Federal Aviation Administration

Final Environmental Assessment for Wing Aviation, LLC Proposed Drone Package Delivery Operations in Houston, Texas

August 2026

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Washington, D.C.

Notice of Availability of the Final Environmental Assessment for Wing Aviation, LLC, Proposed Package Delivery Operations in Houston, Texas

The Federal Aviation Administration (FAA) provides notice that the Final Environmental Assessment (EA), prepared pursuant to the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321–4355), to assess Wing Aviation, LLC (Wing), proposed commercial drone delivery service in the Houston metropolitan area is available.

Wing is seeking to amend its air carrier Operations Specifications (OpSpecs) and other FAA approvals necessary to expand commercial drone package delivery operations in the Houston metro area. The FAA's approval of the amended OpSpecs is considered a major federal action under NEPA and requires a NEPA review. The Final EA has been prepared pursuant to NEPA, FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures*, Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303), Section 7 of the Endangered Species Act (16 U.S.C. § 1531 et seq.), and Section 106 of the National Historic Preservation Act (16 U.S.C. § 470).

The Final EA is available for online review at
https://www.faa.gov/uas/advanced_operations/nepa_and_drones

This Final EA becomes a federal document when evaluated, signed, and dated by the Responsible FAA official.

Declaration Related to Page Limits: The FAA has considered the factors mandated by NEPA, and the EA represents the FAA's good-faith effort to prioritize documentation of the most important considerations required by the statute within the congressionally mandated page limits. This prioritization reflects the FAA's expert judgment, and any considerations addressed briefly or left unaddressed, were, in the FAA's judgment, comparatively not of a substantive nature that meaningfully informed the consideration of environmental effects and the resulting decision on how to proceed.

Declaration Related to Deadline: The EA represents the FAA's good-faith effort to fulfill NEPA's requirements within the Congressional timeline and is substantially complete. In the FAA's expert opinion, the FAA has thoroughly considered the factors mandated by NEPA. In the FAA's judgment, the analysis contained herein is adequate to inform and reasonably explain the FAA's final decision regarding the proposed federal action.

Privacy Notice: Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Responsible FAA Official:

DEREK W HUFTY

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Date: 2026.08.14 10:28:34 -04'00'

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Acronyms and Abbreviations

AGL	above ground level
APE	Area of Potential Effects
CAA	Clean Air Act
CFR	Code of Federal Regulations
dB	decibel
dBA	A-weighted decibel
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
metro	metropolitan
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMHCs	non-methane hydrocarbons
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OpSpecs	Operations Specifications
PM	particulate matter
RMP	risk management plan
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
U.S.C.	United States Code
UA	unmanned aircraft
UAS	Unmanned Aircraft System
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
Wing	Wing Aviation, LLC

Chapter 1
Purpose and Need

1.1 Introduction

Wing Aviation, LLC (Wing), a subsidiary of Alphabet Inc., holds a Federal Aviation Administration (FAA) standard air carrier certificate under 14 Code of Federal Regulations (CFR) Part 135 (Part 135),[1] which allows holders to conduct on-demand cargo delivery operations, and a 49 United States Code (U.S.C.) Section 44807 exemption,[2] which allows Wing to carry the property of another for compensation or hire beyond visual line of sight using its Hummingbird Unmanned Aircraft System (UAS). Wing's Part 135 certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in its Operations Specifications (OpSpecs).[3,4] Wing is seeking to amend its OpSpecs and other FAA approvals necessary to conduct unmanned aircraft (UA, also referred to as a drone) commercial package delivery operations in the Houston metropolitan (metro) area (see Figure 2.2-1).

The FAA's approval of the amended OpSpecs is considered a major federal action under the National Environmental Policy Act (NEPA)[5] and requires NEPA review. Wing prepared this Environmental Assessment (EA) under the supervision of the FAA[6] to evaluate the potential environmental impacts that might result from the FAA's proposed action.

Wing is proposing to conduct UA retail package delivery operations, establishing up to 75 sites in the Houston metro area using Wing's Hummingbird 7000W-B and 8000-A UAS. Wing's intent is to offer service throughout the Houston metro area from a network of nests[7] (see Figure 2.2-4), where each would serve a specific area, thereby avoiding an over-concentration of flights surrounding any given nest. Each nest houses up to 24 aircraft and has a delivery range of approximately 6 miles. Wing proposes a total commercial maximum of 75 nest locations in Houston. Wing's nests would be located in commercial areas, such as shopping centers, large individual retailers, and shopping malls. Wing projects operating a maximum of 400 delivery flights per operating day from each site, with operations initially occurring between 7:00 a.m. and 7:00 p.m. and then extending to 7:00 a.m. to 10:00 p.m. In

[1] https://www.faa.gov/uas/advanced_operations/package_delivery_drone.

[2] 49 U.S.C. § 44807 provides the Secretary of Transportation with authority to determine whether a certificate of waiver, certificate of authorization, or a certificate under 49 U.S.C. §§ 44703 or 44704 is required for the operation of certain UAS.

[3] An Operations Specifications is a document that defines the scope of aircraft operations that the FAA has authorized.

[4] This is different than a concept of operations, or ConOps, which is generally a description of how a set of capabilities may be employed to achieve desired objectives.

[5] 42 U.S.C. § 4321 et seq.

[6] See 42 U.S.C. § 4336a(f) (authorizing agencies to prescribe procedures to allow a project sponsor to prepare Environmental Assessments under the supervision of the agency).

[7] A ground-based service area where UA are assigned and where flights originate and return.

addition, operations would include low altitude (<8 ft) in-nest checkout flights (referred to as FitBITs) between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m.

Under NEPA, federal agencies are required to consider the environmental effects of proposed federal actions and to disclose to decision-makers and the interested public a clear and accurate description of the potential environmental impacts of proposed major federal actions. Additionally, under NEPA, federal agencies are required to consider the environmental effects of a proposed action, the reasonable alternatives to the proposed action, and a no action alternative (assessing the potential environmental effects of not implementing the proposed action). The FAA has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures* (FAA 2025). The FAA also utilizes Department of Transportation (DOT) Order 5610.1D, *Procedures for Considering Environmental Impacts* (DOT 2025), to comply with NEPA.

1.2 FAA Role and Federal Action

In general, Congress has charged the FAA with the safety of air commerce in the United States and to encourage the development of civil aeronautics. The FAA provides multiple approvals associated with package delivery proposals, such as a waiver of 14 CFR § 91.113(b) to enable beyond visual line of sight operations, and a Certificate of Waiver or Authorization; however, the FAA's issuance of an OpSpecs (or amended OpSpecs) to include package delivery flights in a specified operating area is the approval that ultimately enables UA operations.

The FAA has specific statutory and regulatory obligations related to its issuance of a Part 135 certificate and the related OpSpecs.[8] The FAA is required to issue an operating certificate to an air carrier when it "finds, after investigation, that the person properly and adequately is equipped and able to operate safely under this part and regulations and standards prescribed under this part."[9] An operating certificate also specifies "terms necessary to ensure safety in air transportation; and (2)…the places to and from which, and the airways of the United States over which, a person may operate as an air carrier."[10] Also included in air carrier certificates is a stipulation that the air carrier's operations must be conducted in accordance with the provisions and limitations specified in the OpSpecs.[11] The regulations also specify that a Part 135 certificate holder may not operate in a geographical area unless its OpSpecs specifically authorizes the certificate holder to operate in that area.[12] The regulations implementing 49 U.S.C. Section 44705 specify that an air carrier's approved OpSpecs must include, among other things, "authorization and limitations for routes and areas of

[8] See, e.g., 49 U.S.C. §§ 44705, 44709; 14 CFR parts 119, 135.

[9] 49 U.S.C. § 44705.

[10] Id.

[11] 14 CFR §§ 119.5(g)(l).

[12] 14 CFR § 119.5(j).

operations."[13] An air carrier's OpSpecs may be amended at the request of an operator if the FAA "determines that safety in air commerce and the public interest allows the amendment."[14] After making this determination, the FAA must take an action on the OpSpecs amendment.[15]

1.3 Purpose and Need

The federal action subject to review under NEPA is the FAA's decision whether to approve a modification to Wing's OpSpecs under 14 CFR Part 135. The modification would authorize Wing to expand its commercial package delivery operations using UA operations in the Houston metro area.

The purpose of the proposed FAA action is to enable the agency to carry out its statutory responsibilities to ensure the safety and efficiency of the National Airspace System, while considering potential environmental effects consistent with NEPA and FAA Order 1050.1G. Consistent with Order 1050.1G §2.2, when the FAA is acting on an application for authorization, the purpose and need for the federal action is informed both by FAA's statutory mission and the applicant's goals.

The need for the proposed action arises from Wing's application for expanded operating authority to extend its current commercial UA delivery service to the Houston metro area. Wing, in its business judgment, has determined that the Houston region is an appropriate market for expansion. Wing's proposal is to begin full-scale commercial UA delivery operations in this region utilizing its Hummingbird 7000W-B and 8000-A flight platforms. Site locations would be selected based on a combination of business case considerations, operational feasibility, installation feasibility, and proximity to other sites within Wing's existing network. Without FAA approval of the requested OpSpecs modification, Wing would be unable to implement this expansion of its delivery service.

1.4 Public Involvement

The FAA created a Notice of Availability (NOA) with information about the Draft EA and provided it to local, state, and federal officials, interest groups, and federally recognized tribes. The NOA and a complete NOA distribution list can be found in Appendix H, Table H-1. The NOA provided information about the proposed action and requested public review and comments on the Draft EA, which was available on the FAA's website[16] for a 30-day comment period from May 4 to June 3, 2026. Interested parties were invited to submit comments on any environmental concerns related to the proposed action. The FAA did not receive any comments.

[13] 14 CFR § 119.49(a)(6).

[14] 14 CFR § 119.51(a); see also 49 U.S.C. § 44709.

[15] 14 CFR § 119.51(c).

[16] See: https://www.faa.gov/uas/advanced_operations/nepa_and_drones.

Chapter 2
Proposed Action and Alternatives

FAA Order 1050.1G, Paragraph 1.5 (a) (ii) states that an EA will briefly discuss "the proposed action and alternatives to the extent required by NEPA § 102(2)(H), 42 U.S.C. § 4332(2)(H)" which requires all federal agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The FAA has not identified any unresolved conflicts concerning alternative uses of available resources associated with Wing's proposal. Therefore, this EA only considers the proposed action and the no action alternative.

2.1 No Action Alternative

DOT Order 5610.1D, Paragraph 10(b)(3) requires the FAA to consider a no action alternative in their NEPA reviews to compare the environmental effects of not taking action with the effects of the action alternative(s). The no action alternative serves as a baseline to compare the impacts of the proposed action. Under the no action alternative, Wing would not implement commercial UA package delivery operations in Houston and would continue to conduct package delivery operations in other locations under Part 135 in locations currently authorized by its OpSpecs. Consumers in the areas not served by UA would be expected to continue to use ground transportation to retrieve small goods, assuming that there are viable alternative transportation methods. The no action alternative does not fulfill the stated purpose and need.

2.2 Proposed Action

The proposed action is the expansion of Wing's current area of operations for UA commercial delivery service to include the Houston metro area. Wing's proposed Houston operating area boundaries are shown in Figure 2.2-1. Under the proposed action, Wing would establish up to 75 nests in the Houston metro area. The exact timing and pace of nest installation is dependent on market conditions. If, in the future, Wing wanted to exceed 75 nests in the operating area, additional NEPA reviews would be required. Operations, including nest placement and all UA delivery flights, would be confined to the operating areas depicted in Figure 2.2-1.[17]

Nests would be distributed throughout the Houston metro area following a measured rollout plan to be developed with Wing's partners and continuing best practices from Wing's established community outreach program, and in compliance with state and local statutory and regulatory requirements. Wing's nests would be located in established parking lots of commercially zoned areas whose use is consistent with local zoning and land use requirements, such as shopping centers, large individual retailers, and shopping malls.

[17] Modification of Wing's operations plan requires approval in accordance with 14 CFR Part 135.

Remote pickup infrastructure consisting of an autoloader (Figure 2.2.6) would be installed within existing or proposed nests or at offsite locations (i.e., partner locations offering Wing delivery services) and would also be located within commercial areas. Individual autoloader locations (either within a nest or offsite) would typically include up to three autoloaders within or in the vicinity of most nest sites, with a handful more distributed locations having up to 10 autoloaders, depending on market demand, for a total installation of 100–300 autoloaders distributed throughout the operating area. The autoloaders would consist of Y-shaped passive stands designed for automated pick up of packages without landing. Autoloaders would not require ground disturbance for installation and would be anchored through existing pavement, to existing poles, or ballasted for temporary use. The autoloaders would be controlled and operated by Wing and its partners, and would be approximately 10 feet tall, 7 feet wide at the mouth, and 6 feet long, and would include a clear zone of approximately 2 parking spaces. Remote pickups are described further in Section 2.2.2.6, *Remote Pickup Operations*.

To avoid the potential for significant noise impacts, Wing would site its nests and autoloaders at least 120 feet away from a noise-sensitive area[18] when the nest and autoloader is located within the controlled surface area of Class B, Class C, and Class D airspace[19] and at least 65 feet away from a noise-sensitive area in all other areas within the study area, which is defined as Wing's proposed nest locations and service area (see Figure 2.2-1). Offsite package autoload and pickup flight paths would not occur within 80 feet of noise-sensitive areas when the autoloader is located within the controlled surface area of Class B, Class C, and Class D airspace and 45 feet away from noise-sensitive areas in all other areas within the study area.

Each nest would serve an area within a 6-mile radius for package delivery. Offsite Package Autoloads would serve an area within a 1-mile radius of the nest location due to flight energy constraints. Initially, Wing expects to fly considerably less than 400 deliveries per day from each nest and then gradually increase to 400 deliveries per day as consumer demand rises. Even in the locations where the service areas of nests overlap, deliveries would not exceed 400 per day. Proposed delivery and GeoBIT operations would occur from approximately 7:00 a.m. to 10:00 p.m., 7 days of the week, including holidays. Operating hours would also include in-nest checkout flights between 6:00 a.m. and 7:00 a.m.

[18] A *noise-sensitive area* is an area where noise interferes with normal activities associated with its use. Normally, noise-sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife and waterfowl refuges, and cultural and historical sites. (FAA Order 1050.1G, Appendix C-1)

[19] Class B airspace is generally airspace from the surface to 10,000 feet mean sea level surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. Class C airspace is generally airspace from the surface to 4,000 feet above the mean sea level surrounding those airports that have an operational control tower, are serviced by a radar approach control, and have a certain number of operations or passenger enplanements. Class D airspace is generally airspace from the surface to 2,500 feet above the airport elevation (charted in mean sea level) surrounding those airports that have an operational control tower. For more information. See: https://www.faa.gov/regulationspolicies/handbooksmanuals/aviation/phak/chapter-15-airspace.

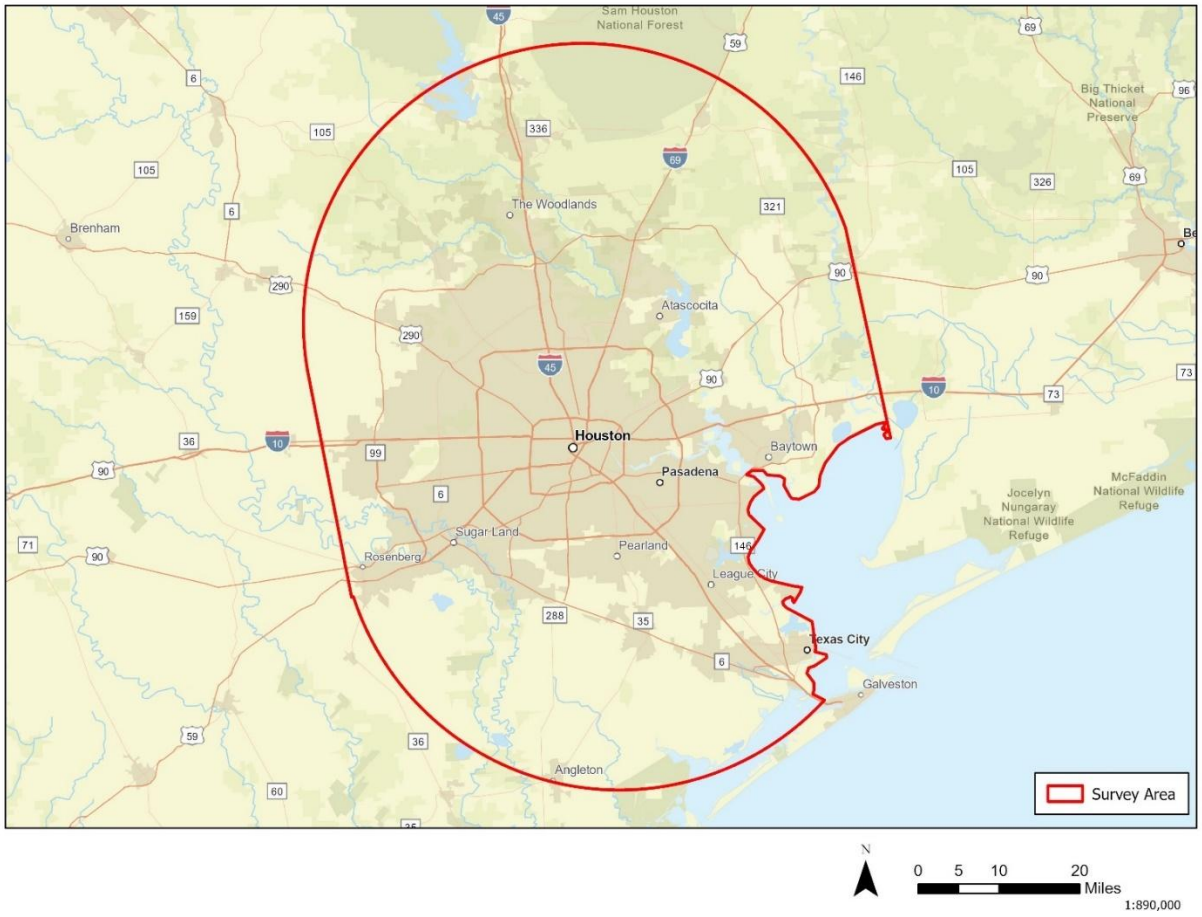


Figure 2.2-1. Wing's Proposed Houston Operating Area

Each nest would contain up to two dozen (24) aircraft on launch pads, and one or more merchants may be partnering with Wing at each nest for drone deliveries. The estimated total distance flown for deliveries would vary depending upon the pickup and drop-off locations in the operating area. At least 50 percent of delivery flights would consist of transport of a package from the nest to a customer delivery address before returning to the nest. There would be variability in the number of flights per day based on customer demand and weather conditions.

Wing would also conduct remote pickup and delivery flights in which the drone would transit from the nest to an offsite location, pick up a package, then deliver the package to the customer before returning back to the nest. Autoloaders would be installed within existing or proposed nests or at offsite locations and would enable drone package delivery for Wing's commercial partners that are not located in the immediate vicinity of a nest. Remote pickup is expected to be complementary to typical package delivery operations and is anticipated to make up less than 50 percent of total operations. However, based on demand, some dedicated remote pickup nests would also be established in the vicinity of 4 to 12 partner sites located in areas adequately isolated from sensitive noise receptors.

The UA would be transporting consumer goods in partnership with merchants in the communities they already serve and would provide an alternative to in-store pickup. Deliveries would be conducted at the time of the customer's choosing and directly to the customer's home in the operating area.

Wing's flight planning software can automatically avoid identified schools (elementary, middle, and high school), preschools, or daycares with outdoor facilities based on the type of resource, time of day, and other factors.[20] Wing has confirmed to the FAA that it will generally not conduct operations over these "*fly less*"[21] areas during the scope of operations covered by this proposed action, including remote pickups, unless there is a specific purpose for Wing to enter one of these areas in coordination with the respective resource authority. Remote pickups would generally involve continuous commercial areas and corridors without noise-sensitive receptors. In addition, Wing's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location; with the diversification of flight paths, the frequency of overflights would inversely scale as the distance from a nest increases.

2.2.1 Unmanned Aircraft Specifications

Two UAs would be primarily used for deliveries: Wing's Hummingbird 7000W-B and 8000-A.[22]

- Hummingbird 7000W-B.
  - Multi-rotor design with 16 propellers (Figure 2.2-2).
  - Weight under 15 pounds when combined with its maximum payload weight of 2.7 pounds.
  - Wingspan of approximately 4.9 feet, a height of approximately 1 foot, and a length of 4 feet.
- 8000-A.
  - Multi-rotor design with 12 propellers (Figure 2.2-3).
  - Weight under 25 pounds when combined with its maximum payload weight of 5 pounds.
  - Wingspan of approximately 6 feet, a height of approximately 1 foot, and a length of approximately 6.2 feet.

[20] Wing's flight planning software is updated monthly. Wing distributes flight routes to avoid concentrating flights over any one location.

[21] Fly less areas are properties that Wing identifies in its flight planning system, which can be automatically avoided based on the type of resource, time of day, and other factors. Wing has committed in its operational proposal to the FAA that it will generally avoid overflights of these fly less resources in the Houston operating area.

[22] The 7000W-A UA may remain in use for low volume nests or specific use cases in less noise sensitive areas while the current supply of UAs are exhausted.

All Wing aircraft use electric power from rechargeable lithium-ion batteries. Aircraft batteries are charged wirelessly from nest charging pads where aircraft sit between deliveries. Charging pads are connected to onsite utilities or temporarily to small diesel generators during the development of utility connections.

Wing anticipates the Houston metro area fleet makeup would consist of 70 to 80 percent 7000W-B aircraft and 20 to 30 percent 8000-A aircraft. The fleet mix of individual nests would be variable based on payload, route, and demand characteristics; nests with a wider range of offerings are anticipated to carry higher proportions of 7000W-B Aircraft.

Figure 2.2-2. Wing Hummingbird 7000W-B UA

Figure 2.2-3. Wing Hummingbird 8000-A UA

2.2.2 Flight Operations

The UA[23] would generally be operated at an altitude of 150–300 feet above ground level (AGL) and always below an altitude of 400 feet AGL while en route to and from delivery locations. At a delivery location, the UA would descend vertically to a stationary hover at 23 feet AGL and lower a package to the ground by a retractable line for delivery. Once a package has been lowered to the ground, the UA would then retract the line, ascend vertically to a cruise altitude, and depart the delivery area enroute back to a nest.

The UA would fly a predefined flight path that is set prior to takeoff. Flight missions are automatically planned by Wing's flight planning software. A mission originates from a nest location, and Wing's software automatically assigns, deconflicts, and routes each flight to the delivery location and back to a nest. Each nest site would include a controlled area wherein UA flights are launched and recovered.

A typical flight profile can be broken into the following general flight phases: takeoff, enroute outbound, delivery, enroute inbound, and landing. Remote pickup procedures are described in Section 2.2.2.6, Remote *Pickup Operations*.

Note: Each aircraft must complete a daily set of preflight checks before being assigned a delivery mission. These include a brief low height hover flight where the UA exercises various systems. These are termed FitBIT or Fitness Built-In Test and are at a height of approximately 6 feet for approximately 1 minute. Additionally, higher hover flights (approximately 60 feet) may be occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

[23] The flight profiles of the 7000W-B and the 8000-A would be the same.

2.2.2.1 Takeoff

Once the UA receives a mission and is cleared for takeoff from a launch pad, the UA takes off from the ground vertically to an altitude of 23 feet AGL and hovers for 30 seconds while the package is loaded. The UA then climbs to the enroute altitude (150–300 feet AGL).

2.2.2.2 En Route Outbound

The en route outbound phase is the part of flight in which the fully loaded UA transits from the nest or a remote pickup location to a delivery point on a predefined flight path. During this flight phase, the UA would typically operate at an altitude of 150–300 feet AGL and a typical airspeed of 59 miles per hour (mph). The UA has a single set cruise airspeed, which would not be exceeded.

2.2.2.3 Delivery

The delivery phase consists of descent from the enroute altitude to a delivery point, such as a residential yard, driveway, parking lot, or common area. The UA descends vertically to 23 feet AGL while maintaining position over the delivery point. The UA hovers at 23 feet AGL for approximately 30 seconds while lowering its package and then proceeds to climb vertically back to en route altitude.

2.2.2.4 En Route Inbound

The UA continues to fly at an altitude of 150–300 feet AGL and a speed of 59 mph toward the nest in the same manner described in Section 2.2.2.2.

2.2.2.5 Landing

Upon reaching the nest, the UA slowly descends over its assigned landing pad and lands on the pad (Figure 2.2-4).

Figure 2.2-4. Wing Hummingbird UA Nest Landing

2.2.2.6 Remote Pickup Operations

Remote pickup operations from each nest would be supported at up to 12 partner establishments depending upon demand and nest capacity. Pickup operations would follow general flight phases and parameters identical to typical delivery operations and would include the addition of a pickup phase. The pickup phase is similar to the delivery phase. The UA descends from its en route altitude (safe altitude above local terrain and obstacles) to 14.5 feet AGL and lowers the package hook. The UA then passes approximately 10 feet laterally over the autoloader. The autoloader's Y-shaped poles passively guide the package hook to a narrow slot that ensures secure attachment of the package. The package is then retracted to the UA before it proceeds to climb to the en route altitude. Remote pickup operations from descent to finish are expected to take no longer than 1 minute and 30 seconds (90 seconds). Delivery, enroute return, and land operations would then occur as described in Sections 2.2.2.3 through 2.2.2.5. The flight profile of remote pickup operations is illustrated in Figure 2.2-5 and the autoloader is illustrated in Figure 2.2-6.

Note: Manual remote pickups loading may also be performed by a person and without a physical autoloader. The profile would be similar to the autoloader pickup profile outlined above but would omit the lateral transition for autoloader engagement.

