; general notes associated with each group are provided. Each species has been assigned to one of three categories: Open Water, Dense Cover or Both.</i>				
<i>Family (and description)</i>	<i>Species</i>	<i>Open-water</i>	<i>Dense-cover</i>	<i>Both</i>
Waterfowl - tend to prefer open water, with some exceptions like tree nesting species that tend to be somewhat secretive, especially in breeding season	Black-bellied Whistling-Duck	x		
	Fulvous Whistling-Duck	x		
	Graylag Goose	x		
	Canada Goose	x		
	Mute Swan	x		
	Egyptian Goose	x		
	Muscovy Duck	x		
	Wood Duck			x
	Blue-winged Teal	x		
	Northern Shoveler	x		
	Gadwall	x		
	American Wigeon	x		
	Mallard	x		
	Mottled Duck	x		
	Mallard x Mottled Duck (hybrid)	x		
	Northern Pintail	x		
	Green-winged Teal	x		
	Ring-necked Duck	x		
	Lesser Scaup	x		
	Bufflehead	x		
Hooded Merganser	x			
Ruddy Duck	x			
Grebes - duck like birds that prefer open water with some vegetative cover	Pied-billed Grebe	x		
	Horned Grebe	x		
Rails, Gallinules, and Allies - Secretive Marsh Birds that are typically associated with dense cover	King Rail		x	
	Virginia Rail		x	
	Sora		x	
	Common Gallinule		x	
	American Coot		x	
	Purple Gallinule		x	

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

	Gray-headed Swamphen		x	
Limpkin - need vegetative cover but also open spaces to visually hunt for apple snails	Limpkin			x
Cranes - need vegetative cover for nesting in/near wetlands, prefer open grasslands & pastures when not nesting	Sandhill Crane			x
Shorebirds - Typically associated with open mudflats, very shallow water, and/or wetland edges; some are very secretive and prefer short herbaceous vegetative cover	Black-necked Stilt	x		
	American Avocet	x		
	Killdeer	x		
	Stilt Sandpiper	x		
	Sanderling	x		
	Dunlin	x		
	Least Sandpiper	x		
	White-rumped Sandpiper	x		
	Pectoral Sandpiper	x		
	Semipalmated Sandpiper	x		
	Western Sandpiper	x		
	Short-billed Dowitcher	x		
	Long-billed Dowitcher	x		
	Short-billed/Long-billed Dowitcher	x		
	American Woodcock		x	
	Wilson's Snipe		x	
	Spotted Sandpiper	x		
	Solitary Sandpiper	x		
	Greater Yellowlegs	x		
	Lesser Yellowlegs	x		
Greater/Lesser Yellowlegs	x			
Willet	x			
Gulls, Terns, and Skimmers - open water foragers	Bonaparte's Gull	x		
	Laughing Gull	x		
	Ring-billed Gull	x		
	Herring Gull	x		
	Least Tern	x		
	Gull-billed Tern	x		
	Caspia Tern	x		
	Forster's Tern	x		
	Royal Tern	x		
	Black Skimmer	x		

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

Storks - associated with a variety of wetlands, mostly open with some herbaceous vegetation	Wood Stork	x		
Cormorants and Anhingas - need open water for successful foraging	Anhinga	x		
	Double-crested Cormorant	x		
Pelicans - need open water for successful foraging	American White Pelican	x		
	Brown Pelican	x		
Hérons, Ibis, and Allies - many wading birds prefer short herbaceous vegetative cover at varying depths of water, will use open water if shallow enough; there are a few that prefer dense cover	American Bittern		x	
	Least Bittern		x	
	Great Blue Heron	x		
	Great Egret	x		
	Snowy Egret	x		
	Little Blue Heron	x		
	Tricolored Heron	x		
	Cattle Egret	x		
	Green Heron		x	
	Black-crowned Night-Heron			x
	Yellow-crowned Night-Heron			x
	White Ibis	x		
	Glossy Ibis	x		
	Roseate Spoonbill	x		
Kingfishers - need open water for successful foraging	Belted Kingfisher	x		

Other Avian Species with Potential for Occurrence in Okeechobee County

These species are not considered waterbirds, but some can be associated with wetlands where indicated. Where noted, the species may be associated with open water, dense cover, or with the edges of STA's where there are larger shrubs, trees, or powerlines

Family	Species	Comments
Grouse, Quail, and Allies	Helmeted Guineafowl	
	Northern Bobwhite	
	Wild Turkey	
	Ring-necked Pheasant	
Pigeons and Doves	Rock Pigeon	
	Eurasian Collared-Dove	
	Common Ground Dove	
	White-winged Dove	
	Mourning Dove	
Swifts	Chimney Swift	