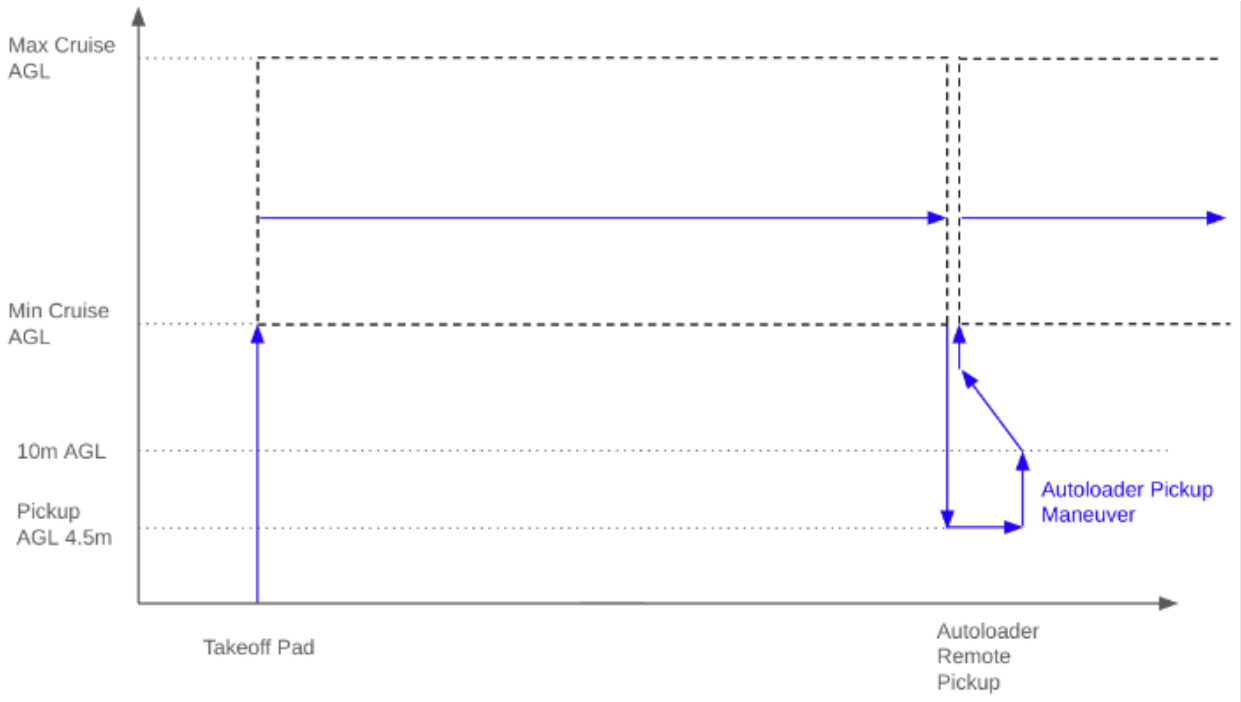


Figure 2.2-5. Wing Hummingbird Remote Pickup Flight Profile

Figure 2.2-6. Wing Hummingbird and Autoloader

Chapter 3
Affected Environment and Environmental Consequences

3.1 Introduction

This chapter provides a description of the affected environment and potential environmental consequences for the environmental impact categories that have the potential to be affected by the no action alternative and proposed action, as required by FAA Order 1050.1G. As required by FAA Order 1050.1G, this EA presents an evaluation of impacts for the environmental impact categories listed below.

- Air quality
- Biological resources (including fish, wildlife, and plants)
- Coastal Resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous materials, solid waste, and pollution prevention
- Historical, architectural, archaeological, and cultural resources
- Land use
- Noise and noise-compatible land use
- Socioeconomics and children's environmental health and safety risks
- Visual effects (including visual resources and visual character)
- Water resources (including wetlands, floodplains, groundwater, and wild and scenic rivers)

The study area evaluated for potential impacts is defined as Wing's proposed operating area shown in Figure 2.2-1. The level of detail provided in this chapter is commensurate with the importance of the potential impacts. EAs are intended to be concise documents that focus on aspects of the human environment that may be affected by the proposed action.

Reasonably foreseeable effects may include those that interact with baseline conditions caused by other past and present activity. To the extent it assists in reasoned decision-making, FAA may—but is not required to by NEPA—analyze environmental effects from other projects separate in time, or separate in place, or that fall outside of FAA's regulatory authority, or that would have to be initiated by a third party. If FAA determines that such analysis would assist in reasoned decision- making, it will document this determination in the EA and explain where it drew a reasonable and manageable line relating to the consideration of such effects from such separate projects.

For example, Wing plans to conduct test operations prior to becoming fully operational at a limited number of nests for a temporary period (no more than six months, beginning in October 31, 2025) in order to evaluate the validity of procedures associated with the UA and its flight planning software in this operating area.

As most of the proposed action's impacts discussed in Chapter 3, *Affected Environment and Environmental Consequences,* were found to be minimal and given that the drone flight is limited in its ability to interact with other outside actions due to its short duration, the proposed action's contribution to reasonably foreseeable impacts in the study area would largely be from noise and are discussed solely in Section 3.7, *Noise and Noise-Compatible Land Use*.

3.2 Environmental Impact Categories Not Analyzed in Detail

This EA did not analyze potential impacts on the following environmental impact categories in detail because the proposed action would not affect the resources included in the category (see FAA Order FAA Order 1050.1G, § 1.2 (b)(1)).

- **Coastal Resources:** The Texas Coastal Management Program (TCMP) was approved by the National Oceanic and Atmospheric Administration (NOAA) in 1997, following the Coastal Coordination Act of 1991. The state of Texas's coastal zone includes area encompassed by portions of the state's 13 coastal counties and its territorial sea, the Gulf of America. The TCMP is administered by the Texas General Land Office (GLO) and its enforceable goals and policies focus management efforts on five primary issues of concern: coastal erosion, wetland protection, water supply and quality, dune protection, and shoreline access (31 TAC § 26.12). Although the project area intersects with portions of the designated coastal zone, the proposed action would not directly affect shoreline zones or be inconsistent with the enforceable policies of the TCMP. The FAA has determined that the Proposed Action is consistent with the goals of the Texas Coastal Management Program, as described in 31 TAC § 26.12, and all associated policies (31 TAC § 26.12 - § 26.34). Written notice of the submission of an application for the FAA license was sent to the GLO on May 4, 2026. On June 19th, 2026, the Texas GLO published a Notice and Opportunity to Comment on Requests for Consistency Agreement/Concurrence Under the Texas Coastal Management Program. The NOA provided information about the proposed action and requested public review and comments, which was available on the Texas GLO's website[24] for a 30-day comment period from June 19 to July 19, 2026. No comments were received. On July 20, 2026, the Texas GLO determined that the Proposed Action is consistent with the goals and enforceable policies of the Texas Coastal Management Program. Copies of all agency correspondence are included in Appendix I.
- **Farmlands:** The proposed action would not involve the development or disturbance of any land regardless of use, nor would it have the potential to convert any farmland to

[24] See: https://www.glo.texas.gov/open-government/public-notices.

non-agricultural uses. The proposed action would not affect designated prime or unique farmlands.

- **Hazardous Materials, Solid Waste, and Pollution Prevention:** The proposed action would not result in any construction or development or any physical disturbances of the ground. Therefore, the potential for impact in relation to hazardous materials, pollution prevention, and solid waste is not anticipated. Additionally, each Wing UA is primarily made from recyclable materials and the only hazardous materials used in its manufacture and operation are lithium-ion batteries. Any hazardous materials would be disposed of in accordance with all federal, tribal, state, and local laws, including 40 CFR Part 273, *Standards for Universal Waste Management*.

- **Land Use:** The proposed action does not involve any changes to existing, planned, or future land uses within the area of operations. Wing would use current infrastructure, such as parking lots, to conduct its operations. Land use and zoning are typically governed by local and state laws. Wing is responsible for complying with any such applicable laws relevant to establishing its operations (e.g., siting drone nests and related infrastructure), and partners are responsible for complying with any applicable laws for remote pick-up nests and related infrastructure. All nest locations would be sited in accordance with all local land use ordinances and zoning requirements. Local jurisdictions in the Houston metro area may vary in the scope of their review and approval of commercial operations. Further, Section 2.2, *Proposed Action,* identifies the standoff distances from noise-sensitive areas.

- **Natural Resources and Energy Supply:** The proposed action would not require the need for unusual natural resources and materials, or those in scarce supply. Wing's aircraft would be battery powered and would not consume fossil fuel (e.g., gasoline or aviation fuel) resources. Wing would use a charging pad at the nest (approximately 1 square meter in size) to charge the batteries of the UA. In addition, Wing's electrically powered aircraft is most often used to replace individual personal automobile trips to retrieve small goods and would therefore be expected to reduce consumption of fuel resources.

- **Socioeconomics and Children's Environmental Health and Safety Risks:** The proposed action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to ensure that children do not suffer disproportionately from environmental or safety risks. The proposed action would not affect products or substances a child would be likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that could disproportionately affect children. It is not anticipated that the proposed action would pose a greater health and safety risk to children than package delivery by other means (truck, mail, personal automobile trips, etc.). Additionally, Wing's proposal includes avoiding fly less areas during operational hours, which could help avoid or reduce any potential environmental health or safety impacts on children. Wing's electrically powered aircraft is most often used to replace individual

personal automobile trips to retrieve small goods and would therefore reduce noxious emissions and improve road safety, which are both appreciable concerns for children.

- **Visual Effects (Light Emissions Only):** The proposed action would not result in significant light emission impacts because the majority of flights are expected to be conducted during the daytime. Light emissions from the UA would not noticeably affect the visual character or ambient light conditions of the study area. The small proportion of flights that do occur at night would likely be infrequent and of short duration, although flight cadence would vary depending on the location and partners served by an individual nest. Because of the overall small number of operations likely to be conducted between twilight and 10:00 p.m., the proposed action would not result in significant light emission impacts due to nighttime operations. Night is defined by 14 CFR Section 1.1 as the time between the end of evening civil twilight[25] and the beginning of morning civil twilight, as published in the *Air Almanac*, converted to local time (U.S. Department of the Navy 2022).
- **Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers):** The proposed action would not result in the construction of facilities and would therefore not encroach upon areas designated as navigable waters, wetlands, or floodplains. The proposed action would not affect any waters of the U.S. The proposed action would not result in any changes to existing discharges to water bodies, create a new discharge that would result in impacts on surface waters, or modify a water body. The proposed action would not degrade water quality or contaminate public drinking water supplies. The proposed action does not involve activities that would withdraw groundwater from underground aquifers or reduce infiltration or recharge to groundwater resources through the introduction of new impervious surfaces. There are no wild and scenic rivers in or within 150 miles of the study area (National Park Service 2025). Approximately 15 miles of the Winters Bayou Nationwide Rivers Inventory river segment is within the northern portion of the study area (National Park Service 2025). However, UA operations would not occur over water and generally would not occur in the vicinity of these segments at sufficient volume to noticeably affect the visitor experience. Therefore, nest establishment and operations would not affect a wild and scenic river or river on the Nationwide Rivers Inventory. The proposed action does not have the potential to disrupt the free-flowing character of any designated wild and scenic river. Therefore, the proposed action would not affect wetlands, floodplains, surface water, groundwater, or wild and scenic rivers.

[25] According to the National Oceanic and Atmospheric Administration (NOAA) National Weather Service, civil twilight begins in the morning, or ends in the evening, when the geometric center of the sun is 6 degrees below the horizon. Evening civil twilight begins at sunset, and ends when the geometric center of the sun is 6 degrees below the horizon (National Oceanic and Atmospheric Administration National Weather Service n.d.).

3.3 Aviation Emissions and Air Quality

3.3.1 Definition of Resource and Regulatory Setting

This section provides an overview of air quality resources within the study area. Air quality refers to the condition of the atmosphere as it relates to the presence and concentrations of pollutants, which can affect human health, ecosystems, and the climate. The quality of the air is influenced by factors such as the type and number of pollutants emitted into the atmosphere, the physical geography (topography) of the air basin, and meteorological conditions like wind patterns, temperature, and precipitation.

The Clean Air Act (CAA), 42 U.S.C. §§ 7401–7671q, establishes a regulatory framework to prevent and control air pollution that may affect public health and the environment. The regulatory framework includes National Ambient Air Quality Standards (NAAQS), implemented under 40 CFR Parts 50–51; National Emission Standards for Hazardous Air Pollutants, implemented under 40 CFR Parts 61 and 63; and permits, implemented under 40 CFR Part 70. Pollutants regulated under the CAA that have established NAAQS include six (6) common air pollutants also known as "criteria" air pollutants. These include particulate matter (PM) (further segregated to particulate matter equal to or less than 10 microns [PM_{10}] and particulate matter equal to or less than 2.5 microns [$PM_{2.5}$]), ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb).

Section 112(r) of the CAA and 40 CFR Part 68 require preparation of a risk management plan (RMP) if reportable quantities of regulated and extremely hazardous chemicals are used. The regulated substances and threshold quantities are provided in 40 CFR § 68.130. However, under 40 CFR § 68.126, flammable substances listed in Tables 3 and 4 of § 68.130 are exempt from RMP requirements when used as fuels or held for sale as fuels at retail facilities. There are no bulk quantities of regulated and extremely hazardous chemicals associated with this project. The ultra-low sulfur diesel fuel for operation of generators in this project is expected to be in relatively low quantities, sourced from the local supply, and used solely as fuel.[26] Therefore, it is not anticipated that the project would require the preparation of an RMP, as all diesel fuel constituents are expected to remain below the reportable threshold quantities outlined in 40 CFR § 68.130 and would qualify for the fuel use exemption.

In addition, the CAA requires federal agencies to demonstrate conformity with state implementation plans for federal actions, such as federal financial assistance, licenses, permits, or approvals (42 U.S.C. § 7506(c)(1)). The U.S. Environmental Protection Agency (EPA) implements this requirement under the General Conformity Rule, 40 CFR Part 93. Projects that do not emit criteria pollutants or their precursors above the *de minimis* levels in 40 CFR § 93.153(b) are considered too small to adversely affect an area's air quality status, and the general conformity requirements would be satisfied.

[26] The estimated diesel fuel consumption for the generator is approximately 2 gallons/hour at full load. The quantity of diesel fuel for daily operations is much less than the threshold quantity of 10,000 lbs. for regulated flammable substances in Tables 3 and 4 of 40 CFR § 68.130. Diesel fuel would be stored in portable containers. There are no permanent fuel storage facilities associated with the proposal.

3.3.2 Affected Environment

The study area includes 10 counties in the Houston, Texas region: Brazoria, Chambers, Fort Bend, Galveston, Grimes, Harris, Liberty, Montgomery, San Jacinto, and Waller Counties. This region is characterized by its diverse meteorological conditions within a humid subtropical climate zone with no dry season (Runkle et al. 2022). Summer in the Houston metro is typically hot and humid, with temperatures often averaging between 77–95°F. Winter daytime temperatures average between 46–63°F. January is generally the coldest month. Rainfall is common in the metro area, particularly during summer months, with a high risk of flooding. Direct landfall of hurricanes is uncommon, but tropical storm system remnants bring heavy precipitation to the Houston metro area (Weather Atlas n.d.).

The ambient pollutant levels in the study area vary and would depend on the uses and activities in the immediate vicinity. Existing emission sources in the study area are primarily anthropogenic and associated with commercial, industrial, transportation (e.g., highways, rail, and air travel), and residential land uses in an urban and suburban environment. For example, emissions near major highways or large commercial centers within the study area are generally higher due to consistent vehicle traffic and freight operations, while emissions in more residential or undeveloped areas are typically lower. Thus, ambient emissions in more urban counties within the study area, such as Harris County, are likely to be higher than ambient emissions in more suburban or rural counties within the study area, such as Brazoria County.

The National Weather Service and Texas Commission on Environmental Quality (TCEQ) provide weather monitoring and support, using models that assist in evaluating atmospheric conditions, including temperature, barometric pressure, wind speeds, and potential air quality impacts under various scenarios. TCEQ maintains the Texas Air Monitoring Information System, which makes data from air quality monitoring stations statewide publicly available (TCEQ 2025). Ambient air monitoring records from stations in these counties are used to characterize the existing air quality. Monitoring sites measure pollutants such as O_3 and $PM_{2.5}$ and PM_{10} to determine compliance with NAAQS standards. There are approximately 36 active monitoring stations in the study area that measure criteria pollutants.

Air quality in the study area is assessed at the county level and is regulated by federal and state agencies, including EPA and the TCEQ. If the air quality in a geographic area meets or is cleaner than the national standard, it is designated an attainment area; areas that do not meet the national standard are designated nonattainment areas. Areas which moved from nonattainment to attainment must follow maintenance plans. All counties in the study area are in attainment for NAAQS expect for O_3 (2008 and 2015 standards). Table 3.3-1 includes the O_3 attainment status of the study area counties.

Table 3.3-1. Attainment Status of Study Area Counties

County	Attainment Status for 8-Hour O_3 (2008 Standard)	Attainment Status for 8-Hour O_3 (2015 Standard)
Brazoria	Severe Nonattainment	Serious Nonattainment
Chambers	Severe Nonattainment	Serious Nonattainment
Fort Bend	Severe Nonattainment	Serious Nonattainment
Galveston	Severe Nonattainment	Serious Nonattainment
Grimes	Attainment	Attainment
Harris	Severe Nonattainment	Serious Nonattainment
Liberty	Severe Nonattainment	Attainment
Montgomery	Severe Nonattainment	Serious Nonattainment
San Jacinto	Attainment	Attainment
Waller	Severe Nonattainment	Attainment

Source: NAAQS (EPA 2025a) and EPA Green Book (EPA 2025b)
O_3 = ozone.

3.3.3 Environmental Consequences

3.3.3.1 No Action Alternative

Under the no action alternative, existing sources of air emissions in the region—such as passenger and freight vehicle traffic, construction activities, and other commercial and industrial operations—would continue to occur. The long-term reduction in emissions from the additional 75 nests for increased drone delivery operations replacing vehicle miles traveled by conventional delivery vehicles, as described in Section 3.3.3.2, *Proposed Action*, would not be realized. Consequently, emissions associated with delivery services would remain at current levels.

3.3.3.2 Proposed Action

Background

Air emissions related to the proposed action could include those associated with the operation of generators; vehicular traffic to and from the sites for installation, maintenance, and package drop-offs; and any incidental emissions from construction or maintenance activities, such as the use of small equipment or delivery vehicles. The UA is battery powered and does not generate emissions that could result in air quality impacts.

Vehicular traffic and incidental emissions from installation and maintenance are not carried forward for further analysis because they are infrequent, temporary, and minimal. Installation activities are brief and would have negligible impacts on air quality, involving only the placement of fencing around the nest and the delivery of a shipping container for UA storage. While package drop-offs to the nests would not be infrequent, they would likely be over very short distances. These activities align with routine commercial operations in urban areas and are expected to be negligible and not lead to a NAAQS violation. Therefore, any minor

increase in vehicle trips due to the proposed action's installation and maintenance activities would be outweighed by the long-term reduction in trips.

Thus, the focus of this analysis is the generator usage during nest installation. This assessment of the proposed action includes the use of generators during the initial phases of site installation, referred to as "transition power." This differs from "emergency power," which provides backup electricity when the primary power source becomes unavailable due to outages.[27] Transition power would serve as a temporary energy source during the lag period between the installation of nests and their connection to the power grid at a rate of up to 1,700 hours of generator operation per year per nest.

Direct Emissions

Additionally, the 75 proposed nests would not be installed simultaneously but phased in over several years. This gradual implementation minimizes the overall emissions profile during the installation phase, making the following analysis of emissions from generator use for all 75 nests conservative (high).

The emissions are calculated based on the 1,700 annual hours per nest of generator usage during the transitional power period, assuming that the Allmand Maxi-Power 25 generator would be used. After the transitional power period concludes, the emissions for emergency power would correspond to 500 annual hours per nest of generator usage and would be substantially less than the emissions during the transitional power period.

Because 8 study area counties are in nonattainment for O_3 (Table 3.3-1), a general conformity analysis must be conducted. Table 3.3-2 calculates the total estimated emissions from generator usage, focusing on O_3 emissions of concern. These emissions are then compared to the CAA *de minimis* thresholds in Table 3.3-3.

O_3 is not directly emitted by generators or other combustion sources. Instead, it forms through photochemical reactions involving volatile organic compounds (VOC) and nitrogen oxides (NO_x). Therefore, this analysis focuses on VOCs (also referred to as non-methane hydrocarbons [NMHCs]) and NO_x emissions. NMHCs are a subset of hydrocarbons that exclude methane and are often used as a proxy for VOCs in emissions inventories because they represent the reactive compounds that contribute to ozone formation (Intergovernmental Panel on Climate Change n.d.). For this reason, Table 3.3-2 uses NO_x and NMHC to estimate O_3-related emissions.

[27] The EPA provides guidance on calculating the potential to emit for emergency generators, recommending a default assumption of 500 hours per year for estimating maximum operational hours under worst-case conditions (EPA 1995).

Table 3.3-2. Calculation of Emissions – No Action Alternative and Proposed Action Alternative

Alternative	Power Output (kW)	Annual Runtime (hrs/yr)	Annual Elec. Gen. (kWh/yr)	Number of Nests	Total Annual Elec. Gen. (kWh/yr)	NMHC+ NOx factor (g/kWh)	NMHC+NOx emissions (g/yr)	NMHC+NOx emissions (tons/yr)
No Action	-	-	-	-	-	-	-	-
Proposed Action	**20**	**1,700**	**34,000**	**75**	**2,550,000**	**4.7**	**11,985,000**	**13.21**

CFR = Code of Federal Regulations; EA = Environmental Assessment; EPA = Environmental Protection Agency; g = grams; hrs = hours; kW = kilowatt(s); kWh = kilowatt hour; NMHC = non-methane hydrocarbon; NOx = nitrogen oxides; O3 = ozone; PM = particulate matter; VOC = volatile organic compound; yr = year(s).
Notes:
(1) Listed power output for each generator is prime power, not standby power. Standby power for emergency generation is slightly greater (Allmand n.d.).
(2) NMHC+NOx, emission factors are from EPA Tier 4 engine standards for compression-ignition (diesel) engines 19 < kW < 56. See 40 CFR 1039.101, Table 1.
(3) O_3 precursor NOx and VOC emissions are conservatively estimated to equal NMHC+NOx emissions. (This approach assumes that all non-methane hydrocarbons act as volatile organic compounds, potentially overestimating the contribution to ozone formation. While these assumptions simplify calculations, they likely overestimate actual emissions to provide a conservative analysis.)

Table 3.3-3. Comparison of Project Emissions to General Conformity De Minimis Thresholds

Pollutant (Nonattainment Classification)	Estimated Net Emissions (tons/year)	De Minimis Threshold Severe (tons/year)	De Minimis Threshold Serious (tons/year)	Exceeds Threshold? (Yes/No)
NOx/NMHCs (VOCs) (Nonattainment)	13.21	25	50	No

Sources: Table 3.3-2 and EPA's De Minimis Tables (EPA 2025c).
NMHCs = non-methane hydrocarbons; NOx = nitrogen oxides; VOCs = volatile organic compounds.

In conclusion, the emissions associated with the proposed action generators are less than the *de minimis* thresholds established under the CAA. This indicates that these emissions would not trigger further regulatory review or a general conformity determination. Overall, based on this analysis, the generator emissions are anticipated to have a minor impact on air quality in the study area and would not significantly contribute to regional air quality concerns.

Indirect Emissions

Increased electricity consumption associated with powering 75 new nests in the Houston metro would result in indirect emissions due to the region's reliance on fossil fuel-based energy sources. The Electric Reliability Council of Texas (ERCOT) manages the vast majority of the Houston power grid, which, as of 2025, derives approximately 34 percent of its electricity from solar, 17.5 percent from wind, 33 percent from natural gas, 9 from coal, and 7 percent from nuclear (ERCOT 2025).

However, while electricity use for the nests would indirectly generate emissions due to the Houston metro's partial reliance on fossil fuel-based energy sources, these impacts are

expected to be outweighed by the emissions reductions achieved through the proposed action, which replaces a substantial number of vehicle miles traveled for conventional delivery services with drone-based deliveries. As previously discussed, research shows that significant vehicle mile reductions are expected as a result of increased availability of delivery drones (Lyon-Hill et al. 2020). Additionally, a 2022 study of 188 delivery-drone flights found that drones can achieve up to 94 percent lower energy consumption per package as compared to conventional delivery vehicles, with medium-duty diesel trucks and small vans producing much higher energy and emissions per kilometer and per package than the UAs (Rodrigues et al. 2022). Therefore, the shift from traditional delivery vehicles to drone-based deliveries from the proposed action would improve energy efficiency and reduce emissions per package delivered.

3.4 Biological Resources (including Fish, Wildlife, and Plants)

3.4.1 Definition of Resource and Regulatory Setting

Biological resources include plant and animal species and their habitats, including special-status species (federally listed or state-listed threatened or endangered species, species proposed for listing, species that are candidates for federal listing, marine mammals, and migratory birds) and environmentally sensitive or critical habitat. Biological resources provide aesthetic, recreational, and economic benefits to society.

3.4.1.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 (16 U.S.C. § 1531 et seq.) requires all federal agencies to seek to conserve threatened and endangered species. Section 7(a)(2) of the ESA requires that each federal agency—in consultation with the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS)—ensures that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The FAA is required to consult USFWS or NMFS if an action may affect a federally listed species or critical habitat. If the FAA determines the action would have *no effect* on listed species or critical habitat, consultation is not required.

3.4.1.2 Migratory Birds

The Migratory Bird Treaty Act (MBTA; 16 U.S.C. §§ 703–712) protects migratory birds by prohibiting the taking, killing, or possessing of migratory birds (including their eggs, nests, and feathers). The MBTA applies to migratory birds identified in 50 CFR § 10.13 (defined hereafter as "migratory birds"). The USFWS is the federal agency responsible for the management of migratory birds when they occupy habitat in the United States. Wing is responsible for compliance with the MBTA.

The Bald and Golden Eagle Protection Act prohibits anyone from "*taking*" a bald or golden eagle, including their parts, nests, or eggs, without a permit issued by USFWS. Implementing

regulations (50 CFR Part 22), and USFWS guidelines as published in the *National Bald Eagle Management Guidelines*, provide for additional protections against "*disturbances*." Similar to take, "*disturb*" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or causes either a decrease in its productivity or nest abandonment due to a substantial interference with breeding, feeding, or sheltering. A permitting process provides limited exceptions to the Bald and Golden Eagle Protection Act's prohibitions. Permits are only needed when avoidance of incidental take is not possible. According to the National Bald Eagle Management Guidelines, if conservation measures can be implemented such that no aircraft are flown within 1,000 feet of an eagle nest, incidental take of Bald Eagles is unlikely to occur, and no permit is needed. Wing is responsible for compliance with the Bald and Golden Eagle Protection Act.

3.4.2 Affected Environment

According to the Texas Parks & Wildlife Department Ecoregions of Texas, the study area overlaps the Piney Woods ecoregion, Gulf Prairies and Marshes ecoregion, small portions of the Post Oak Savannah and Blackland Prairie ecoregions in the northwest portion of the study area (Texas Parks & Wildlife n.d.a). The Piney Woods ecoregion features pine and hardwood forests, fertile bottomlands, and a humid climate with 36 to 50 inches of rainfall annually. Soils are mostly acidic sands or sandy loams.

Gulf Prairies and Marshes ecoregion is characterized by flat, low-lying land with prairies, marshes, woodlands, and barrier islands along the Gulf of America. It receives 30 to 50 inches of rainfall annually, has long growing seasons, and features mainly acidic soils. While much native habitat has been lost to development, it remains crucial for migratory birds and coastal wildlife. The Post Oak Savannah ecoregion features a blend of oak woodlands and grasslands, characterized by a hilly terrain. The area receives 28 to 40 inches of annual rainfall, peaking in May or June, and has varied, often acidic soils. Blackland Prairie ecoregion is known for its productive, rich soils, gentle topography, and lush native grasslands. It is a true prairie grassland community, dominated by a diverse assortment of grasses (Texas Parks & Wildlife n.d.a).

The majority of the land surface within the study area features urban and suburban development. Therefore, wildlife habitats within the study area predominantly include parks and open spaces, lakes, waterways, riparian buffers, and vacant lands. Urban flora and fauna thrive in such environments and typically are well established and populated.

Development is rapidly encroaching upon existing vacant lands both within and surrounding the project. The urban environment in the study area includes agricultural areas; commercial areas (i.e., business parks, airports, landfills); communities; downtown areas; recreational areas (i.e., public parks, golf courses); residential areas; thoroughfare (i.e., highways, railroads, public roads); undeveloped areas (i.e., open fields, vacant lots, wooded areas); and waterbodies, wetlands, and floodplains. These areas provide habitat for the smaller and more common bird and mammal species of the southern United States, including mammals such as white-tailed deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), and gray squirrels (*Scirius carlinensis*).

3.4.2.1 Special-Status Species

Federally Listed Species

The potential for impacts on federally listed species was assessed using USFWS Information for Planning and Consultation online system (August 12, 2025). The official species list for the study area is included within Appendix E. Table 3.4-1 lists the federally threatened and endangered species that could be present in the study area. The action area contains proposed critical habitat for the Louisiana pigtoe (*Pleurobema riddellii)*.

Table 3.4-1. ESA-Listed, Proposed, and Candidate Species Potentially Present within the Study Area

Species	Common Name	Species Name	ESA Status	Critical Habitat
Mammals	West Indian Manatee	*Trichenchus manatus*	Threatened	N
	Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	N
Birds	Eastern Black Rail	*Laterallus jamaicensis ssp. jamaicensis*	Threatened	N
	Piping Plover	*Charadrius melodus*	Threatened	N
	Red-cockaded Woodpecker	*Dryobates borealis*	Threatened	N
	Rufa Red Knot	*Calidris canutus rufa*	Threatened	N
	Whooping Crane	*Grus americana*	Endangered	N
Reptiles	Alligator Snapping Turtle	*Macrochelys temminckii*	Proposed Threatened	N
	Green Sea Turtle	*Chelonia mydas*	Threatened	N
	Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	N
	Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered	N
Clams	Louisiana Pigtoe	*Pleurobema riddellii*	Proposed Threatened	Y
	Texas Fawnsfoot	*Truncilla macrodon*	Threatened	N
Insects	Monarch Butterfly	*Danaus plexippus*	Proposed Threatened	N
Flowering Plants	Texas Prairie Dawn-flower	*Hymenoxys texana*	Endangered	N

Based on the IPaC report, there are eleven ESA-listed and proposed species that could be present in the study area and affected by the action: the West Indian manatee, a threatened species; the tricolored bat, a proposed endangered species; the whooping crane, as endangered species; the eastern black rail, a threatened species; the piping plover, a threatened species; the red-cockaded woodpecker, a threatened species; the rufa red knot, a threatened species; the green sea turtle, a threatened species; the hawksbill sea turtle; an endangered species; the Kemp's ridley sea turtle, an endangered species; and the monarch butterfly, a proposed threatened species. As noted in the IPaC report, both the Piping Plover and the Red Knot only need to be considered for wind energy projects. Therefore, no further analysis was conducted for those two species.

Given that the action does not include any ground construction or habitat modification, and the UA would not touch the ground except at the nests, there are no possible mechanisms of effect to the Alligator Snapping Turtle, ESA-listed clams, ESA-listed flowering plants, and

proposed critical habitat. Therefore, these species and habitats are not discussed further in this document.

Two subspecies of West Indian manatees may occur in the waters surrounding the study area: the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). Although the Florida manatee is found primarily throughout the Florida coastal areas, the Florida manatee's range may extend into Texas waters during warmer months. The Antillean manatee is found primarily along the Gulf Coast, migrating throughout the Caribbean and the South American northeastern Atlantic coastline (USFWS n.d.a). The West Indian manatee is protected under the Marine Mammal Protection Act and is listed as threatened under the ESA.

The tricolored bat typically uses trees, caves, or manmade structures for roosting and forages for insects during dusk, nighttime, and dawn time periods. Tricolored bats emerge early in the evening and fly and forage at treetop level or above but may fly closer to ground later in the evening. This species exhibits slow, erratic, fluttery flight while foraging and are known to forage most commonly over waterways and forest edges (USFWS 2023). This species spends six to nine months per year hibernating in caves or mines (USFWS 2023). The USFWS has proposed to list the tricolored bat as an endangered species, primarily due to white-nose syndrome. Other factors that influence the tricolored bat's viability include wind-energy-related mortality, habitat loss, and effects from climate change.

The eastern black rail can be found in both inland and coastal marshes across Texas, particularly in higher elevation wetland areas with shrubby vegetation. While their presence in inland prairies wetlands is possible, recent observations show poor species presence outside of coastal habitats (USFWS n.d.b).

The red-cockaded woodpecker primarily nests in mature pine forests and may be present in the northern portion of the study area. The species relies on old-growth pine forests with frequent fires, favoring habitats with open understories. Once widespread in longleaf pine regions, it now also inhabits other southeastern pine forests (Cornell Lab n.d.a)

The whooping crane nests much farther north in Canada; there is no threat of disturbing that critical part of their lifecycle. However, whooping cranes often migrate through the Houston area to Texas' coastal plain in and around the study area. It is possible that whooping cranes could use parts of several wetlands and/or waterbodies within the study area as stopover habitat on their way to wintering grounds along the Gulf Coast. A 2019 study evaluated several U.S. Army Corps of Engineers lakes that the Aransas-Wood Buffalo whooping crane could potentially use as stopover habitat. The study found that Wallisville Lake, Addicks Lake, and Barker Reservoir all have at least partial suitable habitat (McConnell 2021). According to iNaturalist, there has been one observation of the whooping crane since 2013 in the proposed study area within the Brazoria National Wildlife Refuge (iNaturalist 2025a).

Green sea turtle is found in tropical and subtropical waters worldwide. In the U.S., the species occur in coastal waters from Texas to Massachusetts. The species occupy three predominant habitat types: high energy oceanic beaches, convergence zones in pelagic areas, and benthic feeding grounds in shallow, protected waters. Nesting occurs onshore above high-water lines from May through November. In Texas, the species occurs primarily within the Gulf of America and with some nesting in coastal areas (Texas Parks & Wildlife n.d.b).

Predominant onshore threats to the species include artificial lighting, beach nourishment, beach armoring, and human disturbance during nesting season.

Hawksbill sea turtles occur in tropical and subtropical waters in the Indian, Pacific, and Atlantic oceans. In the continental U.S., the species is known to occur in southern Florida, the northern Gulf of America, Texas, and Puerto Rico (Texas Parks & Wildlife n.d.e). Although the species can occur along the eastern seaboard as far north as Massachusetts, sightings are rare north of Florida. In Texas, the species occurs primarily in the waters of the Gulf of America and nesting occasionally occurs along the coastline from July to October. Predominant onshore threats to the species include artificial lighting, beach nourishment, beach armoring, and human disturbance during nesting season.

Kemp's Ridley sea turtle occur in tropical and subtropical waters in the Atlantic and Gulf of America. They primarily occur in open ocean and Gulf waters. Their diet consists of primarily marine invertebrates and some shrimp (Texas Parks & Wildlife n.d.c). Young turtles float on large mats of sargassum. Tamaulipas, Mexico serves as the global primary nesting beach for the species, although a secondary nesting population has been established on the Padre Island National Seashore in Texas. Nesting occurs predominantly during daylight hours. Predominant onshore threats to the species include direct harvest, beach nourishment, and human disturbance

The monarch butterfly potentially occurs in the study area (USFWS 2025). Monarchs occur throughout the United States during summer months and are proposed for federal listing. The preferred habitat for monarchs is open meadows, fields, and wetland edges with the presence of milkweed and flowering plants where they typically fly close to the ground. Monarchs migrate across the state of Texas during the fall and spring as Texas is situated between the principal breeding grounds in the north and the overwintering areas in Mexico (Texas Parks & Wildlife n.d.d). Monarch butterflies travel up to 3,000 miles during migration fly at an elevation of about 8,000 to nearly 12,000 feet (USFWS n.d.c).

State Species of Greatest Conservation Need

In Texas, native animals or plants designated as a Species of Greatest Conservation Need (SGCN) are generally those that are declining or rare and in need of attention to recover, or to prevent the need to list under state or federal regulation (Texas Parks & Wildlife 2020). The counties identified in the study area that have been evaluated for SGCN include Brazoria, Chambers, Fort Bend, Galveston, Grimes, Harris, Liberty, Montgomery, San Jacinto, and Waller Counties. The Texas Parks & Wildlife Department's database of Rare, Threatened, and Endangered Species lists 199 species of amphibians, birds, fish, mammals, reptiles, crustaceans, insects, mollusks, and plants in these counties considered SGCN. Table E-1 in Appendix E provides information on the SGCN in these counties.

Migratory Birds

Migratory bird species found within the study area vary throughout the year. The study area is a part of the Central Flyway and Mississippi Flyway where millions of birds, including songbirds, grassland birds, waterfowl, shorebirds, and raptors migrate north and south during spring and fall migration (Texas Parks & Wildlife n.d.a).

Bird behavior, in particular mobbing and territorial defense behaviors, on flying and hovering UA is the most important risk consideration for analysis, as these behaviors are the most pertinent to the proposed action. Mobbing behavior includes birds emitting alarm calls, flying at the predator, diverting its attention, and harassing it. Mobbing and aerial attack behaviors typically occur when a raptor, crow, or other aerial predator enters the airspace of breeding habitat or territorial males (The Royal Society for the Protection of Birds 2023). Certain species of birds harass, mob, and attack aerial predators that fly into or near their territory, especially during the breeding season when birds are actively nesting. The defending birds will chase, dive bomb, attack the backside, and vocalize to harass the aerial predator until the offender is far enough from the territory that the defending birds cease attacking and return to their nests and foraging activities (Kalb and Randler 2019). Not all bird species exhibit mobbing and territorial defensive behaviors. Some bird species are more aggressive, defensive, and cued on aerial predators, while other species may show no aggression or interest toward predators. Species of birds that exhibit mobbing and territorial defense behaviors that are known to occur in the Houston area are shown in Table 3.4-2.

According to the IPaC report, the Bald Eagle (*Haliaeetus leucocephalus*) is not a Bird of Conservation Concern in the study area but warrants attention under the Eagle Act. Bald Eagles may be year-round throughout Texas as spring and fall migrants, breeders, or winter residents (Cornell Lab n.d.b). Bald Eagles typically nest in forested areas adjacent to large bodies of water (Cornell Lab n.d.b) and nests have been previously documented in the Houston area near the Buffalo Bayou, Sims Bayou, Ellis Creek Lake, and Cinco Ranch Lakes (iNaturalist 2025b). Bald Eagles and other raptors may exhibit territorial behavior when nesting (USFWS n.d.d).

Table 3.4-2. Houston Metro Songbird Species with Mobbing and Territorial Behaviors

Common Name (*Scientific Name*)	**Habitat Preferences**	**Notes**
Northern Mockingbird (*Mimus polyglottos*)	Habitat generalist occurring in nearly all types of urban development settings.	The most aggressive territorial bird species in North America, the Mockingbird is a potential mobbing species during hovering at the nest and delivery location. Mockingbirds are known to nest in parking lot landscaping and areas with high density development. Birds will attack any moving object in territory, including humans and pets.
Red-winged Blackbird (*Agelaius phoeniceus*) and Common Grackle (*Cyanocitta cristata*)	Both species have a strong affinity for wetland habitats and lake shorelines for breeding and nesting.	Relatively aggressive territorial defender known to mob a wide variety of animals who fly over or perch within a male Blackbird or Grackle's harem territory. Both males and females exhibit mob behaviors during the breeding season but do not mob during the non-breeding season during the fall and winter months when Blackbirds and Grackles tend to form in flocks.
American Crow (*Corvus brachyrhynchos*)	The American Crow is less of a nest defending bird and is more prone to territorial defense and inquisitive behaviors as the bird species	Little to no concern over mobbing UA vehicles; greater concern over territorial defense and curiosity behaviors. Crows can also attack larger prey items cooperatively.

Common Name (*Scientific Name*)	Habitat Preferences	Notes
	with the highest intelligence in the Houston metro area.	
Blue Jay (*Cyanocitta cristata*)	Known for nest defensive mobbing but can also discern predator from non-predator more easily than other species.	Hovering will be the greatest risk point Blue Jay mobbing attack. Blue Jays require mature tree cover and some degree of pervious surfaces in urban areas, making them a less likely risk than Mockingbirds.
Small songbirds	Include several species that exhibit breeding habitat and nest defense behaviors. Typically tree nesting species.	Smaller bird species like the diminutive Blue-grey Gnatcatcher (*Polioptila caerulea*) do not defend territories as large as the above-mentioned species, making them unlikely mobbing birds for conflicts with UAs.

Source: Texas Parks and Wildlife n.d.a

Multiple factors result in the Northern mockingbird being considered the most aggressive bird in North America (Mass Audubon 2023). During the breeding season, mockingbirds are known to attack any moving object that enters their territory, including pedestrians, bicycles, and the occasional passing vehicle. Mockingbirds occupy a wide range of urban habitats, including industrial and highly commercialized areas such as parking lots with landscaping trees. Mockingbirds are abundant throughout Texas and found in cities (Texas Parks and Wildlife n.d.a).

While also abundant, the Red-winged Blackbird and Common grackle show strong affinity to open herbaceous wetland habitats during the breeding season. The probability of a mobbing attack by these two species is likely lower than the Northern mockingbird.

3.4.3 Environmental Consequences

Potential impacts on biological resources associated with the proposed action were considered in the area where drones may operate (launch, fly, and drop packages). Wing's nests would be located in retail store parking lots; therefore, there would be no ground disturbance or habitat modification associated with the proposed action. Drones fly at lower speeds and elevations and are smaller than conventional aircraft. Wing's deliveries would initiate from the nest, approach at an en route altitude less than 400 feet AGL and would generally occur between 150 and 300 feet AGL. The UA would descend to around 23 feet AGL and hover for a brief time to make a delivery. Then, the UA would ascend and transition back to en route flight mode for a return to the nest. At a potential maximum of 30,000 flights per day across the entire Houston metro area, the distribution and altitude of the flights are not expected to significantly affect wildlife in the study area. Furthermore, the Wing UA would only briefly hover in fixed positions at both the nest and delivery locations, leaving them only temporarily exposed to a mobbing and attacking bird defending its breeding territory.

A significant impact on federally listed threatened and endangered species would occur when USFWS or NMFS determines the proposed action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would be likely

to result in the destruction or adverse modification of federally designated critical habitat. An action need not involve a threat of extinction to federally listed species to meet the NEPA standard of significance. Lesser impacts, including impacts on non-listed or special-status species, could also constitute a significant impact.

3.4.3.1 No Action Alternative

Under the no action alternative, Wing would not implement commercial UA package delivery operations in the Houston metro area. The no action alternative is not expected to result in significant impacts on biological resources.

3.4.3.2 Proposed Action

There would be no ground construction or habitat modification associated with the proposed action, as the nests would be located in lots that are already developed with commercial uses. Wing's aircraft would not touch the ground in any other place than the nest (except during emergency landings) because it remains aerial while conducting deliveries. Wing's deliveries would initiate from the nest, approach an en route altitude less than 400 feet AGL, and would generally occur between 150 and 250 feet AGL. The UA would lower to around 23 feet AGL and hover for a brief time to make a delivery. Then, the UA would transition back to an en route flight mode for a return to the nest.

Because operations would occur mostly in an urban environment, typically well above the tree line and away from sensitive habitats and given the short duration of increased ambient sound levels, flights are not expected to significantly influence wildlife in the area. Wing will establish a direct line of communication with Texas Parks & Wildlife to discuss any potential concerns regarding impacts on wildlife or high-quality habitat in the project area. Wing will also specifically coordinate with the managing entities of state parks and natural areas within the study area on the thoughtful placement and use of delivery sites within these areas as necessary.

Special-Status Species

Federally Listed and Proposed Species

The proposed action could affect ESA-listed species through the emission of light, noise, and risk of collision. The proposed action does not involve ground-disturbing activity outside of existing commercial areas and does not include any operations over water. Flight operations would take place mostly in an urban environment, within airspace, and typically remain well above the tree line while en route to and from a nest. The duration of exposure by wildlife on the ground to visual or noise impacts from the UA would be of very short duration (approximately 30 seconds during takeoff/landing and delivery and a few seconds during the en route phase).

Federally endangered whooping cranes could pass through the study area during their annual fall migration in mid-September to wintering grounds along the Gulf Coast, and during their annual spring migration to Canada in late March to early April. Potential suitable habitat has been identified for whooping cranes at several lakes within the Houston area as discussed in detail in Section 3.4.2.1, *Special-Status Species*. However, whooping crane migration flights

are usually between 1,000 and 6,000 feet (USFWS n.d.b); therefore, it is not expected that occasional drone flights at 150–250 feet AGL would impact transitory whooping cranes at these altitudes. Additionally, the USFWS has used drones to survey Sandhill Cranes, a surrogate species for whooping crane behavior, and reported "no discernible effect" observed on the animals (USFWS n.d.b). If whooping cranes are observed using habitat in the study area in future, Wing would coordinate with the Arlington Ecological Services Field Office of the USFWS, as well as the Texas Parks & Wildlife Department, to determine if any avoidance zones or other best management practices are needed. Therefore, based on operations occurring mostly in an urban environment, the altitude at which the UA flies in the en route phase, the expected low sound levels experienced by whooping cranes, short duration of increased ambient sound levels, the low probability of a whooping crane occurring in the study area, and the low likelihood of a UA striking a whooping crane, the FAA has determined that the proposed action "*may affect, but is not likely to adversely affect*," the whooping crane.

Eastern black rail and red-cockaded woodpecker could potentially be affected by noise, light, and collision risk associated with the proposed action. However, the action does not involve ground disturbance or vegetation removal and therefore would not physically impact any suitable habitat for these birds. If present in the action area, eastern black rails and red-cockaded woodpeckers could experience UA noise during the en route and delivery flight phases. Birds resting or foraging at or near the tree line at the time a UA flies by would experience the greatest sound levels. Birds near the ground at the time a UA flies by would experience lower sound levels. Given the estimated sound levels of the UA, the UA's linear flight profile to and from nests and delivery locations, the low probability of encountering an individual eastern black rail or red-cockaded woodpecker in the action area given their specific habitat requirements, and the short period of time the UA would be in any particular location, UA noise is not expected to adversely affect ESA-listed birds. Further, the chances of any one individual experiencing multiple overflights of a UA are low given the mobility of the birds. One study found that, in most instances, drones within 4 meters of birds did not cause a behavioral response (Vas et al. 2015). In another study, drones barely elicited behavioral responses in terrestrial mammals (Mulero-Pázmány et al. 2017). Therefore, the FAA has determined that the proposed action *may affect but is not likely to adversely affect* eastern black rails and red-cockaded woodpeckers.

The action does not include ground disturbance and therefore would not physically impact potential West Indian manatee habitat. If present in the action area near operation, West Indian Manatees could experience en route noise. Given the estimated sound levels of the UA, the UA's linear flight profile to and from nests and delivery locations, avoidance of flights over water, the low probability of encountering an individual manatee during operations, and the short period of time the UA would be in any particular location, UA noise is not expected to adversely affect West Indian manatee. Further, the chances of any one individual experiencing multiple overflights of a UA are low given the low population numbers of the species and limited distribution throughout the action area. Therefore, the FAA has determined the proposed action *may affect but is not likely to adversely affect* West Indian manatee.

The action does not include ground disturbance and therefore would not physically impact nesting habitat for any species of sea turtle. Although UAs would not overfly water areas and operating hours would not primarily occur during nighttime nesting hours, nesting sea turtles could potentially experience some en route noise or light emissions from UAs. However, sea turtles are low-frequency hearing specialists and likely have limited ability to perceive the predominantly high frequency noise emitted by transiting UAs (Piniak et al. 2012; Rees et al. 2018). The limited available data suggest that nesting sea turtles are not disturbed by UA activity in their vicinity and would not be disturbed by nearby transiting UAs (Bevan et al. 2018; Selles-Rios et al. 2022). Although artificial night lighting is a predominant stressor to these species, light emissions from UAs are limited to collision prevention lighting after civil twilight hours and would not noticeably contribute to the ambient light environment of nesting beaches or to the disorientation of nesting turtles or their hatchlings. Given the estimated sound levels of the UA, the UA's linear flight profile to and from nests and delivery locations, the low probability of encountering an individual turtle during operations, and the short period of time the UA would be in any particular location, UA noise and light emissions are not expected to adversely affect sea turtles. Further, the chances of any one individual experiencing multiple overflights of a UA are low, given the limited number of deliveries expected in the vicinity of nesting and the relatively short time span that nesting turtles are on shore during operating hours. Therefore, the FAA has determined the proposed action *may affect but is not likely to adversely affect* any ESA-listed sea turtles in the action area.

The tricolored bat is listed as proposed endangered and is therefore not protected under the Act; however, conferencing is necessary if it is determined that a federal action is likely to jeopardize the continued existence of a proposed species. The USFWS concurred that the proposed action does not indicate the need for a conference on a proposed species.

Bats at roost or in flight could experience UA noise during the en route and delivery flight phases. Bats foraging at or near the tree line at the time a UA flies by would experience the greatest sound levels. Roosting bats or bats foraging near the ground at the time a UA flies by would experience lower sound levels. Bats may exhibit disturbance behaviors and change their flight paths to avoid drones in the event that flights overlap with bat activity areas (Ednie et al. 2021). Research suggests that drones have "minimal impact on bat behavior" (Fu et al. 2018) primarily from noise emissions. However, drone disturbance is temporary, and bats are expected to return to normal foraging and flight activities shortly after the exposure to drone noise ends (Kuhlmann et al. 2022; Ednie et al. 2021). Given the estimated sound levels of the UA, the UA's linear flight profile to and from nests and delivery locations, the short period of time the UA would be in any particular location, and the low probability of encountering an individual tricolored bat in the action area, UA noise is not expected to adversely affect ESA-listed bats. Any increase in ambient sound levels caused by the UA's flight would only last a few seconds during the en route phase and approximately 30 seconds during a delivery.

Bats could also be struck by a drone, particularly during nighttime delivery operations while bats are foraging. Given the bat's ability to avoid flying into objects, the short period of time the UA would be in any one place, and the low probability of encountering a proposed ESA-listed bat during operations, the likelihood of the UA striking a bat is discountable.

Therefore, the FAA has determined that the proposed action would not result in *jeopardy* to tricolored bat.

The monarch butterfly is proposed for federal listing. The primary threat to monarch butterflies is habitat loss, including the loss of breeding, migratory, and overwintering habitat. Pesticide use and climate change are also threats. The action would not physically affect monarch butterfly habitat or host plants. Monarch butterflies could be struck by drones en route to and from delivery; however, strikes are not likely given the species' mobility. Information regarding drone impacts on insects is limited, and there have been no widespread negative impacts identified in the scientific literature. Based on the information available and the limited scale of operations, the action is not expected to adversely affect the monarch butterfly.

On April 3, 2026, the FAA submitted an informal consultation request to the USFWS in accordance with Section 7 of the ESA and requested concurrence with the FAA's determination that the proposed action *may affect, but is not likely to adversely affect* the tricolored bat (*Perimyotis subflavus*), eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*), piping plover (*Charadrius melodus*), red-cockaded woodpecker (*Dryobates borealis*), rufa red knot (*Calidris canutus rufa*), and whooping crane (*Grus americana*). FAA's correspondence is provided in Appendix E. The FAA received concurrence from the USFWS on May 28th, 2026, of its determination. The USFWS concurrence letter recommended avoidance measures including substantial reduction of flights in areas where large congregations of birds occur, including avoidance of:

- Galveston Bay and surrounding shorelines;
- colonial waterbird nesting sites during peak nesting season March to July;
- bald eagle nesting sites during peak nesting from October through July; and
- extensive contiguous unfragmented areas of undeveloped habitats. Including but not limited to nature preserves, nature parks, etc.

FAA's and USFWS correspondence, including all recommended avoidance measures, are provided in Appendix E.

Species of Greatest Conservation Need

As with ESA-listed species, the proposed action poses the largest potential to affect flying SGCN at risk for collision during delivery operations. While other species would also be affected by noise and light emissions, these temporary disturbances are not expected to measurably affect the reproduction or survival of any given individuals and would not result in population level changes to any particular species. SGCN at greatest risk include birds, bats, and insects. However, the risk of collision is very low and species most likely would be able to avoid UAs due to the same disturbance factors listed previously. As such, the proposed action is not expected to have significant adverse effects on any SGCN within the study area.

The American bumblebee (*Bombus pensylvanicus*) is also considered a state SGCN and may be present in the study area. Insects, such as the bumblebee, could be struck by drones en

route to or during delivery. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in the scientific literature. Therefore, based on the information available, the action is not expected to have significant impacts on insect populations. SGCN insects could be struck by drones en route to or during delivery. Information regarding drone impacts on insects is limited; but what scientific literature there is addressing drone impacts on insects do not report widespread negative impacts. Therefore, based on the information available, the action is not expected to have significant impacts on insect populations.

Migratory Birds

While there is a well-established repository of literature on bird mobbing and attack behaviors, and on bird strikes with large aircraft, information on drone interactions with birds is not as well documented. Without a baseline of data or pre-existing research on drone interactions with birds, creation of an effective and sensible predictive model is not possible. Therefore, this analysis focused on bird behavior and identified the Northern mockingbird, Red-winged Blackbird, and Common Grackle as potential species that could mob or attack a drone while defending territory, especially during the early spring to mid-summer breeding period.

With larger scale operations in Australia since 2017, Wing has incurred relatively few conflicts with birds, which involved a handful of mobbing and brief attack behaviors in Canberra, Australia (2021) from Australian Ravens in delivery flight. In each instance, the Raven attacked the drone from behind causing damage to foam on the vertical tail and then disengaged from the attack. Additionally, two other instances of birds making contact with drones were recorded in the United States by hobbyists (Connecticut Audubon Society n.d.). These were similar to the Australian instance where Ravens made a brief touch to the backside of the drone in flight as a curiosity behavior before flying away from the moving object.