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

<i>Hummingbirds</i>	Ruby-throated Hummingbird	
<i>Vultures, Hawks, and Allies</i>	Black Vulture	
	Turkey Vulture	
	Swallow-tailed Kite	
	Sharp-shinned Hawk	
	Cooper's Hawk	
	Red-shouldered Hawk	
	Short-tailed Hawk	
	Red-tailed Hawk	
	Osprey	utilize open water for fishing
	Snail Kite	utilize open vegetated areas to visually hunt for apple snails
	Northern Harrier	hunts for small birds in a variety of vegetation
	Bald Eagle	utilize open water for fishing and hunting waterfowl
	<i>Owls</i>	Great Horned Owl
Barred Owl		
<i>Woodpeckers</i>	Yellow-bellied Sapsucker	
	Red-headed Woodpecker	
	Red-bellied Woodpecker	
	Downy Woodpecker	
	Pileated Woodpecker	
	Northern Flicker	
<i>Falcons and Caracaras</i>	Crested Caracara	
	American Kestrel	
	Merlin	
	Peregrine Falcon	likelihood of presence in the winter months hunting waterfowl in open water areas
<i>Parrots, Parakeets, and Allies</i>	Monk Parakeet	
<i>Tyrant Flycatchers: Pewees, Kingbirds, and Allies</i>	Eastern Wood-Pewee	associated with open areas/water for foraging on flying insects
	Least Flycatcher	associated with open areas/water for foraging on flying insects
	Eastern Phoebe	associated with open areas/water for foraging on flying insects
	Ash-throated Flycatcher	associated with open areas/water for foraging on flying insects
	Great Crested Flycatcher	associated with open areas/water for foraging on flying insects
	Western Kingbird	associated with open areas/water for foraging on flying insects

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

	Eastern Kingbird	associated with open areas/water for foraging on flying insects
	Gray Kingbird	associated with open areas/water for foraging on flying insects
<i>Vireos</i>	White-eyed Vireo	associated with forested wetlands with medium to dense cover
	Blue-headed Vireo	associated with forested wetlands with medium to dense cover
	Red-eyed Vireo	associated with forested wetlands with medium to dense cover
<i>Shrikes</i>	Loggerhead Shrike	
<i>Jays, Magpies, Crows, and Ravens</i>	Blue Jay	
	American Crow	
	Fish Crow	
<i>Tits, Chickadees, and Titmice</i>	Tufted Titmouse	
<i>Martins and Swallows</i>	Northern Rough-winged Swallow	associated with open water for foraging on flying insects
	Purple Martin	associated with open water for foraging on flying insects
	Tree Swallow	associated with open water for foraging on flying insects
	Bank Swallow	associated with open water for foraging on flying insects
	Barn Swallow	associated with open water for foraging on flying insects
<i>Kinglets</i>	Ruby-crowned Kinglet	
<i>Gnatcatchers</i>	Blue-gray Gnatcatcher	
<i>Wrens</i>	House Wren	
	Sedge Wren	associated with wetlands with dense cover like cattail
	Marsh Wren	associated with wetlands with dense cover like cattail
	Carolina Wren	
<i>Starlings and Mynas</i>	European Starling	
<i>Catbirds, Mockingbirds, and Thrashers</i>	Gray Catbird	
	Brown Thrasher	
	Northern Mockingbird	
<i>Thrushes</i>	Eastern Bluebird	
	American Robin	
<i>Waxwings</i>	Cedar Waxwing	
<i>Old World Sparrows</i>	House Sparrow	
<i>Wagtails and Pipits</i>	American Pipit	
<i>Finches, Euphonias, and Allies</i>	American Goldfinch	

Exhibit 2 –Avian Species with Potential for Utilization of Proposed LKBSTA

<i>New World Sparrows</i>	Bachman's Sparrow	
	Grasshopper Sparrow	
	Lark Sparrow	
	Chipping Sparrow	
	Vesper Sparrow	
	White-crowned Sparrow	
	Savannah Sparrow	
	Song Sparrow	
	Lincoln's Sparrow	
	Swamp Sparrow	
	Eastern Towhee	
<i>Blackbirds</i>	Bobolink	
	Eastern Meadowlark	
	Baltimore Oriole	
	Red-winged Blackbird	associated with wetlands with dense cover like cattail
	Brown-headed Cowbird	
	Common Grackle	associated with wetlands with dense cover like cattail
	Boat-tailed Grackle	associated with wetlands with dense cover like cattail
<i>Wood-Warblers</i>	Ovenbird	
	Northern Waterthrush	
	Black-and-white Warbler	
	Orange-crowned Warbler	
	Common Yellowthroat	
	American Redstart	
	Northern Parula	
	Yellow Warbler	
	Black-throated Blue Warbler	
	Palm Warbler	
	Pine Warbler	
	Yellow-rumped Warbler	
	Yellow-throated Warbler	
	Prairie Warbler	
	Black-throated Green Warbler	
<i>Cardinals, Grosbeaks, and Allies</i>	Summer Tanager	
	Northern Cardinal	
	Blue Grosbeak	
	Indigo Bunting	
	Painted Bunting	