To avoid impacts on nesting Bald Eagles, Wing will implement a monitoring plan for Bald Eagle nests that integrates multiple strategies and resources. This includes periodically checking online tools such as iNaturalist[28] to identify eagle nests that may occur in the operating area, as well as communication with the bird watching community to identify nests. Wing personnel will also be educated in the visual identification of Bald Eagle nests, which are typically very conspicuous. If Wing identifies a Bald Eagle nest or is notified of the presence of a nest, Wing will establish an avoidance area such that there is a 1,000 feet vertical and horizontal separation distance between the vehicle's flight path and the nest. Wing will maintain this avoidance area until the end of the breeding season or until a qualified biologist indicates the nest has been vacated. Wing will regularly report monitoring and avoidance measures to Texas Parks & Wildlife and the USFWS Region 2 Migratory Bird Permit Office.

Based on the information available regarding the interaction between drones and birds, the FAA concludes that mobbing and attacking behaviors would be the most relevant interaction to occur. As detailed in Table 3.4-2, some bird species are more likely to exhibit this type of

[28] https://www.inaturalist.org/.

behavior, and these are the species that would be expected to interact with the drones, if any. The proposed action would not be expected to result in significant impacts on migratory birds because it would not result in long-term or permanent loss of wildlife species, would not result in substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or populations, and would not have adverse impacts on reproductive success rates, natural mortality rates, non-natural mortality, or ability to sustain the minimum population levels.

3.5 Department of Transportation Act, Section 4(f) Resources

3.5.1 Definition of Resource and Regulatory Setting

Section 4(f) of the U.S. Department of Transportation Act (codified at 49 U.S.C. § 303) protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) states that, subject to exceptions for de minimis impacts "[t]he Secretary may approve a transportation program or project requiring the use of [4(f) resources]…only if—(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

The term "use" includes both direct or physical and indirect or "constructive" impacts on Section 4(f) resources. *Direct use* is the physical occupation or alteration of a Section 4(f) property or any portion of a Section 4(f) property. *Constructive use* does not require direct physical impacts or occupation of a Section 4(f) resource. A constructive use would occur when a proposed action would result in substantial impairment of a resource to the degree that the protected activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.[29] Substantial impairment occurs only when the protected activities, features, or attributes of the Section 4(f) property that contribute to its purpose and significance are substantially diminished. This means that the value of the Section 4(f) property, in terms of its prior purpose and significance, is substantially reduced or lost.

Another type of physical use, known as *temporary occupancy,* results when a transportation project results in activities that require a temporary easement, right-of-entry, project construction, or another short-term arrangement involving a Section 4(f) property. Temporary occupancies of land are so minimal as to not constitute a use within the meaning of Section 4(f). See, e.g., 23 CFR 774.13(d)(1)-(5) for description.

A physical use may be considered *de minimis* if, after considering avoidance, minimization, mitigation, and enhancement measures, the result is either (1) a determination that the project

[29] Federal Highway Administration Section 4(f) Policy Paper. (Note: Federal Highway Administration regulations are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to aviation projects.) Available: https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf.

would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or (2) a Section 106 *finding of no adverse effect* or *no historic properties affected*. Before the FAA may finalize a determination that a physical use is *de minimis*, the official(s) with jurisdiction must concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection.

Procedural requirements for complying with Section 4(f) are set forth in in DOT Order 5610.1D, *Procedures for Considering Environmental Impacts* and 49 U.S.C. § 303. The FAA also uses Federal Highway Administration regulations (23 CFR Part 774) and Federal Highway Administration guidance (e.g., Section 4(f) Policy Paper) when assessing potential impacts on Section 4(f) properties. These requirements are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to FAA projects. More information about DOT Act, Section 4(f) can be found in Appendix C of the FAA Order 1050.1G (FAA 2025).

3.5.2 Affected Environment

The FAA used data from federal, state, and other public-access sources to identify potential Section 4(f) resources within the study area (Appendix B). The FAA identified many properties that meet the definition of a Section 4(f) resource, including public parks administered by state, city, and county authorities, and historic properties identified on the Texas State Historic Preservation Officer (SHPO) website. By count, most of the Section 4(f) resources are local public parks, trails, and ballfields. Appendix B provides a map and table of local, state, and federal parks and recreation departments in the study area which have jurisdiction over Section 4(f) properties. The Trinity River National Wildlife Refuge and Brazoria National Wildlife Refuge are within the study area. The San Houston National Forest, W. G. Jones State Forest, Brazos Bend State Park, Sheldon Lake State Park, North Park Recreation Area, and San Jacinto Battleground State Historic Site are located within the study area. These resources are not currently included in Wing's fly less restrictions, which include schools (elementary, middle, high school), preschools and daycares with outdoor facilities, and churches.

There may be instances where the delivery would be to a customer located within a Section 4(f) resource. Wing validation activities with the FAA may include deliveries to sites in the Houston metro area. For example, when initiating package delivery operations in other locations, public delivery zones were set up for events and community engagement in collaboration with the city parks and recreation department.

As discussed in Section 3.6, *Historical, Architectural, Archaeological, and Cultural Resources*, there are numerous historic properties within the study area as listed on the Texas SHPO website, although most of these are considered for architectural or other purposes that would not typically be affected by UA operations. The FAA also consulted with the Texas SHPO to determine whether historic and traditional cultural properties would be affected by the proposed action (see Section 3.6.2, *Affected Environment*).

3.5.3 Environmental Consequences

3.5.3.1 No Action Alternative

Under the no action alternative, Wing would not implement commercial UA package delivery operations in the Houston metro area. Market demand would not be met, and consumers would continue to use personal ground transportation to retrieve small goods. This alternative does not support the stated purpose and need.

3.5.3.2 Proposed Action

Under the proposed action, there would be no physical or constructive use of Section 4(f) resources because nests and autoloaders would be sited in commercially zoned areas outside of Section 4(f) property boundaries and occasional flyovers in the study area would not result in substantial impairment of Section 4(f) properties. No physical occupancy of Section 4(f) resources would occur as a result of the proposed action. As discussed in Section 3.7, *Noise and Noise-Compatible Land Use*, and Appendix D, the proposed action would not result in significant noise levels at any location within the study area. As further described in Section 3.8, *Visual Effects*, the short duration of en route flights (approximately 15 seconds) would minimize any potential for significant visual impacts. In addition, Wing's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location; with the diversification of flight paths, the frequency of overflights would inversely scale as the distance from a nest increases. As discussed above, Wing has established a direct line of communication with Texas Parks & Wildlife to discuss any concerns regarding parkland noise and will carefully coordinate any parkland delivery operations with managing entities as necessary. The only aboveground structures would consist of autoloaders no more than 10 feet in height and seven feet wide, which could incur a minor visual effect on historic properties if those properties are within the viewshed of the autoloaders. Similarly, nests are located in commercially zoned areas and would not appreciably change the viewshed or result in substantial visual effects on Section 4(f) resources.

Therefore, the FAA has determined that UA overflights and nest and autoloader siting as described in the proposed action would not cause substantial impairment to any of the Section 4(f) resources in the study area and are therefore not considered a constructive use of any Section 4(f) resource.

3.6 Historical, Architectural, Archaeological, and Cultural Resources

3.6.1 Definition of Resource and Regulatory Setting

Cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions. Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archaeological sites, structures, objects, and districts that are considered important to

a culture or community. Cultural resources also include aspects of the physical environment, namely natural features and biota that are a part of traditional ways of life and practices and are associated with community values and institutions.

The major law that protects cultural resources is the National Historic Preservation Act. Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. § 306108) requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP). This includes properties of traditional religious and cultural importance to an American Indian tribe or Native Hawaiian organization that meets the NRHP criteria. Regulations related to this process are contained in 36 CFR Part 800, Protection of Historic Properties. Compliance with Section 106 requires consultation with the SHPO and applicable other parties, including Indian tribes.

Major steps in the Section 106 process include identifying the area of potential effects (APE), identifying historic and cultural resources within the APE, consulting with the SHPO and Tribal Historic Preservation Officers for tribes that are identified as potentially having traditional cultural interests in the area, and determining the potential effects on historic properties as a result of the action.

The FAA has not established a significance threshold for this impact category; however, the FAA has identified a finding of adverse effect on historic properties through the Section 106 process as a factor to consider in assessing significant impact. However, an adverse effect finding does not automatically trigger the preparation of an Environmental Impact Statement (i.e., a significant impact). If an adverse effect is determined, the Section 106 process will be resolved through execution of a Memorandum of Agreement or Programmatic Agreement to mitigate or minimize adverse effects.

3.6.2 Affected Environment

The APE for the proposed action is the entire study area where Wing is planning to conduct UA package deliveries, as shown in Figure 2.2-1. According to the National Park Service's online database of the NRHP, a total of 285 NRHP-listed historic properties and 3 NRHP historic districts occur within the APE (National Park Service 2025). Historic properties and districts are listed in the attached Tribal and SHPO letters (Appendices F and G, respectively).

3.6.3 Environmental Consequences

3.6.3.1 No Action Alternative

Under the no action alternative, Wing would not implement commercial UA package delivery options in the Houston metro area and surrounding areas. The no action alternative is not expected to result in significant impacts related to historical, architectural, archaeological, and cultural resources.

3.6.3.2 Proposed Action

Nests would be located in commercially zoned areas within parking lots of shopping centers and large retailers. Infrastructure for this project would consist almost entirely of pre-existing hardstand and would involve no ground disturbance. The only aboveground structures would consist of autoloaders no more than 10 feet in height and seven feet wide, which could incur a minor visual effect on historic properties if those properties are within the viewshed of the autoloaders. However, required standoff distances of 45–80 feet, depending on airspace classification as described in Appendix D, would minimize these impacts.

Wing projects up to 400 delivery flights per operating day per nest, meaning any historic or cultural resource would experience few overflights per day, if any. All takeoff and loading operations would occur at least 45 feet away from any historic properties, adhering to standoff requirements for noise-sensitive areas. Deliveries at or near historic properties would involve the UA hovering at 23 feet AGL for about 30 seconds. In flight, the UA would appear as a small object moving at twice the speed of bird flight. These rapid and intermittent flight operations would result in minimal visual effects. Additionally, Wing's flight planning software minimizes overflights of any specific location by varying flight paths (Section 2.2, *Proposed Action*).

Noise levels for takeoff and delivery would remain below 84 dB SEL for 30 seconds. In-flight noise for the 7000W-B model at 165 feet AGL is 56.5 dBA SEL, while the 8000-A model produces 62.0 dBA. The FAA's noise exposure analysis (Section 3.7, Noise and Noise-Compatible Land Use, and Appendix D) confirms that noise levels would be below significance thresholds, even in areas of highest exposure. The small size of the UA ensures no vibrations that could affect historic structures or contents within the APE.

In conclusion, Wing UA operations would only incur intermittent and minor visual and audible effects on historic properties. While delivery noise and potential visual impacts were considered for properties where a quiet setting or an unobstructed sky contributes to significance, any effects would be negligible and temporary. In accordance with 36 CFR § 800.4(a)(1), the FAA transmitted a letter on April 23, 2026, to the Texas SHPO that there would be *no adverse effect* on historic properties by the proposed action based on the minimal infrastructure required for the project, consideration of historic properties in the OpSpecs as noise-sensitive areas, and the temporary nature of potential audible and visual effects (Appendix F).

On April 23, 2026, the FAA submitted consultation request with the Texas SHPO. FAA's consultation with the Texas SHPO is provided in Appendix F. The FAA received concurrence from the SHPO on April 29, 2026 of its determination of *no adverse effect* by the proposed action. As currently analyzed, the proposed action would not result in significant impacts on historical, architectural, archaeological, or cultural resources. On April 27, 2026, the FAA initiated government-to-government consultation with Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Tonkawa Tribe of Indians of Oklahoma, and the Wichita and Affiliated Tribes. The FAA did not receive a response from any of the tribes. The FAA's tribal and historic outreach letters are included in Appendix F.

3.7 Noise and Noise-Compatible Land Use

3.7.1 Definition of Resource and Regulatory Setting

Noise is considered any unwanted sound that interferes with normal activities (such as sleep, conversation, student learning) and can cause annoyance. Aircraft noise is often the most noticeable environmental effect associated with any aviation project. Several federal laws, including the Aviation Safety and Noise Abatement Act of 1979, as amended (49 U.S.C. §§ 47501–47507) regulate aircraft noise and noise-compatible land use. Through 14 CFR Part 36, the FAA regulates noise from aircraft. FAA Order 1050.1G, Appendix C, Section 1.3 requires the FAA to identify the location and number of noise-sensitive areas that could be significantly impacted by noise.

Sound is measured in terms of the decibel (dB), which is the ratio between the sound pressure of the sound source and 20 microPascals, which is nominally the threshold of human hearing. Various weighting schemes have been developed to collapse a frequency spectrum into a single dB value. The A-weighted decibel, or dBA, corresponds to human hearing accounting for the higher sensitivity in the mid-range frequencies. To comply with NEPA requirements, the FAA has issued requirements for assessing aircraft noise in FAA Order 1050.1G, Appendix C. The FAA's required noise metric for aviation noise analysis is the yearly Day-Night Average Sound Level (DNL) metric. The DNL metric is a single value representing the logarithmically averaged aircraft sound level at a location over a 24-hour period, with a 10 dB adjustment added to those noise events occurring from 10:00 p.m. to 7:00 a.m. the following morning. A significant noise impact is defined in FAA Order 1050.1G as an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure or a noise exposure at or above the DNL 65 dB due to a DNL 1.5 dB or greater increase.

3.7.2 Affected Environment

The approximate land area within the study area is approximately 4,703 square miles, the approximate water area is 84 square miles, and the estimated population within the counties included in the study area is 7,468,827 per 2023 estimates (USCB 2023).

The ambient (or background) sound level in the operations area varies and depends on the uses in the immediate vicinity. For example, the ambient sound level along a major highway is higher than the ambient sound level within a residential neighborhood. Existing sound sources in the operating area are primarily those from anthropogenic sources associated with commercial, industrial, transportation (e.g., highways, rail, and air travel), and residential land uses in an urban and city environment (e.g., vehicles, construction equipment, aircraft). Except for areas proximate to airports, existing aviation noise levels in the Houston study area are expected to be well below the FAA's threshold for significant noise exposure to residential land use (DNL 65 dB).

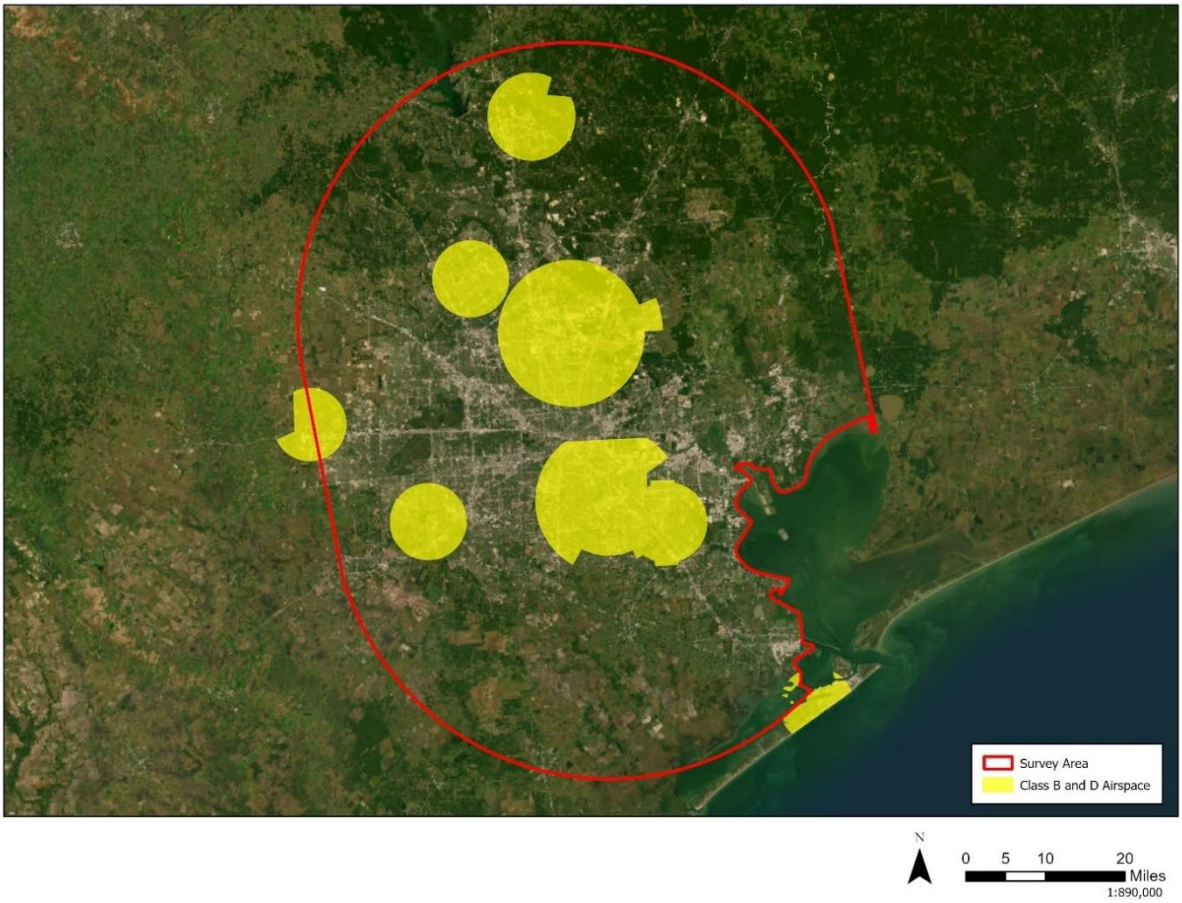


Figure 3.7-1. Controlled Surface Area of Class B and Class D Airspace

3.7.3 Environmental Consequences

3.7.3.1 No Action Alternative

Under the no action alternative, Wing would not implement commercial UA package delivery operations in the Houston metro area. Wing would continue to conduct UA package delivery operations under Part 135 in locations currently authorized by its OpSpecs and at other locations under 14 CFR Part 107. Therefore, the no action alternative is not expected to cause a significant impact on any noise-sensitive resources within the study area.

3.7.3.2 Proposed Action

Operations would include up to 400 deliveries from each nest and would occur up to 365 days per year. The FAA developed a methodology to evaluate the potential noise exposure in the proposed study area that could result from implementation of the proposed action (Appendix D). The noise assessment evaluated noise emissions data for the Hummingbird 7000W-B and 8000-A.

Due to the unknown fleet mix and operational profile(s) that would be used (i.e., manual load, nearfield autoload, or offsite autoload), this analysis assumes the most conservative

scenario with the farthest setback distances presented in Tables 9 to 16 of Appendix D. This analysis was used to define the potential significant impacts due to the proposed action. Noise assessments were performed for each of the flight phases as discussed in detail in the following sections.

Noise Exposure for Nest Operations

Based on a daily maximum of 400 deliveries per nest, 24 FitBIT operations before 7 a.m., 1 GeoBIT operation, and 365 operating days per year, Table 3.7-1 provides the most conservative extent of daily noise exposure for nest operations.

Table 3.7-1. Estimated Extent of Noise Exposure from Nest

Annual Average Daily DNL Equivalent Deliveries	DNL Equivalent FitBIT Operations	DNL Equivalent GeoBIT Operations	DNL 65 dB	DNL 60 dB	DNL 55 dB	DNL 50 dB
400	240	1	35 feet	65 feet	120 feet	235 feet

Source: ICF 2024.
Note: Distances are the worst-case noise scenario (longest set back distances) based on Tables 9 through 12 of Appendix D.
dB = decibel; DNL = day-night average sound level; FitBIT = fitness built-in test; GeoBIT = geography built-in test.

As described in Section 2.2, *Proposed Action*, nests would be placed at least 120 feet away from noise-sensitive areas within the controlled surface areas of Class B, Class C, and Class D airspace. In addition, nests would be placed at least 65 feet away from noise-sensitive areas when they are outside of the controlled surface areas of Class B, Class C, and Class D airspace. Based on the above distances, the increase of noise would not be expected to exceed DNL 1.5 dB within DNL 65 dB of existing aviation noise exposure or become DNL 65 dB with the increase of DNL 1.5 dB because DNL 60- and 65-dB of existing aviation noise exposure would not exceed the controlled surface areas of Class B, Class C, and Class D airspace. Therefore, there would be no significant impact due to the nest operations.

Noise Exposure for Offsite Package Autoload Operations

As stated in 2.2.2.6, offsite package autoload operations consist of UA descent from its close transit altitude (safe altitude above local terrain and obstacles) to 14.5 feet AGL and lowers the package hook. The UA then passes approximately 10 feet laterally over the autoloader. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. A single offsite package autoload operation consists of arrival, package autoload, and departure phases. As shown in Table 3.7-2, offsite package autoload operations would not exceed DNL 65 dB at 25 feet from an offsite autoloading location at a rate of 400 deliveries per day.

Table 3.7-2. Estimated Extent of Noise Exposure from an Offsite Package Autoloading Location

Average Daily Deliveries per Autoloader	DNL 65 dB (ft)	DNL 60 dB (ft)	DNL 55 dB (ft)	DNL 50 dB (ft)	DNL 45 dB (ft)
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	<25
10	<25	<25	<25	<25	40
15	<25	<25	<25	<25	50
20	<25	<25	<25	30	55
25	<25	<25	<25	35	65
50	<25	<25	<25	50	95
75	<25	<25	35	60	135
100	<25	<25	40	70	170
150	<25	<25	50	95	230
200	<25	30	55	115	275
300	<25	40	70	165	355
400	<25	45	80	205	430

Note: Distances are the worst-case noise scenario (longest set back distances) based on Tables 13 and 14 of Appendix D.
DNL = day-night average sound level.

Offsite package autoload would not occur within 80 feet of noise-sensitive areas when the autoloader is located within the controlled surface area of Class B, Class C, and Class D airspace and 45 feet away from noise-sensitive areas in all other areas within the study area. Based on the above distances, the increase of noise would not be expected to exceed DNL 1.5 dB within DNL 65 dB of existing aviation noise exposure or become DNL 65 dB with the increase of DNL 1.5 dB because DNL 60- and 65-dB of existing aviation noise exposure would not exceed the controlled surface areas of Class B, Class C, and Class D airspace. Therefore, there would be no significant impact due to autoload operations. See Appendix D for a detailed explanation of setback distances.

Noise Exposure for En Route Operations

Based on the information provided by Wing, it is expected that UA would generally cruise at or above an altitude of 165 feet AGL and travel at a ground speed of 59 mph (51 knots) during en route flight. The en route noise exposure for a single point exposed to 400 delivery and return flights (800 flights total) would be DNL 40.7 dBA. Considering that en route UA noise would be significantly lower under any delivery scenarios, this was not quantified further.

Noise Exposure for Delivery Operations

The noise exposure for delivery operations includes the noise exposure for the delivery point itself, based on maximum daily deliveries to any one location. The DNL delivery noise exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. The noise exposure for any one delivery point is provided in Tables 15 and 16 of Appendix D and summarized in Table 3.7-3 for

various DNL levels. At the level of five daily DNL equivalent deliveries, significant noise effects would not be expected anywhere beyond the immediate point of delivery.

Table 3.7-3. Estimated Extent of Noise Exposure for Delivery Locations Based on Maximum Deliveries per Location

Average Daily DNL Equivalent Deliveries	DNL 65 dB (ft)	DNL 60 dB (ft)	DNL 55 dB (ft)	DNL 50 dB (ft)	DNL 45 dB(ft)
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	<25

Source: ICF 2024.
Note: Distances are the worst-case noise scenario (longest set back distances) based on Tables 15 and 16 of Appendix D.
DNL = day-night average sound level.

Reasonably Foreseeable Effects

Because UA operations would occur in areas subject to other aviation noise sources, it is necessary to evaluate the total noise exposure that would result from the other aviation noise sources present that are also subject to FAA jurisdiction. Examples of such scenarios are Wing operations occurring in the vicinity of an airport where Wing flight activity may overlap with those other UA package delivery operators. Aviation noise sources are most likely to be the dominant contribution to noise impacts near airports. By comparison, other sources of noise would not appreciably contribute to overall noise levels at these locations.

There are 210 airports within the Houston metro area (see Appendix G). The potential for noise and compatible land use effects would result from UA and manned aircraft operating within DNL 60 dB noise exposure areas of existing airports. As such, the potential for additional effects would be minimized because Wing has elected to require that all nests would be placed at least 120 feet away from noise-sensitive areas within the controlled surface areas of Class B, Class C, and Class D airspace. In addition, nests would be placed at least 65 feet away from noise-sensitive areas when they are outside of the controlled surface areas of Class B, Class C, and Class D airspace. No other Part 135 UA operations currently occur in the Houston metro area. Wing's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location, thereby reducing the potential for additive effects when combined with other operations in the study area. Additionally, Part 135 operators would be required to complete an environmental review before beginning operations, ensuring that any potential noise effects are properly analyzed and disclosed.

Nest sites would be in areas zoned for commercial activities and away from noise-sensitive areas. Nests would be powered using available electric outlets for recharging batteries. No effects are expected on the power grid or from energy sources.

Wing acknowledges that future operators may propose locating operations within this proposed action's study area. Should that occur, Wing understands the potential for impacts may increase due to a future operator's project and would work with that operator and the FAA to mitigate potential impacts. Wing also understands that any future operators would be required to perform their own NEPA analysis to identify the potential for any noise impacts due to their operations. The degree to which all of the different operators would operate

within areas of shared airspace is dependent on the operators, their specific business use cases, and their ability to deconflict with one another in those overlapping areas. Each operator is responsible for coordinating with other operators in the same geographic area to avoid significant impacts. Wing will communicate and coordinate with other operators to limit operations occurring concurrently in the same area to avoid any significant impacts.

Overall Noise Exposure Results

The maximum noise exposure levels are associated with nest operations, where DNL 65 dB occurs within 45 feet of a nest perimeter and DNL 60 dB occurs within 65 feet. As described in Section 2.2, *Proposed Action*, nests would be located at least 65 feet away from noise-sensitive areas. In addition, when nests are planned to be within the controlled surface areas of Class B, Class C, and Class D airspace, nests would be placed 120 feet away from noise-sensitive areas. Offsite package autoload would not occur within 80 feet of noise-sensitive areas when the autoloader is located within the controlled surface area of Class B, Class C, and Class D airspace and 45 feet away from noise-sensitive areas in all other areas within the study area. Wing understands the potential for future operators to enter into the proposed operations area and would work with future operators and the FAA to avoid the contribution of significant noise effects.

Based on the noise analysis, and the above operating parameters, *the proposed action would not have a significant noise impact*.

3.8 Visual Effects

3.8.1 Definition of Resource and Regulatory Setting

Visual effects deal broadly with the extent to which the project would either (1) produce light emissions that create annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Visual effects can be difficult to define and assess because they involve subjectivity. In this case, the detailed analysis of visual effects is limited to the introduction of a visual intrusion—a UA in flight—which could be out of character with the suburban or natural landscapes.

The FAA has not developed a visual effects significance threshold. Factors the FAA considers in assessing significant impacts include the degree to which the action would have the potential to (1) affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; (2) contrast with the visual resources and/or visual character in the study area; or (3) block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

3.8.2 Affected Environment

The proposed action would take place over mostly suburban and commercially developed properties. As noted in Section 3.5, *Department of Transportation Act, Section 4(f) Resources*, there are some publicly owned resources that could be valued for aesthetic

attributes within the study area. However, Wing's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location; with the diversification of flight paths, the frequency of overflights would inversely scale as the distance from a nest increases. During takeoff, remote pickup, and delivery, the UA would depart from a nest and travel en route at an altitude less than 400 feet AGL (en route travel would generally occur between 150 and 250 feet AGL). Deliveries would mostly take place at residences, and, in some cases, there may be instances where the delivery would be to a customer located within a Section 4(f) resource (see Section 3.5.2 for more information on 4(f) properties). A 6-foot-radius clear space is required for delivery, such as a driveway, parking lot, field, common area, patio, or clear spaces surrounding multi-family dwellings, as determined during the delivery request process.[30] The duration of delivery from the time the customer approves the delivery to the transition back to en route flight mode is expected to last approximately 15 seconds. The FAA estimates at typical operating altitude and speeds the UA en route would be observable for approximately 6 seconds by an observer on the ground.

3.8.3 Environmental Consequences

3.8.3.1 No Action Alternative

Under the no action alternative, Wing would not implement commercial UA package delivery operations in the Houston metro area. Therefore, the no action alternative is not expected to result in significant visual effects.

3.8.3.2 Proposed Action

The proposed action would make no changes to any landforms or land uses; thus, there would be minimal effect on the visual character of the area, as the nests and autoloaders would be located in established commercial areas as further described in Section 2.2, *Proposed Action*. At most, visual effects from stationary equipment would be minor in magnitude and would not substantially affect the viewshed of sensitive visual resources, such as historic properties. The proposed action involves airspace operations that could result in visual impacts on sensitive areas such as Section 4(f) properties where the visual setting is an important resource of the property. The short duration when each UA flight could be seen from any resource in the study area and the low number of overflights within any given location would minimize any potential for significant visual impacts.

The proposed action does not have the potential to do the following:

- Create annoyance or interfere with normal activities from light emissions;
- Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;

[30] In the event that the clear space contains obstructions such as trees or cars, the UA would abort the delivery and return to the nest.

- Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Contrast with the visual resources and/or visual character in the study area; and
- Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

Therefore, the proposed action is not expected to cause significant impacts to visual resources.

Appendix A
References

Allmand n.d. Allmand Maxi-Power 25 Generator. Available: https://www.allmand.com/na/en_us/product-catalog/generators/maxipower-25.html. Accessed: August 12, 2025.

Bevan, E., S. Whiting, T. Tucker, M. Guinea, A. Raith, and R. Douglas. 2018. Measuring behavioral responses of sea turtles, saltwater crocodiles, and crested terns to drone disturbance to define ethical operating thresholds. *PLOS One* 13(3): e0194460. Available: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0194460. Accessed: January 27, 2026.

Connecticut Audubon Society. n.d. *Flying Drones Pose Danger to Threatened Birds*. Available: https://ct.audubon.org/news/flying-drones-pose-danger-threatened-birds#:~:text=Drones%20can%20cause%20nest%20abandonment,repeated%20harassment%20from%20a%20drone. Accessed: August 12, 2025.

Cornell Lab of Ornithology (Cornell Lab). n.d.a. *All About Birds: Red-cockaded Woodpecker.* Available: https://www.allaboutbirds.org/guide/Red-cockaded_Woodpecker/overview. Accessed: August 22, 2025.

———. n.d.b. *All About Birds: Bald Eagle*. Available: https://www.allaboutbirds.org/guide/bald_Eagle/overview. Accessed: August 22, 2025.

Ednie, G., D.M. Bird, and K.H. Elliott. 2021. Fewer Bat Passes Are Detected During Small, Commercial Drone Flights. *Sci Rep* 11, 11529. Available: https://doi.org/10.1038/s41598-021-90905-0. Accessed: August 12, 2025.

Electric Reliability Council of Texas (ERCOT). 2025. Grid and Market Conditions. Available at: https://www.ercot.com/gridmktinfo/dashboards. Accessed: August 15, 2025.

U.S. Environmental Protection Agency (EPA). 2025a. NAAQS Table. Available: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed: August 14, 2025.

———. 2025b. Green Book Nonattainment Areas for Criteria Pollutants: Texas. Available https://www3.epa.gov/airquality/greenbook/anayo_tx.html Accessed: August 14, 2025.

———. 2025c. De Minimis Tables. Available: https://www.epa.gov/general-conformity/de-minimis-tables. Accessed: August 14, 2025.

U.S. Environmental Protection Agency (EPA). 1995. Calculating Potential to Emit (PTE) for Emergency Generators. Available: https://www.epa.gov/sites/default/files/2015-08/documents/emgen.pdf. Accessed: April 29, 2026.

Federal Aviation Administration (FAA). 2025. *Order 1050.1G, FAA National Environmental Policy Act Implementing Procedures.* Available: https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050.1G.pdf. Accessed: August 25, 2025.

Fu, Y., M. Kinniry, and L. N. Kloepper. 2018. The Chirocopter: A UAV for Recording Sound and Video of Bats at Altitude. *Methods in Ecology and Evolution* 9(6):1531–1535. Available: https://doi.org/10.1111/2041-210x.12992. Accessed: August 12, 2025.

ICF. 2024. Technical Noise Study Report: Hummingbird 7000W-B And 8000-A Unmanned Aircraft Package Delivery Operations. Report No. 112024.

iNaturalist. 2025a. Whooping Crane Observations. Available: https://www.inaturalist.org /observations?nelat=30.573632861433406&nelng=-94.73113384504423&subview=map &swlat=29.13970822231531&swlng=-95.90941753645048&taxon_id=34. Accessed August 12, 2025.

———. 2025b. Bald Eagle Observations. Available: https://www.inaturalist.org/observations?nelat=30.450588397195503&nelng=-94.40154400129423&page=3&subview=map&swlat=29.13970822231531&swlng=-96.01928081770048&taxon_id=5305. Accessed: August 12, 2025.

Intergovernmental Panel on Climate Change. n.d. 4.2.3.2 Volatile organic compounds (VOC). Available: https://archive.ipcc.ch/ipccreports/tar/wg1/140.htm. August 14, 2025.

Kalb, N., and C. Randler. 2019. Behavioral Responses to Conspecific Mobbing Calls Are Predator-Specific in Great Tits (*Parus major*). *Ecology and Evolution* 9(16):9207–9213. Available: https://doi.org/10.1002/ece3.5467. Accessed: August 12, 2025

Kuhlmann, K., Fontaine, A., Brisson-Curadeau, É., Bird, D. M. & Elliott, K. H.. 2022. Miniaturization eliminates detectable impacts of drones on bat activity. Methods in Ecology and Evolution. 13(4): 842–851. Available: https://besjournals. onlinelibrary.wiley.com/doi/full/10.1111/2041-210X.13807. Accessed: August 22, 2025.

Lyon-Hill, Sarah, Tilashalski, Melissa, Ellis, Kimberly, and Travis Elli. 2020. *Measuring the Effects of Drone Delivery in the United States.* Virginia Tech Office of Economic Development and the Grado Department of Industrial & Systems Engineering.

Mass Audubon. 2023. *Aggressive Birds*. Available: https://www.massaudubon.org/nature-wildlife/birds/aggressive-birds. Accessed: August 12, 2025.

McConnell, C. 2021. Identifying, Protecting and Managing Stopover Habitats for Wild Whooping Cranes on U.S. Army Corps of Engineers Lakes. *bioRxiv (Cold Spring Harbor Laboratory)*. Available: https://doi.org/10.1101/2020.12.30.424870. Accessed: January 27, 2026.

Mulero-Pázmány, M., S. Jenni-Eiermann, N. Strebel, T. Sattler, J. José Negro, and Z. Tablado. 2017. Unmanned Aircraft Systems as a New Source of Disturbance for Wildlife: A Systematic Review. PloS One. Available: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0178448. Accessed January 27, 2026.

National Parks Service. 2025. Nationwide Rivers Inventory. Available https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm. Accessed: August 14, 2025.

Piniak WED, Mann DA, Eckert SA, Harms CA. 2012. Amphibious hearing in sea turtles. In: Popper AN, Hawkins A (eds) The effects of noise on aquatic life. Springer, New York, NY, p 83−87.

Rees, A.F., Avens, L., Katia, B. et al. 2018. The potential of unmanned aerial systems for sea turtle research and conservation: a review and future directions. Endangered Species Research. 35: 81–100. Available: https://www.int-res.com/articles/esr2018/35/n035p081.pdf. Accessed: January 27, 2026.

Rodrigues, T. A., Patrikar, J., Oliveira, N. L., Matthews, H. S., Scherer, S., and Samaras, C. 2022. Drone flight data reveal energy and greenhouse gas emissions savings for very small package delivery. *Patterns* 3(8): 100569, ISSN 2666-3899. Available: https://doi.org/10.1016/j.patter.2022.100569. Accessed: August 14, 2025.

Royal Society for the Protection of Birds (RPSB). 2023. *What is Mobbing?* Available: https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/birdwatching/bird-behaviour/what-is-mobbing/. Accessed: August 12, 2025.

Runkle, J., K.E. Kunkle, J. Nielson-Gammon, R. Frankson, S.M. Champion, B.C. Stewart, L. Romolo, W. Sweet. 2022: Texas State Climate Summary 2022. NOAA Technical Report NESDIS 150-GA. Available: https://statesummaries.ncics.org/chapter/tx/. Accessed: August 15, 2025.

Selles-Rios, B., Flatt, E., Ortiz-Garcia, J., Garcia-Colome, J., Latour, O., and Whitworth, A. 2022. Warm beach, warmer turtles: Using drone-mounted thermal infrared sensors to monitor sea turtle nesting activity. Frontiers in Conservation Science. 3: 954791. Available: https://www.frontiersin.org/journals/conservation-science/articles/10.3389/fcosc.2022.954791/full. Accessed: January 27, 2026.

Texas Commission on Environmental Quality (TCEQ). 2025. Monitoring Operations. Available: https://www.tceq.texas.gov/airquality/monops. Accessed: August 22, 2025.

Texas Parks & Wildlife Department. n.d.a Texas Ecoregions. https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions. Accessed: September 4, 2025.

———. n.d.b. Green Sea Turtle. https://tpwd.texas.gov/huntwild/wild/species/greentur/. Accessed: January 27, 2026.

———. n.d.c. Kemp's Ridley Sea Turtle. https://tpwd.texas.gov/huntwild/wild/species/ridley/. Accessed: January 27, 2026.

———. n.d.d Monarch Butterfly. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/texas_nature_trackers/monarch/. Accessed: January 22, 2026.

———. n.d.e. Hawksbill Sea Turtle. https://tpwd.texas.gov/huntwild/wild/species/seaturtle/. Accessed: January 27, 2026.

U.S. Census Bureau (USCB). 2023. ACS Demographic and Housing Estimates, Texas Counties. Available: https://data.census.gov/table/ACSDP5Y2023.DP05?q=population&g=050XX00US48071,48407,48473. Accessed: September 8, 2025.

U.S. Department of the Navy. 2022. *The Air Almanac 2023.* The Nautical Almanac Office United States Naval Observatory. Available: https://aa.usno.navy.mil/publications/aira. Accessed: August 12, 2025.

U.S. Fish and Wildlife Service (USFWS). 2023. Tricolored Bat. Available at: https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus. Accessed: August 12, 2025.

———. 2025. Official Species List. Information for Planning and Conservation (IPaC). Available: https://ipac.ecosphere.fws.gov/. Accessed: August 13, 2025.

———. n.d.a. *West Indian Manatee (Trichechus manatus).* Available: https://ecos.fws.gov/ecp/species/4469. Accessed: September 8, 2025.

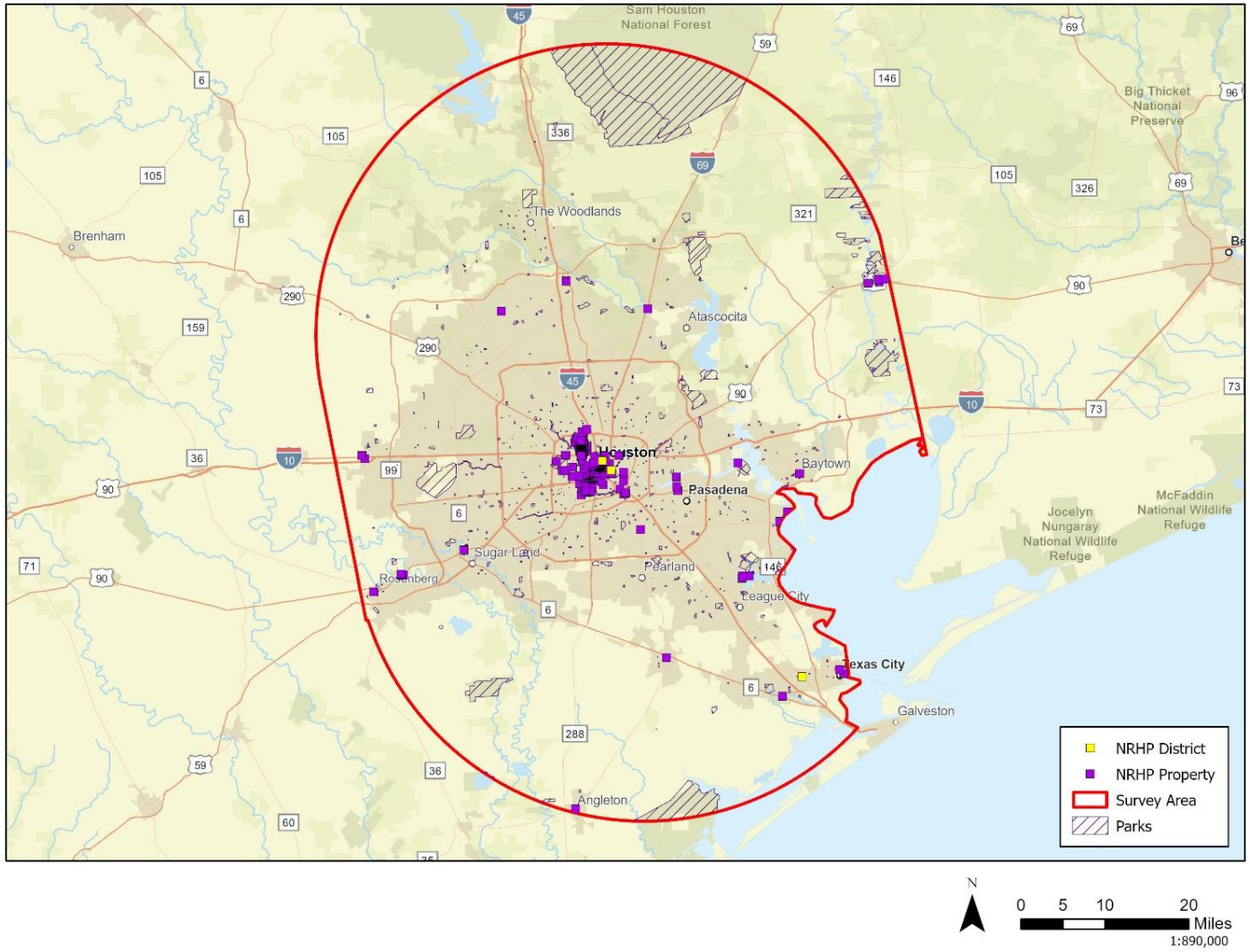
———. n.d.b. *Eastern Black Rail.* Available: https://www.fws.gov/species/eastern-black-rail-laterallus-jamaicensis-jamaicensis. Accessed: September 9, 2025.

———. n.d.c. *Monarch Butterfly*. Available: https://www.fws.gov/species/monarch-danaus-plexippus. Accessed: January 22, 2026.

———. n.d.d *Keeping Wildlife Safe from Drones: Keeping Bald Eagles and Other Wildlife Safe from Drones.* Available: https://www.fws.gov/story/keeping-wildlife-safe-drones#:~:text=Eagles%20and%20many%20other%20raptors,injury%20to%20the%20adult%20birds. Accessed: August 12, 2025.

Vas, E., A. Lescroel, O. Duriez, G. Boguszewski, and D. Gremillet. 2015. Approaching Birds with Drones: First Experiments and Ethical Guidelines. Biology Letters. 11: 20140754. Available: https://royalsocietypublishing.org/doi/10.1098/rsbl.2014.0754. Accessed: January 27, 2026.

Weather Atlas. n.d. Climate and Monthly Weather Forecast Houston, TX. Available: https://www.weather-atlas.com/en/texas-usa/houston-climate. Accessed: August 15, 2025


Sam Houston National Forest
Big Thicket National Preserve
The Woodlands
Brenham
Atascocita
Houston
Baytown
Pasadena
Sugar Land
Pearland
League City
Texas City
Galveston
Angleton
Jocelyn Nungaray National Wildlife Refuge
McFaddin National Wildlife Refuge
NRHP District
NRHP Property
Survey Area
Parks
N
0 5 10 20
Miles
1:890,000

Section 4(f) Property Name	Section 4(f) Property Type	County
1884 Houston Cotton Exchange Building	Historic Buildings	Harris
500 Jefferson Building	Historic Buildings	Harris
A. S. Cleveland House	Historic Buildings	Harris
All Saints Roman Catholic Church	Historic Buildings	Harris
Allbach House	Historic Buildings	Harris
Andrew Jackson and Margaret Cullinan Wray House	Historic Buildings	Harris
Angelo AND Lillian Minella House	Historic Buildings	Harris
Annunciation Church	Historic Buildings	Harris
Antioch Missionary Baptist Church	Historic Buildings	Harris
Apollo Mission Control Center	Historic Buildings	Harris
Arthur B. Cohn House	Historic Buildings	Harris
Austin Copeland House I	Historic Buildings	Harris
Austin Copeland House II	Historic Buildings	Harris
B. Ray and Charlotte Woods House	Historic Buildings	Fort Bend
Banta House	Historic Buildings	Harris
Barker House	Historic Buildings	Harris
Battelstein's	Historic Buildings	Harris
Beaconsfield	Historic Buildings	Harris
Ben C. and Jenette Cyrus House	Historic Buildings	Harris
Benjamin Apartments	Historic Buildings	Harris
Bethel Baptist Church	Historic Buildings	Harris
Borgstrom House	Historic Buildings	Harris
Burge House	Historic Buildings	Harris
Burnett House	Historic Buildings	Harris
C. L. Neuhaus House	Historic Buildings	Harris
Cameron Iron Works	Historic Buildings	Harris
Charles E. Coombs House	Historic Buildings	Harris
Charles Johnson House	Historic Buildings	Harris
Charles Roessler House	Historic Buildings	Harris
Charles W., Sr. and Mary Duncan House	Historic Buildings	Harris
Cheek-Neal Coffee Company Building	Historic Buildings	Harris
Christ Church	Historic Buildings	Harris
City National Bank Building	Historic Buildings	Harris
Clarke & Courts Building	Historic Buildings	Harris
Cleveland-Partlow House	Historic Buildings	Liberty
Col. Hugh B. and Helen Moore House	Historic Buildings	Galveston
Colorado and Santa Fe Railway Passenger Depot	Historic Buildings	Brazoria
Coombs & Fredericks Sweeney Building	Historic Buildings	Harris
Countryman House	Historic Buildings	Harris
Cummings House	Historic Buildings	Harris
D. C. McCollum House	Historic Buildings	Harris
D. D. Peden House	Historic Buildings	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
David A. Carden House	Historic Buildings	Harris
DePelchin Faith Home	Historic Buildings	Harris
Dexter House	Historic Buildings	Harris
Dr. B. F. Coop House	Historic Buildings	Harris
Dr. Billie V. Ellis House	Historic Buildings	Harris
Dr. James M. and Dove Stewart House	Historic Buildings	Waller
Dr. Penn B. Thornton House	Historic Buildings	Harris
Eaton House	Historic Buildings	Harris
Edward Albert Palmer Memorial Chapel and Autry House	Historic Buildings	Harris
Eldorado Ballroom	Historic Buildings	Harris
Elkins House	Historic Buildings	Harris
Ella Lewis Store and Rental Houses	Historic Buildings	Harris
Emil Lindenburg House	Historic Buildings	Harris
Ezekial and Mary Jane Miller House	Historic Buildings	Harris
Ezzell House	Historic Buildings	Harris
Farnsworth & Chambers Building	Historic Buildings	Harris
Fayette C. Lowry House	Historic Buildings	Harris
Fire Engine House No. 9	Historic Buildings	Harris
First Evangelical Church	Historic Buildings	Harris
Forrest A. Nairn House	Historic Buildings	Harris
Fort Bend County Courthouse	Historic Buildings	Fort Bend
Forum of Civics	Historic Buildings	Harris
Frank B. Davidson House	Historic Buildings	Galveston
Fred J. Heyne House	Historic Buildings	Harris
General Mercantile Store	Historic Buildings	Harris
George L. Burlingame House	Historic Buildings	Harris
Gerloff House	Historic Buildings	Harris
Ghent W. Rogers House	Historic Buildings	Harris
Gillette House	Historic Buildings	Harris
Glenn W. Morris House	Historic Buildings	Harris
Gulf Building	Historic Buildings	Harris
Harris County Courthouse of 1910	Historic Buildings	Harris
Hartley House	Historic Buildings	Harris
Hawkins House	Historic Buildings	Harris
Heights Christian Church	Historic Buildings	Harris
Heights State Bank Building	Historic Buildings	Harris
Heights Theater	Historic Buildings	Harris
Henry Hicks McCain House	Historic Buildings	Harris
Hermann Park Municipal Golf Clubhouse	Historic Buildings	Harris
Hogg Building	Historic Buildings	Harris
Hollyfield Laundry and Cleaners	Historic Buildings	Harris
Holy Rosary Catholic Church	Historic Buildings	Fort Bend

Section 4(f) Property Name	Section 4(f) Property Type	County
House at 1111 Heights Boulevard	Historic Buildings	Harris
House at 112 W. 4th Street	Historic Buildings	Harris
House at 1210 Harvard Street	Historic Buildings	Harris
House at 1217 Harvard	Historic Buildings	Harris
House at 122 East Fifth Street	Historic Buildings	Harris
House at 1220 Harvard	Historic Buildings	Harris
House at 1222 Harvard Street	Historic Buildings	Harris
House at 1227 Rutland Street	Historic Buildings	Harris
House at 1230 Oxford Street	Historic Buildings	Harris
House at 1237 Rutland Street	Historic Buildings	Harris
House at 1304 Cortlandt Street	Historic Buildings	Harris
House at 1343 Allston Street	Historic Buildings	Harris
House at 1421 Harvard St.	Historic Buildings	Harris
House at 1421 Heights Boulevard	Historic Buildings	Harris
House at 1421-1423 Waverly Street	Historic Buildings	Harris
House at 1435 Heights Boulevard	Historic Buildings	Harris
House at 1437 Heights Boulevard	Historic Buildings	Harris
House at 1437 Waverly Street	Historic Buildings	Harris
House at 1443 Allston Street	Historic Buildings	Harris
House at 1509 Allston Street	Historic Buildings	Harris
House at 1515 Allston Street	Historic Buildings	Harris
House at 1517 Cortland Street	Historic Buildings	Harris
House at 1537 Tulane Street	Historic Buildings	Harris
House at 1640 Harvard Street	Historic Buildings	Harris
House at 201 W. 15th Street	Historic Buildings	Harris
House at 2035 Rutland Street	Historic Buildings	Harris
House at 217 E. 5th Street	Historic Buildings	Harris
House at 2402 Rutland Street	Historic Buildings	Harris
House at 402 E. 11th Street	Historic Buildings	Harris
House at 444 West 24th Street	Historic Buildings	Harris
House at 505 W. 18th Street	Historic Buildings	Harris
House at 532 Harvard Street	Historic Buildings	Harris
House at 828 Heights Boulevard	Historic Buildings	Harris
House at 844 Columbia Street	Historic Buildings	Harris
House at 844 Courtlandt	Historic Buildings	Harris
House at 917 Heights Boulevard	Historic Buildings	Harris
House at 943 1/2 Cortlandt Street	Historic Buildings	Harris
Houses at 1217 and 1219 Tulane Street	Historic Buildings	Harris
Houston Bar Center Building	Historic Buildings	Harris
Houston City Hall	Historic Buildings	Harris
Houston Fire Station No. 3	Historic Buildings	Harris
Houston Fire Station No. 7	Historic Buildings	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Houston Heights Fire Station	Historic Buildings	Harris
Houston Heights Waterworks Reservoir	Historic Buildings	Harris
Houston Heights Woman's Club	Historic Buildings	Harris
Houston Light Guard Armory	Historic Buildings	Harris
Houston Municipal Airport Terminal	Historic Buildings	Harris
Houston Negro Hospital	Historic Buildings	Harris
Houston Negro Hospital School of Nursing Building	Historic Buildings	Harris
Houston Post	Historic Buildings	Harris
Houston Post-Dispatch Building	Historic Buildings	Harris
Houston Public Library	Historic Buildings	Harris
Houston Turn-Verein	Historic Buildings	Harris
Hugo V. Neuhaus, Jr. House	Historic Buildings	Harris
Humble Oil Building	Historic Buildings	Harris
Immanuel Lutheran Church	Historic Buildings	Harris
Imperial Sugar Company Refinery Historic District	Historic Buildings	Fort Bend
Isabella Court	Historic Buildings	Harris
Isbell House	Historic Buildings	Harris
J. A. Folger and Company Plant	Historic Buildings	Harris
J. H. Clare House	Historic Buildings	Harris
J. J. Carroll House	Historic Buildings	Harris
James A. Dawson House	Historic Buildings	Harris
James and Jessie West Mansion	Historic Buildings	Harris
James Bute Company Warehouse	Historic Buildings	Harris
James L. Autry House	Historic Buildings	Harris
James L. Jensen House	Historic Buildings	Harris
James V. Meek House	Historic Buildings	Harris
Jay L. Durham House	Historic Buildings	Harris
Jefferson Davis Hospital	Historic Buildings	Harris
John H. Shoaf House	Historic Buildings	Harris
John M. and Lottie D. Moore House	Historic Buildings	Fort Bend
John M. Dorrance House	Historic Buildings	Harris
John Milroy House	Historic Buildings	Harris
John W. Anderson House	Historic Buildings	Harris
John W. Parker House	Historic Buildings	Harris
Jones House	Historic Buildings	Harris
Jones-Hunt House	Historic Buildings	Harris
Joseph Ogle House	Historic Buildings	Harris
Joseph R. and Mary M. Stevenson House	Historic Buildings	Harris
Judson L. Taylor House	Historic Buildings	Harris
Julia Ideson Building	Historic Buildings	Harris
Keller House	Historic Buildings	Harris
Kellum-Noble House	Historic Buildings	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Kennedy Bakery	Historic Buildings	Harris
Kleinhaus House	Historic Buildings	Harris
K'nesseth Israel Synagogue	Historic Buildings	Harris
Knittel House	Historic Buildings	Harris
Kress Building	Historic Buildings	Harris
Kronenberger House	Historic Buildings	Harris
Lamar--Calder House	Historic Buildings	Fort Bend
Leonard W. Macatee House	Historic Buildings	Harris
Lewis Apartment Building	Historic Buildings	Harris
Liberty County Courthouse	Historic Buildings	Liberty
Link--Lee House	Historic Buildings	Harris
Logue House	Historic Buildings	Harris
Lucie Wray and Anderson Todd House	Historic Buildings	Harris
Lula J. Doughty House	Historic Buildings	Harris
Lund House	Historic Buildings	Harris
Mansfield House	Historic Buildings	Harris
Marguerite Meachum & John S. Mellinger House	Historic Buildings	Harris
Maria Boswell Flake Home for Old Women	Historic Buildings	Harris
Marshall W. Kennedy House	Historic Buildings	Harris
McDonald House	Historic Buildings	Harris
Mechanical Laboratory and Power House	Historic Buildings	Harris
Medical Towers	Historic Buildings	Harris
Meitzen House	Historic Buildings	Harris
Melrose Building	Historic Buildings	Harris
Merchants and Manufacturers Building	Historic Buildings	Harris
Methodist Church of Richmond	Historic Buildings	Fort Bend
Miller House	Historic Buildings	Harris
Milroy House	Historic Buildings	Harris
Milroy-Muller House	Historic Buildings	Harris
Morris and Mary Johnson House	Historic Buildings	Harris
Morton Brothers Grocery	Historic Buildings	Harris
Moses A. Clanton House	Historic Buildings	Harris
Mulcahy House	Historic Buildings	Harris
National Biscuit Company Building	Historic Buildings	Harris
Ned A. and Linda S. Eppes House	Historic Buildings	Harris
Old Brazoria County Courthouse	Historic Buildings	Brazoria
Old Houston National Bank	Historic Buildings	Harris
Oriental Textile Mill	Historic Buildings	Harris
Oscar Lindsay House	Historic Buildings	Harris
Otto H. Baring House	Historic Buildings	Harris
Otto House	Historic Buildings	Harris
Palace Hotel	Historic Buildings	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Pasadena Post Office	Historic Buildings	Harris
Paul Building	Historic Buildings	Harris
Perry-Swilley House	Historic Buildings	Harris
Peter and Sophie Wunderlich Farm	Historic Buildings	Harris
Petroleum Building	Historic Buildings	Harris
Pomeroy Homestead	Historic Buildings	Harris
Rice Hotel	Historic Buildings	Harris
Ross S. Sterling House	Historic Buildings	Harris
Rothko Chapel	Historic Buildings	Harris
Roy and Margaret Farrar House	Historic Buildings	Harris
Sam Houston Hotel	Historic Buildings	Harris
Samuel H. Webber House	Historic Buildings	Harris
San Jacinto Senior High School	Historic Buildings	Harris
Scanlan Building	Historic Buildings	Harris
Schauer Filling Station	Historic Buildings	Harris
Schlesser-Burrows House	Historic Buildings	Harris
Schlumberger Well Surveying Corporation Building	Historic Buildings	Harris
Sessums--James House	Historic Buildings	Harris
Sewall, Cleveland Harding, House	Historic Buildings	Harris
Sheridan Apartments	Historic Buildings	Harris
Sills Building	Historic Buildings	Harris
Simon and Mamie Minchen House	Historic Buildings	Harris
South Texas National Bank	Historic Buildings	Harris
St. Elizabeth's Hospital	Historic Buildings	Harris
St. Paul's Methodist Episcopal Church	Historic Buildings	Harris
Star Engraving Company Building	Historic Buildings	Harris
State National Bank Building	Historic Buildings	Harris
Sterling Myer House	Historic Buildings	Harris
Sterling-Berry House	Historic Buildings	Harris
Stowers Building	Historic Buildings	Harris
Stringfellow Orchards	Historic Buildings	Galveston
Sylvan Beach Pavilion	Historic Buildings	Harris
Temple Beth Israel	Historic Buildings	Harris
Texas State Hotel	Historic Buildings	Harris
The Orange Show	Historic Buildings	Harris
Thomas B. Reed House	Historic Buildings	Harris
Thomas J. Donoghue House	Historic Buildings	Harris
Thomas Jefferson Chambers House	Historic Buildings	Liberty
Trinity Church	Historic Buildings	Harris
U.S. Customhouse	Historic Buildings	Harris
Union Station	Historic Buildings	Harris
Union Transfer and Storage Building	Historic Buildings	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Upchurch House	Historic Buildings	Harris
W. L. Foley Building	Historic Buildings	Harris
W. T. Carter, Jr. House	Historic Buildings	Harris
Ward House	Historic Buildings	Harris
Webber House	Historic Buildings	Harris
Wilkins House	Historic Buildings	Harris
William F. Fluegel House	Historic Buildings	Harris
William L. Clayton Summer House	Historic Buildings	Harris
William Mackey House	Historic Buildings	Harris
William R. Nash House	Historic Buildings	Harris
Williams-Brueder House	Historic Buildings	Harris
Wilson House	Historic Buildings	Harris
Wimberly House	Historic Buildings	Harris
Wisnoski House	Historic Buildings	Harris
Woodard House	Historic Buildings	Harris
Woodward House	Historic Buildings	Harris
Wunsche Bros. Saloon and Hotel	Historic Buildings	Harris
The Settlement Historic District	Historic Districts	Galveston
Willow Street Pump Station	Historic Districts	Harris
W-K-M Company, Inc. Historic District	Historic Districts	Harris
1879 Houston Waterworks	Historic Structures	Harris
Almeda Road Bridge over Brays Bayou	Historic Structures	Harris
Aviary at the Houston Zoo	Historic Structures	Harris
Heights Boulevard Esplanade	Historic Structures	Harris
Hill Street Bridge over Buffalo Bayou	Historic Structures	Harris
McKee Street Bridge	Historic Structures	Harris
Sabine Street Bridge over Buffalo Bayou	Historic Structures	Harris
San Jacinto Street Bridge over Buffalo Bayou	Historic Structures	Harris
Saturn V Launch Vehicle	Historic Structures	Harris
Space Environment Simulation Laboratory	Historic Structures	Harris
State Highway 3 Bridge at the Trinity River	Historic Structures	Liberty
State Highway 35 Bridge at the West Fork of the San Jacinto River	Historic Structures	Harris
Telephone Road Bridge over Brays Bayou	Historic Structures	Harris
U.S.S. TEXAS	Historic Structures	Harris
Washburn Tunnel	Historic Structures	Harris
Yale Street Bridge over White Oak Bayou	Historic Structures	Harris
A E Dyess Park	Park	Harris
Acacia Park	Park	Montgomery
Agnes Moffit Park	Park	Harris
Alabonson Park	Park	Harris
Albert Finkle Memorial Park	Park	Brazoria
Alden Woods Park	Park	Montgomery

Section 4(f) Property Name	Section 4(f) Property Type	County
Alexander Deussen Park	Park	Harris
Alief Amity Park	Park	Harris
Alief Community Park	Park	Harris
Allenbrook Park	Park	Harris
Allens Landing Memorial Park	Park	Harris
Almeda Park	Park	Harris
Almeda Plaza Park	Park	Harris
American Legion Park	Park	Harris
American Statesmanship Park	Park	Harris
Anderson Park	Park	Harris
Andover Park	Park	Harris
Andy Anderson Park	Park	Harris
Antioch Park	Park	Harris
Arena Park	Park	Galveston
Armand Bayou Park	Park	Harris
Aron Ledet Park	Park	Harris
Arthur Bayer Park	Park	Harris
Arthur Storey Park	Park	Harris
Audubon Park	Park	Harris
Autry Park	Park	Harris
Av Sallas Park	Park	Montgomery
Bane Park	Park	Harris
Barbara Jordan Family Park	Park	Harris
Barbara Jordan Park	Park	Harris
Barkaloo Park	Park	Harris
Battleground Deerpark	Park	Harris
Battleship Texas	Park	Harris
Bauer Pocket Park	Park	Harris
Bay Area Park	Park	Harris
Bayland Park	Park	Harris
Bayou Bend Park	Park	Harris
Bayridge Park	Park	Galveston
Baytown Fairgrounds	Park	Harris
Bear Branch Park	Park	Montgomery
Bear Creek Park	Park	Harris
Beeler Memorial Pocket Park	Park	Harris
Bell Park	Park	Harris
Bellaire-Zindler Park	Park	Harris
Ben Briar Park	Park	Harris
Bendwood Park	Park	Harris
Bergeron Park	Park	Harris
Bethel Church Site	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Beulah Maxie Park	Park	Harris
Beverly Hills Park	Park	Harris
Bicentennial Park	Park	Harris
Big Bend Park	Park	Harris
Blackhawk Park	Park	Harris
Bliss Meadows Park	Park	Harris
Blossom Heights Park	Park	Harris
Blue Ridge Park	Park	Fort Bend
Blueridge Park	Park	Harris
Bonham Park	Park	Harris
Boone Park	Park	Harris
Bowie Park	Park	Harris
Boyce-Dorian Park	Park	Harris
Braeburn Glen Park	Park	Harris
Braeswood Park	Park	Harris
Brazos Bend State Park	Park	Fort Bend
Brazos Park	Park	Fort Bend
Bremond Park	Park	Galveston
Brentwood Park	Park	Harris
Brewster Park	Park	Harris
Briar Bend Park	Park	Harris
Briar Meadow Park	Park	Harris
Bricker Park	Park	Harris
Broadmoor-Kretschmar Park	Park	Harris
Brock Park	Park	Harris
Brook Hollow Park	Park	Harris
Brookline Park	Park	Harris
Buffalo Bayou/Tinsley Park/Jamail Skate Park	Park	Harris
Buffalo Run Park	Park	Fort Bend
Burke Road Park	Park	Harris
Burnett Bayland Park	Park	Harris
Burnett Street Park	Park	Harris
Burrus Park	Park	Harris
Cambridge Park	Park	Harris
Camp Logan Triangle	Park	Harris
Campbell Woods Park	Park	Harris
Candlelight Park	Park	Harris
Candy Cane Park	Park	Montgomery
Caney Creek Park	Park	Montgomery
Canterbury Village Park	Park	Harris
Capstone Park	Park	Montgomery
Carbide Park	Park	Galveston

Section 4(f) Property Name	Section 4(f) Property Type	County
Carol Fox Park	Park	Harris
Carol Tree Pocket Park	Park	Harris
Carter Park	Park	Harris
Carver Park	Park	Galveston
Carverdale Park	Park	Harris
Castillo Park	Park	Harris
Catherine Adams Rawley Park	Park	Harris
Cattail Park	Park	Montgomery
Cedar Grove Park	Park	Harris
Centennial Park	Park	Galveston
Challenger 7 Memorial Park	Park	Harris
Chandler Creek Park	Park	Montgomery
Channelview Sports Complex	Park	Harris
Charles H Milby Park	Park	Harris
Charlton Park	Park	Harris
Cherryhurst Park	Park	Harris
Chimney Rock Park	Park	Harris
Christa Adair County Park	Park	Brazoria
Christy Park	Park	Harris
Cimarron Park	Park	Harris
City of Meadows Place Lake	Park	Fort Bend
Clark Park	Park	Harris
Clear Creek Regional Park	Park	Harris
Clear Lake City Community Association Park	Park	Harris
Clear Lake Park	Park	Harris
Cleveland Park	Park	Harris
Clinton Park	Park	Harris
Cloverland Park	Park	Harris
Cole Creek Park	Park	Harris
College Park	Park	Harris
Colonial Park	Park	Harris
Colony Bend Park	Park	Fort Bend
Community Park	Park	Fort Bend
Confederate Ship Area	Park	Harris
Cooper Park	Park	Harris
Copper Sage Park	Park	Montgomery
Corrigan Park	Park	Brazoria
Cottage Grove Park	Park	Harris
Countryside Park	Park	Galveston
Covington West Park	Park	Fort Bend
Crain Park	Park	Harris
Crane Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Cravens Parkway	Park	Harris
Creek Village Park	Park	Harris
Creekmont Park	Park	Harris
Creekwood Park	Park	Montgomery
Crestmont Park	Park	Harris
Crooker/Moody Park	Park	Harris
Crosby Park	Park	Harris
Crowley Park	Park	Harris
Croyden Park	Park	Harris
Cullen Park	Park	Harris
Cullen Sculpture Garden	Park	Harris
Cullinan Park	Park	Fort Bend
Cumberland Greenbelt Park	Park	Montgomery
Cypress Creek Park Project Site 7	Park	Harris
Cypress Meadows Park	Park	Harris
Cypress Top Historic Park	Park	Harris
Cypresswood Park	Park	Harris
Dads Club Community Park	Park	Brazoria
Danny Jackson Family Bark Park	Park	Harris
Dave Brown Memorial Park	Park	Galveston
David Burnett Park	Park	Harris
Dayton City Park	Park	Liberty
Deer Ridge Park	Park	Harris
Deer Rush Pond Park	Park	Montgomery
Delce Park	Park	Harris
Delmonte Park	Park	Harris
Denver-Harbor Park	Park	Harris
Devonshire Park	Park	Harris
Dezavala Park	Park	Harris
Diez Street Park	Park	Harris
Discovery Green	Park	Harris
Dixie Farm Road Park	Park	Brazoria
Dodson Lake Park	Park	Harris
Doss Park	Park	Harris
Doswell Park	Park	Harris
Dow Park	Park	Harris
Dow Park 2	Park	Harris
Dwight D Eisenhower Park	Park	Harris
Eagle Ranch West Pocket Park	Park	Harris
East Shadowlake Pocket Park	Park	Harris
East Southmore Park	Park	Harris
Eastwood Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Edgewater Park	Park	Harris
Edgewood Park	Park	Harris
Edna Washington Park	Park	Harris
El Franco Lee Park	Park	Brazoria
Elbert Park	Park	Harris
Eldridge Park	Park	Fort Bend
Elizabeth Baldwin Park	Park	Harris
Elizabeth Glover Park	Park	Harris
Elizabeth K Meyer Park	Park	Harris
Elizabeth Kaiser Meyer Park	Park	Harris
Ella Lee Park	Park	Harris
Elliott Park	Park	Harris
Elva Lobit Park	Park	Galveston
Emancipation Park	Park	Harris
Ervan Chew Park	Park	Harris
Evalyn Wilson Park	Park	Harris
Evella Park	Park	Harris
Evergreen Park	Park	Harris
Fairmont Park	Park	Harris
Fairmont Park West Cia Pool	Park	Harris
Fairway Oaks Dr Park	Park	Harris
Falcon Park	Park	Harris
Falconwing Park	Park	Montgomery
Field Park	Park	Harris
Finnigan Park	Park	Harris
Fire Truck Park	Park	Harris
Flag Tree Park	Park	Harris
Fleming Park	Park	Harris
Fonde Park	Park	Harris
Fondren Park	Park	Harris
Forest Gate Park	Park	Montgomery
Forest West Park	Park	Harris
Forrest West Park	Park	Harris
Fort Bend County Fairgrounds	Park	Fort Bend
Fort Bend County Kitty Hollow Park	Park	Fort Bend
Forum Park	Park	Harris
Four Seasons Park	Park	Harris
Fox Park	Park	Harris
Freed Art and Nature Park	Park	Harris
Freed Park	Park	Harris
Freedom Park	Park	Brazoria
Freeman Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Freshmeadows Park	Park	Harris
Friends Park	Park	Harris
Friendship Park	Park	Harris
Fritsche Cemetery	Park	Harris
Fry Road Park	Park	Harris
Fulton Park	Park	Harris
Gail Reeves Park	Park	Harris
Galena Park	Park	Harris
Galena Park City Park	Park	Harris
Galveston County Park	Park	Galveston
Garcia Memorial Park	Park	Fort Bend
Garden Villas Park	Park	Harris
Gardens Park	Park	Harris
Gary and Bonnie Trietsch Park	Park	Harris
Gene Green Beltway 8 Sports Park	Park	Harris
George Bush Park	Park	Harris
George Park	Park	Fort Bend
George Ranch Historical Park	Park	Fort Bend
Gerber Park	Park	Harris
Gessner Park	Park	Harris
Gibson Park	Park	Montgomery
Gleason Park	Park	Harris
Glen Cove Park	Park	Galveston
Glen Meadows Park	Park	Harris
Glenbrook Park	Park	Harris
Glenmore Forrest Park	Park	Harris
Goddard Park	Park	Galveston
Godwin Park	Park	Harris
Golden Acres Park	Park	Harris
Gordon Fountain Lake	Park	Fort Bend
Grady Park	Park	Harris
Gragg Park Complex	Park	Harris
Graham Park	Park	Harris
Grantwoods Park	Park	Harris
Greenbelt Park	Park	Harris
Greens Bayou Park	Park	Harris
Greenwood Park	Park	Harris
Gregg Street Park	Park	Harris
Grogan's Point Park	Park	Montgomery
Groveland Terrace Park	Park	Harris
Guadalupe Plaza	Park	Harris
Gulf Palms Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Hackberry Park	Park	Harris
Hadden Park	Park	Harris
Hager Park	Park	Harris
Halbert Park	Park	Harris
Harris County Katy Park	Park	Harris
Hartman Park	Park	Harris
Harwin Park	Park	Harris
Heights Boulevard Park	Park	Harris
Heiner Street Park	Park	Harris
Hennessy Park	Park	Harris
Heritage Park	Park	Harris
Herman Brown Park	Park	Harris
Hermann Park	Park	Harris
Hermann Square	Park	Harris
Hidalgo Park	Park	Harris
Highland Park	Park	Harris
Highlands Park	Park	Harris
Hill Park	Park	Harris
Hobart Taylor Park	Park	Harris
Hockley Park	Park	Harris
Hogg Bird Sanctuary Park	Park	Harris
Hogg Park	Park	Harris
Holly Springs Park	Park	Harris
Homewood Park	Park	Harris
Housman Park	Park	Harris
Houston Gardens Park	Park	Harris
Houston Sportsplex	Park	Harris
Huffington Park	Park	Harris
Humble City Park	Park	Harris
Hunters Point Park	Park	Fort Bend
Hunters Trail Park	Park	Fort Bend
Hutcheson Park	Park	Harris
Hyde Park	Park	Brazoria
I T May Park	Park	Harris
Imperial Park	Park	Fort Bend
Independence Park	Park	Brazoria
Ingrando Park	Park	Harris
Irvington Park	Park	Harris
J C Hollaway Park	Park	Harris
Jack Brooks Park	Park	Galveston
James Bute Park	Park	Harris
James Driver Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Japhet Creek Park	Park	Harris
Jaycee Park	Park	Harris
Jenkins Memorial Park	Park	Harris
Jerry Matheson Park	Park	Harris
Jesse Jones County Park	Park	Harris
Jim Lee Park	Park	Harris
John Pundt Park	Park	Harris
Johnny Goyen Park	Park	Harris
Jones Plaza	Park	Harris
Joseph A Fiorenza Park	Park	Harris
Juan Seguin Historical Park	Park	Harris
Judson Park	Park	Harris
Juergens Park	Park	Harris
Kaminski Park	Park	Harris
Karl Young Park	Park	Harris
Katy City Park	Park	Harris
Keith Weiss Park	Park	Harris
Kemah Park	Park	Galveston
Kerr Park	Park	Harris
Kirby Park	Park	Harris
Kirkwood South Park	Park	Harris
Klein Park	Park	Harris
Kleinbrook Community Assoc Park	Park	Harris
Knox Park	Park	Harris
Kohfeld Park	Park	Galveston
Lake Houston Park	Park	Harris
Lake Nassau Park	Park	Harris
Lakecrest Park	Park	Harris
Lakeside Park	Park	Montgomery
Lakewood Park	Park	Harris
Lamar Park	Park	Harris
Langwood Park	Park	Harris
Lansdale Park	Park	Harris
Larkwood Park	Park	Montgomery
Law Park	Park	Harris
Lawndale Triangles Park	Park	Harris
Lawrence Park	Park	Harris
League of Women Voters Park	Park	Harris
Levy Park	Park	Harris
Ley Plaza Park	Park	Harris
Liberty Hill Park	Park	Harris
Lincoln Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Lindsay/Lyons Park and Sport Complex	Park	Harris
Linear Park	Park	Harris
Linkwood Park	Park	Harris
Little Cedar Bayou Park	Park	Harris
Little League Park	Park	Montgomery
Little Thicket Park	Park	Harris
Live Oak Park	Park	Harris
Lonnie Green Park	Park	Fort Bend
Lost Creek Park	Park	Fort Bend
Love Park	Park	Harris
Lynn Eusan Park	Park	Harris
MacGregor Park	Park	Harris
MacGregor Parkway	Park	Harris
MacGregor Way Park	Park	Harris
Madison High School Park	Park	Harris
Mahan Park	Park	Galveston
Malibu Park	Park	Harris
Mandell Park	Park	Harris
Mangum Manor Park	Park	Harris
Maplewood Park	Park	Montgomery
Mark McGrath Municipal Park	Park	Fort Bend
Market Square Park	Park	Harris
Marrs-Satsuma Park	Park	Harris
Mary Jo Peckham Park for All Children	Park	Harris
Mason Park	Park	Harris
Masterson Park	Park	Brazoria
Matzke Park	Park	Harris
Maureen and Joe Mulrooney Pocket Park	Park	Harris
Maxey Park	Park	Harris
MC Cullinan Park	Park	Harris
Mc Elroy Park	Park	Harris
McClendon Park	Park	Harris
McCloud Park	Park	Chambers
McCollum Park	Park	Chambers
McCullough Park	Park	Harris
McNair Memorial Park	Park	Harris
Meadowbrook Park	Park	Harris
Mel Killian Park	Park	Montgomery
Melrose Park	Park	Harris
Memorial Ashford Little League Fields	Park	Harris
Memorial Park	Park	Galveston
Memorial-Silver Triangle	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Mercer Arboretum	Park	Harris
Mesquite Park	Park	Fort Bend
Meyer (Rebecca) Park	Park	Harris
Meyers Park	Park	Harris
Mickey Leland Memorial Park	Park	Harris
Middlebrook Community Association Park	Park	Harris
Mills Bennett Park	Park	Harris
Milroy Park	Park	Harris
Miramar Park	Park	Harris
Mission Bend Community Park	Park	Fort Bend
Monroe Park	Park	Harris
Monte Beach Park	Park	Harris
Monterief Park	Park	Harris
Montgomery County Park	Park	Montgomery
Moody Park	Park	Harris
Morgan Park	Park	Brazoria
Moritz Pech Family Park	Park	Harris
Moses Leroy Park	Park	Harris
Mulberry Park	Park	Harris
Mystic Forest Park	Park	Montgomery
N C Foote Park	Park	Harris
Naeem Choudhri Jetall Park	Park	Harris
National Oak Park	Park	Brazoria
Ned and Fay Dudney Nature Center	Park	Galveston
Nedith Park	Park	Harris
Nellie Keyes Park	Park	Harris
New Kentucky Park	Park	Harris
Nob Hill Park	Park	Harris
Noble Park	Park	Galveston
North Houston Avenue Triangles	Park	Harris
North Park Recreation Area	Park	Montgomery
Northline Park	Park	Harris
Northshore Park	Park	Montgomery
Northwood Park	Park	Harris
Nottingham Park	Park	Harris
Oak Forrest Park	Park	Harris
Oak Meadows Park	Park	Harris
Oaks Drive Park	Park	Harris
Old Westheimer Park	Park	Harris
Olmstead Park	Park	Montgomery
Olympia Park	Park	Harris
Our Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Oxnard Park	Park	Harris
Park Drive Park	Park	Harris
Park Lane Park	Park	Harris
Park Meadows	Park	Harris
Parkview Park	Park	Harris
Parkwood Park	Park	Harris
Pasadena Memorial Park	Park	Harris
Paul Hopkins Park	Park	Galveston
Peach Creek Forest	Park	Montgomery
Peggy H. Shiffick Park	Park	Harris
Peggy Park	Park	Harris
Peggys Point Plaza Park	Park	Harris
Pelham Park	Park	Harris
Pelly Park	Park	Harris
Pep Mueller Park	Park	Harris
Pershing Park	Park	Harris
Pfeiffer Park	Park	Harris
Pin Oak Park	Park	Harris
Pine Valley Park	Park	Harris
Pinewood Park	Park	Harris
Pitner Park	Park	Harris
Pleasanton Manner Park	Park	Harris
Pleasantville Park	Park	Harris
Port Houston Park	Park	Harris
Proctor Park	Park	Harris
Quebedeaux Park	Park	Harris
Queens Park	Park	Harris
R.E. Bob Smith Park	Park	Harris
Randall P Jones Park	Park	Harris
Randolph Park	Park	Harris
Ray Holbrook Park	Park	Galveston
Ray Miller Park	Park	Harris
Ray Park	Park	Harris
Red Bluff Park	Park	Harris
Regency Park	Park	Harris
Reveille Park	Park	Harris
Revelon Park	Park	Harris
Rex L Meador Park	Park	Harris
Richard Brock Park	Park	Harris
Ridgeview Park	Park	Fort Bend
Ridgewood Park	Park	Montgomery
Riley Chambers Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
River Grove Park	Park	Harris
River Oaks Comm Center	Park	Harris
River Terrace Park	Park	Harris
Riverbend Park	Park	Fort Bend
Riverside Park	Park	Harris
Root Memorial Square Park	Park	Harris
Roseland Park	Park	Harris
Rosewood Park	Park	Harris
Rosslyn Park	Park	Harris
Roy Burrough Park	Park	Harris
Runger Park	Park	Galveston
Sage Meadow Park	Park	Harris
Sam Houston National Forest	Park	Montgomery
Sam Houston Park	Park	Harris
Samuel Matthews Park	Park	Harris
San Jacinto Battleground State Historic Site	Park	Harris
Saracen Park	Park	Harris
Satsuma Park	Park	Harris
Saums Park	Park	Harris
Sawmill Park	Park	Montgomery
Schnurr Park	Park	Harris
Schroeder Field	Park	Brazoria
Schwartz Park	Park	Harris
Schweppe Park	Park	Harris
Scottcrest Park	Park	Harris
Seabrook Meyer Road Park	Park	Harris
Selena Park	Park	Harris
Sesquicentennial Park	Park	Harris
Sesquicentennial Park Fish Plaza	Park	Harris
Settegast Park	Park	Harris
Settlers Way Parkland	Park	Fort Bend
Shadow Park	Park	Montgomery
Shady Lane Park	Park	Harris
Sheldon Lake State Park & Environmental Learning Center	Park	Harris
Sheldon Park	Park	Harris
Shepherd Park	Park	Harris
Sims Bayou Park	Park	Harris
Sleepy Hollow Park	Park	Harris
Slockett Park	Park	Fort Bend
Smith Park	Park	Harris
Smither Park	Park	Harris
Smokey Jasper Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Songwood Park	Park	Harris
South Burke Park	Park	Harris
South Post Oak Park	Park	Fort Bend
Southcrest Park	Park	Harris
Southland Park	Park	Harris
Southwell Park	Park	Harris
Spencer Middleton Clements Park	Park	Harris
Spillway Park	Park	Galveston
Sportsman Park	Park	Harris
Spotts Park	Park	Harris
Spring Branch Park	Park	Harris
Spring Creek Park	Park	Montgomery
Spring Green Park	Park	Fort Bend
Spring Klein Park	Park	Harris
Spurlock Park	Park	Harris
Spurlock Parkway	Park	Harris
Squatty Lyons Park	Park	Harris
Stanfield Park	Park	Harris
Steed Park	Park	Galveston
Stein Family Park	Park	Harris
Stein Park	Park	Harris
Stevenson Park	Park	Galveston
Stewart Park	Park	Harris
Stratford Park	Park	Harris
Strawberry Park	Park	Harris
Strickland Park	Park	Harris
Stuart Park	Park	Harris
Stude Park	Park	Harris
Studemont Spaceway	Park	Harris
Stuebner-Airline Park	Park	Harris
Sugar Land City Park	Park	Fort Bend
Sugar Mill Park	Park	Fort Bend
Sunflower Park	Park	Harris
Sunnyside Park	Park	Harris
Sunset Park	Park	Fort Bend
Swiney Park	Park	Harris
Sylvan Beach Park	Park	Harris
Sylvan Dells Park	Park	Harris
Sylvan Rodriguez Park	Park	Harris
T C Jester Park	Park	Harris
Talmage Park	Park	Brazoria
Tamarac Park	Park	Montgomery

Section 4(f) Property Name	Section 4(f) Property Type	County
Tamina Park	Park	Montgomery
Tanglewilde Park	Park	Harris
Tanglewood Park	Park	Harris
Tarpey Park	Park	Galveston
Taub Park	Park	Harris
Taylor Lake Village Community Park	Park	Harris
Tejas Park	Park	Harris
Terry Hershey Park	Park	Harris
Texas Avenue Park	Park	Harris
Tidwell Park	Park	Harris
Timbergrove Manor Park	Park	Harris
Timsbury Farnington Park	Park	Harris
Tom Bass Regional Park	Park	Brazoria
Tomball City Park	Park	Harris
Tony Marron Park	Park	Harris
Townwood Park	Park	Harris
Trahan Park	Park	Galveston
Tranquility Park	Park	Harris
Travis Park	Park	Fort Bend
Trinity Gardens Park	Park	Harris
Trinity River National Wildlife Refuge	Park	Liberty
Trotter Park	Park	Harris
Tuffly Park	Park	Harris
Turkey Creek Park	Park	Harris
Twin Creek Park	Park	Brazoria
Vassar Spaceway	Park	Harris
Veteran's Park	Park	Brazoria
Victoria Gardens Park	Park	Harris
W 23rd St Park	Park	Harris
W G Jones State Forest	Park	Montgomery
W Little York Park	Park	Harris
Wagner Park	Park	Harris
Walker Park	Park	Galveston
Walnut Park	Park	Harris
Walter Jones Park	Park	Harris
Wanita Triangle	Park	Harris
Warren Park	Park	Harris
Watongo Parkway Park	Park	Harris
WC Britton Park	Park	Harris
West 11th Street Park	Park	Harris
West End Park	Park	Harris
West Webster Street Park	Park	Harris

Section 4(f) Property Name	Section 4(f) Property Type	County
Westbury Park	Park	Harris
Westfield Athletic Complex	Park	Harris
Westside Park	Park	Harris
Westwood Park	Park	Harris
White Oak Parkway	Park	Harris
Whitt Johnson Park	Park	Harris
Wier Park	Park	Harris
Wiess Park	Park	Harris
Wildheather Park	Park	Harris
Wiley Park	Park	Harris
Wilke Park	Park	Harris
Williamsburg Hamlet Family Park	Park	Harris
Willow Park	Park	Harris
Windsor Village Park	Park	Harris
Winzer Park	Park	Harris
Woodcreek Park	Park	Brazoria
Woodland Park	Park	Fort Bend
Woods Park	Park	Harris
Woodway Forest	Park	Montgomery
Yellowstone Park	Park	Harris
Zollie Scales Park	Park	Harris
Zube Park	Park	Harris
Zurrie M. Malone Park	Park	Harris

Appendix C
List of Preparers and Agencies Consulted

Consulting Agency / Tribal Government	Representative
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Appendix D
Noise

TECHNICAL NOISE STUDY REPORT: HUMMINGBIRD 7000W-B AND 8000-A UNMANNED AIRCRAFT PACKAGE DELIVERY OPERATIONS

REPORT NO. 112024

PREPARED FOR:

Federal Aviation Administration
Unmanned Aircraft Systems Integration Office (AUS)
950 L'Enfant Plaza SW, Suite 500
Washington, D.C. 20024

PREPARED BY:

ICF

November 2024

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Acronyms and Abbreviations

AGL	above ground level
CONOPS	Concept of operations
dB	decibel
dBA	A-weighted decibel
DNL	day/night level
FAA	Federal Aviation Administration
Lmax	maximum sound level
SEL	sound exposure level
UA	unmanned aircraft

Chapter 1
Introduction

1.1 Purpose

The purpose of this report is to provide calculations of noise exposure for package delivery operations by Hummingbird unmanned aircraft (UA) developed by Wing Aviation LLC, a subsidiary of Alphabet, Inc. Noise exposure estimates are provided for two Hummingbird models: the Model 7000W-B and the Model 8000-A based on sound level testing data collected by AvEnviro Acoustics (2024a, 2024b).

The analysis in this report provides a methodology of estimating noise levels from UA operation that is limited to these specific UA models. Because the methods used in this report are based on collected measurements, they should not be applied to other UA models. The analysis does not include a geographic component, nor does it account for the presence of structures in urban areas.

Passby exposure levels at different distances from a nest or delivery point are based on as-tested conditions, which were intended to simulate all operation types for each UA model. Testing simulations consisted of the following operations:

- Manual package loading at a nest and takeoff toward delivery point
- Package offloading at a delivery point and departure back to nest
- Landing at a nest
- Remote launch, autoload of package at a nest, and takeoff
- Nearfield launch, autoload of package at a nest, and takeoff
- Hover in place
- En route (with and without a package)
- Preflight warmup (a.k.a. “Fitbit” operation)
- Nest homebase survey (a.k.a. “Geobit” operation)

Total DNL noise exposures are calculated based on various scales of package delivery and associated activities using passby exposure levels for the types of operation applicable to nests, delivery points and en route locations.

It is important to note that the results presented in this report shall supersede the results presented in the previous report, *Noise Assessment for Wing Aviation Proposed Package Delivery Operations with Hummingbird 7000W-B Unmanned Aircraft*, prepared March 17, 2023 by Harris Miller Miller and Hanson Inc (2023). The results in the previous Model 7000W-B report relied on certification measurements for en route and hover of a surrogate UA model. This is because sound level measurements had not yet been conducted for simulation of package delivery operations using the Model 7000W-B at the time the previous report was written. In contrast, the sound level measurements presented in this report are based closely on the concept of operations (CONOPS) for all modes of UA package delivery and associated operations.

1.2 Fundamental Concepts

Various noise descriptors or metrics have been developed to describe time-varying noise levels. The following metrics are used in this evaluation.

- Sound Exposure Level (SEL): SEL represents the total sound energy occurring over a specified period compressed into a one-second time interval. The SEL metric has broad utility in noise prediction and is a primary measurement collected for sound level testing of the two UA models.
- Day Night Average Sound Level (DNL): DNL is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 decibel (dB) penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m. The DNL is used in this analysis to describe noise exposure for daily operations from a nest, en route, or delivery point.
- Maximum Sound Level (Lmax): Lmax is the highest instantaneous sound level measured during a specified period.
- Community Noise Equivalent Level (CNEL): Similar to DNL, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

1.3 Regulatory Context

The noise exposure estimates in this document are intended to be used for environmental assessments of operations involving the Models 7000W-B and 8000-A, for compliance with the National Environmental Policy Act and operational requirements for a commercial carrier under 14 Code of Federal Regulations Part 135. The analysis method used in this report does not apply standard models such as the Aviation Environmental Design Tool, but instead applies an estimation method based on collected noise measurements. As such the application of this method is only applicable to the Model 7000W-B and 8000-A UAs.

Chapter 2
Methods

2.1 Sound Level Measurements

The analysis in this report used sound level testing data from two reports: *Noise Measurement Results: Wing Model 7000W-B Revision D*, dated November 4, 2024, prepared by AvEnviro Acoustics (2024a), and *Noise Measurement Results: Wing Model 8000-A Revision C*, dated October 28, 2024 also prepared by AvEnviro Acoustics (2024b).

2.1.1 Wing Model 7000W-B Sound Level Measurements

The Hummingbird 7000W-B is a hybrid UA featuring a multi-rotor design with sixteen round diameter propellers. This UA has fixed wing elements, including four motors for forward flight, while also using rotors to provide vertical lift and the capability to hover during packing loading and delivery operations. Packages are loaded or unloaded to the UA during hover by a retractable cord.

The 7000W-B UA weighs 14 pounds when combined with its maximum payload weight of 2.3 pounds. It has a wingspan of approximately 4.9 feet, a height of approximately 1 foot, and a length of approximately 3 feet. Model 7000W-B is shown in Figure 1.

Figure 1. Hummingbird Wing Model 7000W-B.

Sound level testing was conducted at the Wing flight test center in Hollister, California in March 2024. The testing protocol followed FAA direction given in the document, *Measuring Drone Noise for Environmental Review Process*, dated October 2023 (FAA 2023). A brief summary of test results is shown in Table 1. The test results that include forward flight assume a nominal cruise speed of 50.5 knots (AvEnviro Acoustics 2024a).

Table 1. Summary of Sound Level Testing, Model 7000W-B

Test Series	Altitude	Microphone Position	Average SEL (dBA)	Average Lmax (dBA)
En Route with Package	100 feet AGL	Under flight path	59.2	54.3
En Route without Package	100 feet AGL	Under flight path	55.5	50.3
Nest: Manual Loading and Takeoff	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	80.6	66.8
Delivery Point: Arrival, Delivery, Departure	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	83.4	71.9
Nest: Arrival, Landing	Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	78.1	68.2
Offsite Package Autoload	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	81.7	68.9
Nest: Nearfield launch, Autoload and Takeoff	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	82.1	68.6
Nest: Preflight warmup (a.k.a. “Fitbit”)	7 feet AGL	50 feet away from nest	80.3	64.0
Nest: Homebase survey (a.k.a. “Geobit”)	66 feet AGL	50 feet away from nest	81.0	66.2

Source: AvEnviro Acoustics 2024a.
AGL = above ground level
dBA = A-weighted decibel

2.1.2 Wing Model 8000-A Sound Level Measurements

The Hummingbird 8000-A is a hybrid UA featuring a multi-rotor design with twelve round diameter propellers. This UA has fixed wing elements, including four motors for forward flight, while also using rotors to provide vertical lift and the capability to hover during packing loading and delivery operations. Packages are loaded or unloaded to the UA during hover by a retractable cord.

The 8000-A UA weighs 24.3 pounds when combined with its maximum payload weight of 6.6 pounds. It has a wingspan of approximately 6 feet, a height of approximately 1 foot, and a length of approximately 6.2 feet. Model 8000-A is shown in Figure 2.

Figure 2. Wing Hummingbird 8000-A UA

Sound level testing was conducted at the Wing flight test center in Hollister, California in April 2024. The testing protocol followed FAA direction given in the document, *Measuring Drone Noise for Environmental Review Process*, dated October 2023 (FAA 2023). A brief summary of key test results is shown in Table 2. The test results that include forward flight assume a nominal cruise speed of 50.5 knots (AvEnviro Acoustics 2024b).

Table 2. Summary of Sound Level Testing, Model 8000-A

Test Series	Altitude	Microphone Position	Average SEL (dBA)	Average Lmax (dBA)
En Route with Package	100 feet AGL	Under flight path	64.7	58.7
En Route without Package [1]	100 feet AGL	Under flight path	62.7	55.5
Nest: Manual Loading and Takeoff	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	79.0	65.8
Delivery Point: Arrival, Delivery, Departure	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	83.6	71.5
Nest: Arrival, Landing	Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	77.7	66.3
Offsite Package Autoload	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	80.9	66.8
Nest: Nearfield launch, Autoload and Takeoff	Hover: 13 feet AGL, Flight: 165 feet AGL	Under flight path, 50 feet away from takeoff point	81.6	66.8
Nest: Preflight warmup (a.k.a. “Fitbit”)	7 feet AGL	50 feet away from nest	77.1	63.2

Test Series	Altitude	Microphone Position	Average SEL (dBA)	Average Lmax (dBA)
Nest: Homebase survey (a.k.a. "Geobit")	66 feet AGL	50 feet away from nest	79.4	66.7

Source: AvEnviro Acoustics 2024b.

[1] Based on guidance from the test report, data for en route without a package is not used. This item uses the same sound level as en route with a package.

AGL = above ground level; dBA = A-weighted decibel

2.2 Analysis Procedure Methodology

To calculate SEL for receptors located near a nest or delivery point, a combination of actions are evaluated to define different types of operations, as a UA transitions between different operating modes of takeoff, hover, ascend, descend, and en route. The types of operations evaluated are the following:

- Manual package loading at nest
- Package delivery at a delivery point
- Landing at nest
- Package autoload at an offsite location
- Nearfield launch and package autoload at nest
- Preflight warmup (a.k.a. "Fitbit")
- Homebase survey (a.k.a. "Geobit")

The SEL calculation for each of these operation types involves the use of sound level data as measured by an array of microphones during simulation testing of each operation, as described in the noise measurement test reports (AvEnviro 2024a, AvEnviro 2024b). Microphones placed on a linear path relative to the UA launch point collected sound level data at distances of 25 feet, 50 feet, 100 feet , 200 feet, 400 feet and 800 feet. The incident SEL sound levels were used to determine attenuation rates between microphone positions, which were influenced by different degrees of en route and hover noise depending on the type of operation tested. However, as described in the noise measurement test reports, ambient noise from other sources heavily influenced data collected at the 400-foot and 800-foot positions (AvEnviro 2024a, 2024b). For this reason, the data collected at the 400-foot and 800-foot positions is not used in this analysis. At 800 feet, the SEL is equivalent to en route noise as measured during testing. As such, for the distances greater than 200 feet from the UA launch point, attenuation would assume a falloff rate consistent with an en route SEL level at 800 feet. At distances greater than 800 feet, the en route level is used.

DNL values are calculated for four types of locations: 1) a nest, 2) a delivery point, 3) an offsite autoloader, and 4) directly under the en route path. The DNL values at a nest are calculated by summing the sound energy for a launch and package loading operation with a return to land at the nest to describe sound levels for a single delivery cycle. UA noise from FitBit and GeoBit operations are also accounted for in DNL values from a nest. The DNL value for a single delivery cycle at each of the four locations is scaled for multiple UA operations using a logarithmic multiplier (i.e., log of the number of events multiplied by 10). adjusted by a factor of 49.4 to convert from SEL to DNL.

Chapter 3
Testing Procedure for Wing Operations

Sound level testing included a simulation of different UA operations to account for different activities that would take place at nest and delivery points. Each operation type includes a specific sequence of actions, described in the following subsections.

3.1 Manual Load and Takeoff

Sequence of manual package loading and takeoff operation from the launch point (e.g., nest):

1. Ascend from launch pad until reaching 33 feet above ground level AGL, then descend slightly to 22 feet AGL (about 9 seconds for 7000W-B, 11 seconds for 8000-A)
2. Hover at 22 feet AGL during package pickup (about 20 seconds for both models)
3. Aircraft with package ascends from 22 feet AGL to 165 feet AGL (about 14 seconds for both models)
4. Begin horizontal flight at constant acceleration until a speed of 50.5 knots is reached (about 13 seconds for 7000W-B, 15 seconds for 8000-A)
5. Maintain horizontal flight at constant velocity of 50.5 knots over microphone array

3.2 Delivery

Sequence of package delivery operation to a delivery point:

1. Aircraft with package approaches at 165 feet AGL above microphone array
2. Decelerate from 50.5 knots to zero (about 15 seconds for 7000W-B, 13 seconds for 8000-A)
3. Descend from 165 feet AGL to 22 feet AGL (about 20 seconds for 7000W-B, 28 seconds for 8000-A)
4. Hover at 22 feet AGL during package drop (about 12 seconds for both models)
5. Empty aircraft ascends from 22 feet AGL to 165 feet AGL (about 15 seconds for 7000W-B, 16 seconds for 8000-A)
6. Begin horizontal flight at constant acceleration until a speed of 50.5 knots (i.e., Vcruise) is reached (about 14 seconds for 7000W-B, 18 seconds for 8000-A)
7. Maintain horizontal flight at constant velocity of 50.5 knots over microphone array

3.2.1 Landing

Sequence of landing operation at nest:

1. Empty aircraft approaches at 165 feet AGL above microphone array
2. Decelerate from 50.5 knots to zero (about 14 seconds for both models)

3. Descend from 165 feet AGL to ground (for 7000W-B, the UA descends to 20 feet AGL in about 15 seconds and from 20 feet AGL to ground in about 13 seconds; for 8000-A, the UA descends to 20 feet AGL in about 24 seconds and from 20 feet AGL to ground in about 12 seconds)

3.2.2 Offsite Package Autoload

For offsite package autoload operation, the UA takes off from a distant nest location and approaches the offsite package loading point.

1. Empty aircraft approaches at 165 feet AGL above microphone array
2. Decelerate from 50.5 knots to zero (about 17 seconds for both models)
3. Descend from 165 feet AGL to 22 feet AGL (about 15 seconds for 7000W-B, 25 seconds for 8000-A)
4. Hover at 22 feet AGL during package pickup (about 22 seconds for both models)
5. Aircraft with package ascends from 22 feet AGL to 165 feet AGL (about 15 seconds for both models) Begin horizontal flight at constant acceleration until a speed of 50.5 knots (i.e., V_{cruise}) is reached (about 14 seconds for both models)
6. Maintain horizontal flight at constant velocity of 50.5 knots over microphone array

3.2.3 Nearfield Launch and Autoload

For nearfield launch, the UA takes off and approaches the package loading point from a nearby nest.

1. Empty aircraft ascends from nest 50 feet away to 165 feet AGL (about 15 seconds for 7000W-B, 16 seconds for 8000-A)
2. Transit to nearby autoloader (about 8 seconds for 7000W-B, 12 seconds for 8000-A)
3. Descend from 165 feet AGL to 14 feet AGL at constant velocity of (about 15 seconds for 7000W-B, 26 seconds for 8000-A)
4. Hover at 14 feet AGL during package pickup (about 22 seconds for both models)
5. Aircraft with package ascends from 14 feet AGL to 165 feet AGL (about 15 seconds for both models)
6. Begin horizontal flight at constant acceleration until a speed of 50.5 knots (i.e., Vcruise) is reached (about 14 seconds for both models)
7. Maintain horizontal flight at constant velocity of 50.5 knots over microphone array

3.2.4 Fitbit Operation

The Fitbit operation is a brief hover operation to warm up the battery and conduct preflight tests at the beginning of each day of flight operation. This would be done for each individual UA at the nest. Testing time varies but generally would be less than two minutes.

1. Climb to 7 feet AGL (about 3 seconds for both models)
2. Hover in place (assumes 118 seconds for 7000W-B, 49 seconds for 8000-A)

3. Descend from 7 feet AGL to ground (about 6 seconds for both models)

3.2.5 Geobit Operation

The Geobit operation is a brief hover operation above the nest to verify geolocation of ground-based infrastructure.

1. Climb to 66 feet AGL (about 8 seconds for both models)
2. Hover in place (about 25 seconds for both models)
3. Descend from 66 feet AGL to ground (about 40 seconds for both models)

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Chapter 4
Sound Levels of UA Operations

4.1 Sound Levels for Wing Model 7000W-B

4.1.1 Manual Loading, Delivery and Landing

Calculated sound levels for Wing Model 7000W-B manual loading, delivery, and landing at the launch point are shown in Table 3.

Table 3. Model 7000W-B: Estimate of SEL for Manual Launch, Delivery and Landing at Nest

Distance between Launch Point and Receiver	Manual Load and Takeoff, dBA SEL[1]	Delivery, dBA SEL[2]	Return to Nest and Landing, dBA SEL[3]
25	86.6	88.4	83.2
50	80.6	83.5	78.1
75	76.8	79.9	75.0
100	74.1	77.3	72.8
125	72.6	75.5	71.1
150	71.4	74.0	69.6
175	70.3	72.7	68.4
200	69.4	71.6	67.4
225	68.3	70.4	66.2
250	67.3	69.4	65.0
275	66.4	68.5	64.0
300	65.6	67.6	63.1
325	64.9	66.8	62.3
350	64.2	66.1	61.5
375	63.5	65.4	60.8
400	62.9	64.8	60.1
425	62.4	64.2	59.5
450	61.8	63.7	58.8
475	61.3	63.1	58.3
500	60.9	62.6	57.7
525	60.4	62.1	57.2
550	60.0	61.7	56.7
575	59.6	61.3	56.3
600	59.2	60.8	55.8
625	58.8	60.4	55.4
650	58.4	60.1	55.0
675	58.1	59.7	54.6
700	57.7	59.3	54.2

Distance between Launch Point and Receiver	Manual Load and Takeoff, dBA SEL[1]	Delivery, dBA SEL[2]	Return to Nest and Landing, dBA SEL[3]
725	57.4	59.0	53.8
750	57.1	58.7	53.5
775	56.8	58.3	53.1
800	56.5	58.0	52.8
825	56.5	58.0	52.8
850	56.5	58.0	52.8
875	56.5	58.0	52.8
900	56.5	58.0	52.8
925	56.5	58.0	52.8
950	56.5	58.0	52.8
975	56.5	58.0	52.8
1000	56.5	58.0	52.8

Source: AvEnviro 2024a, ICF 2024.

[1] Assumes one en route trip with package on board.

[2] Assumes one en route trip with package on board plus one en route trip without a package.

[3] Assumes one en route trip without a package.

dBA = A-weighted decibel; SEL = sound exposure level

4.1.2 Sound Levels for Wing Model 7000W-B Autoload Actions

Calculated sound levels for offsite autoload, and nearfield launch and autoload for Model 7000W-B are shown in Table 4.

Table 4. Model 7000W-B: Estimate of SEL for Offsite Autoload and Nearfield Launch and Autoload Actions

Distance between Launch Point and Receiver	Offsite Autoload, dBA SEL[1]	Nearfield Launch and Autoload, dBA SEL[1]
25	87.1	87.1
50	81.7	82.1
75	78.7	79.2
100	76.6	77.1
125	75.0	75.3
150	73.6	73.9
175	72.5	72.7
200	71.5	71.6
225	70.4	70.3
250	69.3	69.2
275	68.4	68.1
300	67.6	67.2
325	66.8	66.3
350	66.1	65.5

Distance between Launch Point and Receiver	Offsite Autoload, dBA SEL[1]	Nearfield Launch and Autoload, dBA SEL[1]
375	65.4	64.7
400	64.8	64.0
425	64.2	63.4
450	63.6	62.8
475	63.1	62.2
500	62.6	61.6
525	62.1	61.1
550	61.7	60.6
575	61.2	60.1
600	60.8	59.6
625	60.4	59.2
650	60.0	58.7
675	59.7	58.3
700	59.3	57.9
725	59.0	57.6
750	58.7	57.2
775	58.3	56.8
800	58.0	56.5
825	58.0	56.5
850	58.0	56.5
875	58.0	56.5
900	58.0	56.5
925	58.0	56.5
950	58.0	56.5
975	58.0	56.5
1000	58.0	56.5

Source: AvEnviro 2024a, ICF 2024.

[1] Assumes one incoming en route trip without a package plus one outgoing en route trip with package on board.

dBA = A-weighted decibel; SEL = sound exposure level

4.1.3 Sound Levels for Wing Model 7000W-B FitBit and GeoBit Actions

Calculated sound levels for Fitbit and Geobit operations for Model 7000W-B are shown in Table 5.

Table 5. Model 7000W-B: Estimate of SEL for FitBit and GeoBit Actions

Distance between Launch Point and Receiver	FitBit, dBA SEL	GeoBit, dBA SEL
25	87.3	85.3
50	80.3	81.0
75	76.5	78.0
100	73.8	75.9

Distance between Launch Point and Receiver	FitBit, dBA SEL	GeoBit, dBA SEL
125	72.2	74.0
150	70.9	72.4
175	69.8	71.1
200	68.8	69.9
225	68.0	68.9
250	67.2	68.0
275	66.5	67.1
300	65.9	66.4
325	65.3	65.7
350	64.8	65.1
375	64.3	64.5
400	63.8	63.9
425	63.4	63.4
450	63.0	62.9
475	62.6	62.4
500	62.2	62.0
525	61.8	61.5
550	61.5	61.1
575	61.2	60.8
600	60.9	60.4
625	60.6	60.0
650	60.3	59.7
675	60.0	59.4
700	59.8	59.1
725	59.5	58.8
750	59.3	58.5
775	59.0	58.2
800	58.8	57.9
825	58.6	57.6
850	58.4	57.4
875	58.2	57.1
900	58.0	56.9
925	57.8	56.6
950	57.6	56.4
975	57.4	56.2
1000	57.2	56.0

Source: AvEnviro 2024a, ICF 2024.
dBA = A-weighted decibel; SEL = sound exposure level

4.1.4 En Route Sound Levels for Wing Model 7000W-B

The SEL for an en route overflight with a package loaded on the Model 7000W-B was measured to be 59.2 dBA. The en route overflight SEL for a Model 7000W-B with no package was measured to be 55.5 dBA (AvEnviro 2024a). During testing, en route measurements were taken with UA in forward

flight at an altitude of 100 feet AGL, which is lower than the expected operating altitude of 165 feet AGL. To adjust the measured en route sound level to the operating altitude of 165 feet AGL, a data correction factor using the logarithm of the ratio of altitudes multiplied by 12.5 was added to the en route SEL, consistent with procedures described in 14 CFR Part 36. The corrected SEL values were calculated to be 56.5 dBA with a package and 52.8 dBA without a package. These corrected en route sound levels were used for distances 800 feet or greater from the nest or delivery site.

4.2 Sound Levels for Wing Model 8000-A

4.2.1 Manual Loading, Delivery and Landing

Calculated sound levels for Wing Model 8000-A manual loading, delivery and landing at the launch point are shown in Table 6.

Table 6. Model 8000-A: Estimate of SEL for Manual Launch, Delivery and Landing at Nest

Distance between Launch Point and Receiver	Manual Load and Takeoff, dBA SEL[1]	Delivery, dBA SEL[2]	Return to Nest and Landing, dBA SEL[3]
25	84.4	87.3	81.8
50	79.0	83.6	77.7
75	76.9	80.7	75.4
100	75.4	78.6	73.7
125	74.4	77.0	71.6
150	73.6	75.7	70.0
175	72.9	74.6	68.5
200	72.3	73.7	67.3
225	71.4	72.9	66.7
250	70.6	72.2	66.1
275	69.9	71.5	65.6
300	69.3	70.9	65.2
325	68.7	70.3	64.7
350	68.1	69.8	64.3
375	67.6	69.3	64.0
400	67.1	68.9	63.6
425	66.7	68.5	63.3
450	66.3	68.1	63.0
475	65.9	67.7	62.7
500	65.5	67.4	62.5
525	65.1	67.0	62.2
550	64.8	66.7	62.0
575	64.4	66.4	61.7
600	64.1	66.1	61.5
625	63.8	65.8	61.3
650	63.5	65.5	61.1

Distance between Launch Point and Receiver	Manual Load and Takeoff, dBA SEL[1]	Delivery, dBA SEL[2]	Return to Nest and Landing, dBA SEL[3]
675	63.2	65.3	60.9
700	63.0	65.0	60.7
725	62.7	64.8	60.5
750	62.5	64.6	60.3
775	62.2	64.3	60.1
800	62.0	64.1	60.0
825	62.0	64.1	60.0
850	62.0	64.1	60.0
875	62.0	64.1	60.0
900	62.0	64.1	60.0
925	62.0	64.1	60.0
950	62.0	64.1	60.0
975	62.0	64.1	60.0
1000	62.0	64.1	60.0

Source: AvEnviro 2024b, ICF 2024.

[1] Assumes one en route trip with package on board.

[2] Assumes one en route trip with package on board plus one en route trip without a package.

[3] Assumes one en route trip without a package.

dBA = A-weighted decibel; SEL = sound exposure level

4.2.2 Sound Levels for Wing Model 8000-A Autoload Actions

Calculated sound levels for offsite autoload, and nearfield launch and autoload for Model 8000-A are shown in Table 7.

Table 7. Model 8000-A: Estimate of SEL for Offsite Autoload and Nearfield Launch and Autoload Actions

Distance between Launch Point and Receiver	Offsite Autoload, dBA SEL[1]	Nearfield Launch and Autoload, dBA SEL[1]
25	85.2	85.4
50	80.9	81.6
75	78.6	79.1
100	77.0	77.4
125	75.9	76.0
150	75.0	74.9
175	74.2	73.9
200	73.5	73.1
225	72.7	72.2
250	72.0	71.3
275	71.3	70.5
300	70.8	69.8
325	70.2	69.2

Distance between Launch Point and Receiver	Offsite Autoload, dBA SEL[1]	Nearfield Launch and Autoload, dBA SEL[1]
350	69.7	68.6
375	69.2	68.1
400	68.8	67.5
425	68.4	67.1
450	68.0	66.6
475	67.6	66.2
500	67.3	65.8
525	67.0	65.4
550	66.6	65.0
575	66.3	64.6
600	66.1	64.3
625	65.8	64.0
650	65.5	63.6
675	65.3	63.3
700	65.0	63.1
725	64.8	62.8
750	64.5	62.5
775	64.3	62.2
800	64.1	62.0
825	64.1	62.0
850	64.1	62.0
875	64.1	62.0
900	64.1	62.0
925	64.1	62.0
950	64.1	62.0
975	64.1	62.0
1000	64.1	62.0

Source: AvEnviro 2024b, ICF 2024.

[1] Assumes one incoming en route trip without a package plus one outgoing en route trip with package on board.

dBA = A-weighted decibel; SEL = sound exposure level

4.2.3 Sound Levels for Wing Model 8000-A FitBit and GeoBit Actions

Calculated sound levels for Fitbit and Geobit operations for Model 8000-A are shown in Table 8.

Table 8. Model 8000-A: Estimate of SEL for FitBit and GeoBit Actions

Distance between Launch Point and Receiver	FitBit, dBA SEL	GeoBit, dBA SEL
25	84.1	84.4
50	77.1	79.4
75	73.6	75.3
100	71.1 [1]	72.5 [1]
125	69.1	70.2
150	67.5	68.4
175	66.2	66.8
200	65.0	65.5
225	64.0	64.3
250	63.1	63.3
275	62.2	62.3
300	61.5	61.4
325	60.8	60.6
350	60.1	59.9
375	59.5	59.2
400	59.0	58.6
425	58.4	57.9
450	57.9	57.4
475	57.5	56.8
500	57.0	56.3
525	56.6	55.8
550	56.2	55.4
575	55.8	54.9
600	55.4	54.5
625	55.1	54.1
650	54.7	53.7
675	54.4	53.3
700	54.1	52.9
725	53.8	52.6
750	53.5	52.2
775	53.2	51.9
800	52.9	51.6
825	52.6	51.3
850	52.4	51.0
875	52.1	50.7
900	51.9	50.4

Distance between Launch Point and Receiver	FitBit, dBA SEL	GeoBit, dBA SEL
925	51.6	50.1
950	51.4	49.9
975	51.2	49.6
1000	51.0	49.4

Source: AvEnviro 2024b, ICF 2024.

[1] The SEL value for FitBit and GeoBit operations at 100 feet was adjusted from the test report to use a falloff rate from the 50 foot to the 200 foot value due to no valid passes during testing.

dBA = A-weighted decibel; SEL = sound exposure level

4.2.4 En Route Sound Levels for Wing Model 8000-A

The SEL for an en route overflight with a package loaded on the Model 8000-A was measured to be 64.7 dBA. The en route overflight SEL for a Model 8000-A with no package was measured to be 62.7 dBA (AvEnviro 2024b). During testing, en route measurements were taken with UA in forward flight at an altitude of 100 feet AGL, which is lower than the expected operating altitude of 165 feet AGL. To adjust the measured en route sound level to the operating altitude of 165 feet AGL, a data correction factor using the logarithm of the ratio of altitudes multiplied by 12.5 was added to the en route SEL, consistent with procedures described in 14 CFR Part 36. The corrected SEL values were calculated to be 62.0 dBA with a package and 60.0 dBA without a package. These corrected en route sound levels were used for distances 800 feet or greater from the nest or delivery site.

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Chapter 5
Noise Exposure from UA Operations

This chapter presents estimated DNL values for package delivery operations assuming different rates of delivery for a nest. This analysis assumes all package deliveries would occur during daytime hours only (i.e., 7:00 a.m. to 10:00 p.m.), so no nighttime penalties are applied to package deliveries. Fitbit operations would be done before package delivery operations each day, and are assumed to be done before 7:00 a.m. As such nighttime penalties would apply to Fitbit operations. Geobit operations would be conducted on an intermittent basis at the rate of about one event per week. To simulate a loudest case, Geobit operations are included in the DNL analysis.

5.1 Noise Exposure from a Nest

A single delivery operation consists of launch, package load, departure, return and landing phases, and the full cycle of these actions are accounted for in noise exposure at a nest. In addition to package deliveries, the noise exposure values include up to 24 nighttime Fitbit operations and one Geobit operation. Therefore, the DNL value at a nest accounts for the following:

- Package loading operations: manual, offsite package autoload, or nearfield autoload (up to 400 events)
- Landings at nest post-delivery (up to 400 events)
- FitBit (240 DNL equivalent events)
- GeoBit (1 DNL equivalent event)

Estimated DNL noise exposure distances at a nest operating Model 7000W-B UAs are shown in Table 9 for Manual loading and Table 10 for Nearfield Autoloading. Noise exposure DNL values are shown at different scales: from 1 delivery per day to 400 deliveries per day. The noise exposure values assume a departure and return flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet from the nest. According to the calculations, package loading operations would exceed 65 DNL at 35 feet from a nest location, at a rate of 400 package loading operations per day for both loading scenarios.

Table 9. DNL Noise Exposure Distances at Nest for Model 7000W-B for Different Scales of Operation, Manual Launch Option

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	35	50	85	160
5	<25	35	50	90	165
10	<25	35	55	90	165
15	<25	35	55	90	170
20	<25	35	55	90	175
25	<25	35	55	95	175
50	<25	40	60	100	195

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
75	<25	40	65	105	210
100	<25	40	65	115	220
150	<25	45	70	125	245
200	<25	45	75	140	265
300	30	50	85	165	295
400	35	55	95	185	325

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. except for Fitbit, which would be done before 7:00 a.m. DNL = day/night average sound level

Table 10. DNL Noise Exposure Distances at Nest for Model 7000W-B for Different Scales of Operation, Nearfield Launch Option

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	35	50	85	160
5	<25	35	50	90	165
10	<25	35	55	90	170
15	<25	35	55	95	175
20	<25	35	55	95	180
25	<25	35	55	95	185
50	<25	40	60	105	205
75	<25	40	65	120	220
100	<25	40	70	125	235
150	<25	45	80	145	260
200	<25	50	85	160	285
300	30	55	100	190	320
400	35	65	115	215	350

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. except for Fitbit, which would be done before 7:00 a.m. DNL = day/night average sound level

Estimated DNL noise exposure distances at a nest operating Model 8000-A UAs are shown in Table 11 for Manual loading and Table 12 for Nearfield Autoloading. Noise exposure DNL values are shown at different scales: from 1 delivery per day to 400 deliveries per day. The noise exposure values assume a departure and return flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet from the nest. According to the calculations, package loading operations would exceed 65 DNL at less than 25 feet from a nest location, at a rate of 400 package loading operations per day for both loading scenarios.

Table 11. DNL Noise Exposure Distances at Nest for Model 8000-A for Different Scales of Operation, Manual Launch Option

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	40	65	110
5	<25	<25	40	65	115
10	<25	<25	40	65	120
15	<25	<25	40	70	125
20	<25	<25	45	70	130
25	<25	<25	45	75	135
50	<25	<25	45	85	160
75	<25	30	50	95	190
100	<25	30	50	105	215
150	<25	35	60	125	255
200	<25	40	70	145	300
300	<25	45	85	180	375
400	<25	45	100	215	440

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. except for Fitbit, which would be done before 7:00 a.m.
DNL = day/night average sound level

Table 12. DNL Noise Exposure Distances at Nest for Model 8000-A for Different Scales of Operation, Nearfield Launch Option

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	40	65	110
5	<25	<25	40	65	115
10	<25	<25	40	70	120
15	<25	<25	45	70	130
20	<25	<25	45	75	135
25	<25	<25	45	75	140
50	<25	<25	50	90	170
75	<25	30	55	105	200
100	<25	35	60	115	225
150	<25	35	70	140	270
200	<25	40	80	160	315
300	<25	50	100	200	390
400	<25	55	120	235	455

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. except for Fitbit, which would be done before 7:00 a.m.
DNL = day/night average sound level

5.2 Noise Exposure from Offsite Package Autoloading

Estimated DNL noise exposure distances at an offsite package autoloader location for the Model 7000W-B are shown in Table 13. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. A single delivery operation consists of arrival, package autoload, and departure phases. According to calculations, package delivery operations would exceed 65 DNL at less than 25 feet from an offsite autoloading location at a rate of 400 deliveries per day to a single delivery site.

Table 13. DNL Noise Exposure Distances at an Offsite Package Autoloading Location for Model 7000W-B, for Different Scales of Operation

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	<25
10	<25	<25	<25	<25	40
15	<25	<25	<25	<25	50
20	<25	<25	<25	30	55
25	<25	<25	<25	35	65
50	<25	<25	<25	50	95
75	<25	<25	35	60	115
100	<25	<25	40	70	140
150	<25	<25	50	90	175
200	<25	30	55	105	205
300	<25	40	70	135	245
400	<25	45	80	160	280

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m.
DNL = day/night average sound level

Estimated DNL noise exposure distances at an offsite package autoloader location for the Model 8000-A are shown in Table 14. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. A single delivery operation consists of arrival, package autoload, and departure phases. According to calculations, package delivery operations would exceed 65 DNL at less than 25 feet from an offsite autoloading location at a rate of 400 deliveries per day to a single delivery site.

Table 14. DNL Noise Exposure Distances at Nest for Model 8000-A for Different Scales of Operation, Remote Launch Option

Average Daily Deliveries per Nest[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	<25
10	<25	<25	<25	<25	30
15	<25	<25	<25	<25	40
20	<25	<25	<25	<25	50
25	<25	<25	<25	<25	60
50	<25	<25	<25	45	95
75	<25	<25	<25	55	135
100	<25	<25	30	70	170
150	<25	<25	40	95	230
200	<25	<25	50	115	275
300	<25	30	65	165	355
400	<25	40	80	205	430

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m.
DNL = day/night average sound level

5.3 En Route Noise Exposure

Noise exposure from UA en route trajectories would be loudest directly under the flight path. In practice, UAs would serve many delivery points from a given nest, however in areas where there is a high demand for deliveries, en route UA noise may be intermittently audible depending on the level of existing ambient noise. Based on calculations however, even if the louder of the two Hummingbird UA models (Model 8000-A) under en route conditions used the same en route trajectory for delivery service to surrounding areas, the noise exposure level accounting for both the delivery and return paths would be no higher than 40.7 DNL at a rate of up to 400 deliveries per day. Considering that en route UA noise would not exceed 45 DNL under any delivery scenarios, this was not quantified further.

5.4 Noise Exposure from a Delivery Site

Estimated DNL noise exposure distances at a delivery point for the Model 7000W-B are shown in Table 15. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. A single delivery operation consists of arrival, package delivery, and departure phases. According to calculations, package delivery operations would exceed 65 DNL at 30 feet from a nest location at a rate of 400 deliveries per day to a single delivery site.

Table 15. DNL Noise Exposure Distances at a Delivery Point for Model 7000W-B for Different Scales of Operation

Average Daily Deliveries at Delivery Point[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	35
10	<25	<25	<25	<25	50
15	<25	<25	<25	30	60
20	<25	<25	<25	40	65
25	<25	<25	<25	45	75
50	<25	<25	35	60	100
75	<25	<25	40	70	125
100	<25	<25	50	80	145
150	<25	30	60	100	180
200	<25	40	65	115	205
300	<25	45	80	140	245
400	30	55	90	165	280

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m.
DNL = day/night average sound level

Estimated DNL noise exposure distances at a delivery point for the Model 8000-A are shown in Table 16. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 1,000 feet. A single delivery operation consists of arrival, package delivery, and departure phases. According to calculations, package delivery operations would exceed 65 DNL at less than 25 feet from a nest location at a rate of 400 deliveries per day to a single delivery site.

Table 16. DNL Noise Exposure Distances at a Delivery Point for Model 8000-A for Different Scales of Operation

Average Daily Deliveries at Delivery Point[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<25	<25	<25	<25	<25
5	<25	<25	<25	<25	<25
10	<25	<25	<25	<25	45
15	<25	<25	<25	<25	60
20	<25	<25	<25	35	70
25	<25	<25	<25	40	80
50	<25	<25	<25	65	120
75	<25	<25	40	80	155
100	<25	<25	45	95	185
150	<25	<25	60	120	235

Average Daily Deliveries at Delivery Point[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
200	<25	35	70	140	280
300	<25	45	90	180	365
400	<25	55	105	210	435

Note: [1] Average daily deliveries are shown in terms of DNL equivalent. The CONOPS assumes all UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m.
DNL = day/night average sound level

5.5 Cumulative Noise Exposure

Criteria for significance of impacts and changes in noise exposure are defined in FAA Order 1050.1F *Environmental Impacts: Policies and Procedures* (FAA 2015). Order 1050.1F Exhibit 4-1 states the following with respect to threshold of significance for a proposed action:

> The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe. For example, an increase from DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB.

A cumulative increase in noise from a proposed action can be calculated using the difference between the additional noise exposure introduced by a proposed action and the no action alternative. The cumulative DNL increase associated with different values of the proposed action is shown in Table 17.

Table 17. Cumulative Increase in DNL due to a Proposed Action

Proposed Action minus No Action (x)	Cumulative Increase in DNL (Δ)
$x < -3.8$ dB	$\Delta < 1.5$ dB
-3.8 dB $< x < 0.0$ dB	1.5 dB $< \Delta <$ 3 dB
0.0 dB $< x <$ 3.3 dB	3 dB $< \Delta <$ 5 dB
3.3 dB $< x$	5 dB $< \Delta$

For air traffic airspace and procedure actions where the study area is larger than the immediate vicinity of an airport, Order 1050.1F specifies the following change-of-exposure criteria to identify locations where noise exposure levels will increase by a magnitude considered reportable. An action that would increase noise exposure by 3 dB where no action is between 60 and 65 DNL, or by 5 dB where no action is between 45 and 60 DNL would be considered reportable.

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Chapter 6
References

AvEnviro Acoustics. 2024a. *Environmental Noise Assessment: Wing Model 7000W-B Revision D.*

AvEnviro Acoustics. 2024b. *Environmental Noise Assessment: Wing Model 8000-A Revision C.*

Code of Federal Regulations (CFR). *Noise Standards: Aircraft Type and Airworthiness Certification.* Available: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-36. Accessed: July 23, 2024.

Federal Aviation Administration (FAA). 2015. Order 1050.1F. *Environmental Impacts: Policies and Procedures*. Appendix B. Available: https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf#page=113 Accessed: July 23, 2024.

Federal Aviation Administration (FAA) Office of Environment and Energy. 2023. Drone Team, AEE-100. *Measuring Drone Noise for Environmental Review Process*. Draft Measurement Protocol for Applications for EA Noise Analysis V05, PowerPoint Presentation, October 2023.

Harris Miller Miller and Hanson. 2023. *Noise Assessment for Wing Aviation Proposed Package Delivery Operations with Hummingbird 7000W-B Unmanned Aircraft*, prepared March 17, 2023.

ICF International. 2024. *Noise Modeling for the Technical Noise Study Report: Hummingbird 7000W-B and 8000-A Unmanned Aircraft Package Delivery Operations.* Dallas-Fort Worth, TX. Prepared for the Federal Aviation Administration.

Wing Aviation LLC. 2024. Description of Proposed Action and Alternatives, Supplemental EA for Package Delivery Operations for Dallas-Fort Worth Metro.

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Appendix E
Biological Resources and USFWS Consultation

Table E-1. State Species of Greatest Conservation Need in Brazoria, Chambers, Fort Bend, Galveston, Grimes, Harris, Liberty, Mongomery, San Jacinto, and Waller Counties, Texas

Scientific Name	Common Name	State Status	ESA Status
Ambystoma tigrinum	Eastern tiger salamander		
Anaxyrus houstonensis	Houston toad	E	E
Anaxyrus woodhousii	Woodhouse's toad		
Desmognathus conanti	Spotted dusky salamander		
Lithobates areolatus areolatus	Southern crawfish frog		
Necturus beyeri	Gulf Coast waterdog		
Pseudacris streckeri	Strecker's chorus frog		
Anas fulvigula	Mottled Duck		
Anthus spragueii	Sprague's pipit		
Calidris alba	Sanderling		
Calidris canutus rufa	Rufa red knot	T	T
Cardellina pusilla	Wilson's Warbler		
Centronyx henslowii	Henslow's Sparrow		
Charadrius melodus	Piping plover	T	T
Charadrius montanus	Mountain plover		
Charadrius nivosus	Snowy Plover		
Chordeiles minor	Common Nighthawk		
Coccyzus americanus	Yellow-billed cuckoo		T
Colinus virginianus	Northern Bobwhite		
Coturnicops noveboracensis	Yellow Rail		
Dryobates borealis	Red-cockaded woodpecker	E	E, PT
Egretta rufescens	Reddish egret	T	
Elanoides forficatus	Swallow-tailed kite	T	
Euphagus cyanocephalus	Brewer's Blackbird		
Grus americana	Whooping crane	E	E
Lanius ludovicianus	Loggerhead Shrike		
Laterallus jamaicensis	Black rail	T	T
Leucophaeus pipixcan	Franklin's gull		
Mycteria americana	Wood stork	T	
Numenius borealis	Eskimo curlew	E	E
Peucaea aestivalis	Bachman's sparrow	T	

Scientific Name	Common Name	State Status	ESA Status
Quiscalus quiscula	Common Grackle		
Riparia riparia	Bank Swallow		
Rynchops niger	Black skimmer		
Sternula antillarum	Least Tern		
Tringa semipalmata	Willet		
Tympanuchus cupido attwateri	Attwater's greater prairie-chicken	E	E
Fallicambarus houstonensis	Houston burrowing crayfish		
Procambarus brazoriensis	Brazoria crayfish		
Procambarus nechesae	Neches crayfish		
Anguilla rostrata	American eel		
Atractosteus spatula	Alligator gar		
Carcharhinus acronotus	Blacknose shark		
Carcharhinus brevipinna	Spinner shark		
Carcharhinus falciformis	Silky shark		
Carcharhinus isodon	Finetooth Shark		
Carcharhinus leucas	Bull Shark		
Carcharhinus longimanus	Oceanic whitetip shark	T	T
Carcharhinus obscurus	Dusky shark		
Carcharhinus plumbeus	Sandbar shark		
Carcharhinus porosus	Smalltail shark		
Epinephelus drummondhayi	Speckled hind		
Erimyzon claviformis	Western creek chubsucker	T	
Fundulus jenkinsi	Saltmarsh topminnow		
Hybognathus nuchalis	Mississippi silvery minnow		
Istiophorus platypterus	Sailfish		
Isurus oxyrinchus	Shortfin mako shark	T	
Kajikia albida	White marlin		
Macrhybopsis storeriana	Silver chub		
Makaira nigricans	Blue marlin		
Manta birostris	Giant manta ray		T
Megalops atlanticus	Atlantic tarpon		
Menidia clarkhubbsi	Texas silverside		
Microphis brachyurus	Opossum pipefish		
Minytrema melanops	Spotted sucker		
Mycteroperca bonaci	Black grouper		
Mycteroperca phenax	Scamp		
Negaprion brevirostris	Lemon shark		

Scientific Name	Common Name	State Status	ESA Status
Notropis atrocaudalis	Blackspot shiner		
Notropis potteri	Chub shiner	T	
Notropis sabinae	Sabine shiner		
Notropis shumardi	Silverband shiner		
Paralichthys lethostigma	Southern flounder		
Percina maculata	Blackside darter	T	
Pristis pectinata	Smalltooth sawfish	E	E
Rachycentron canadum	Cobia		
Rhinobatos lentiginosus	Atlantic guitarfish		
Rhizoprionodon porosus	Caribbean sharpnose shark		
Seriola dumerili	Greater amberjack		
Sphyrna lewini	Scalloped hammerhead shark		
Sphyrna mokarran	Great hammerhead	T	
Xiphias gladius	Swordfish		
Bombus pensylvanicus	American bumblebee		
Danaus plexippus plexippus	Migratory monarch butterfly		C
Euphyes bayensis	Bay skipper		
Heliastus subroseus	Rose-wind beach grasshopper		
Neotrichia mobilensis	No accepted common name		
Somatochlora margarita	Texas emerald dragonfly		
Sparbarus coushatta	No accepted common name		
Tricorythodes curvatus	No accepted common name		
Balaenoptera acutorostrata	Minke whale		
Balaenoptera borealis	Sei whale	E	E
Balaenoptera edeni brydei	Bryde's whale	E	
Balaenoptera musculus	Blue whale	E	E
Balaenoptera physalus	Finback whale	E	E
Balaenoptera ricei	Rice's whale	E	E
Corynorhinus rafinesquii	Rafinesque's big-eared bat	T	
Eubalaena glacialis	North Atlantic right whale	E	E
Feresa attenuata	Pygmy killer whale	T	
Globicephala macrorhynchus	Short-finned pilot whale	T	
Kogia breviceps	Pygmy sperm whale	T	
Kogia simus	Dwarf sperm whale	T	
Lasiurus cinereus	Hoary bat		
Lasiurus seminolus	Seminole bat		
Megaptera novaeangliae	Humpback whale		E

Scientific Name	Common Name	State Status	ESA Status
Mesoplodon densirostris	Blainville's beaked whale		
Mesoplodon europaeus	Gervais's beaked whale	T	
Myotis austroriparius	Southeastern myotis bat		
Nyctinomops macrotis	Big free-tailed bat		
Orcinus orca	Killer whale	T	
Perimyotis subflavus	Tricolored bat		PE
Physeter macrocephalus	Sperm whale	E	E
Pseudorca crassidens	False killer whale	T	
Puma concolor	Mountain lion		
Spilogale interrupta	Plains spotted skunk		
Spilogale putorius	Eastern spotted skunk		
Stenella clymene	Clymene dolphin		
Stenella frontalis	Atlantic spotted dolphin	T	
Stenella longirostris	Spinner dolphin		
Steno bredanensis	Roughtoothed dolphin	T	
Trichechus manatus	West Indian manatee	T	T
Tursiops truncatus	Bottlenosed dolphin		
Ziphius cavirostris	Cuvier's beaked whale	T	
Cyclonaias pustulosa	Pimpleback		
Cyrtonaias tampicoensis	Tampico Pearlymussel		
Lampsilis hydiana	Louisiana Fatmucket		
Lampsilis satura	Sandbank pocketbook	T	
Leaunio lienosus	Little Spectaclecase		
Pleurobema riddellii	Louisiana pigtoe	T	PT
Potamilus amphichaenus	Texas heelsplitter	T	PE
Potamilus streckersoni	Brazos heelsplitter	T	
Quadrula quadrula	Mapleleaf		
Sagittunio subrostratus	Pondmussel		
Toxolasma parvum	Lilliput		
Tritogonia nobilis	Gulf Mapleleaf		
Tritogonia verrucosa	Pistolgrip		
Truncilla macrodon	Texas fawnsfoot	T	T
Truncilla truncata	Deertoe		
Uniomerus declivis	Tapered Pondhorn		
Amorpha laevigata	Smooth indigobush		
Amorpha paniculata	Panicled indigobush		
Astragalus wrightii	Wright's milkvetch		

Scientific Name	Common Name	State Status	ESA Status
Bartonia paniculata ssp. texana	Texas screwstem		
Calopogon oklahomensis	Oklahoma grass pink		
Carex decomposita	Cypress knee sedge		
Chloris texensis	Texas windmill grass		
Coreopsis intermedia	Goldenwave tickseed		
Crataegus viridis var. glabriuscula	Green hawthorn		
Cuscuta attenuata	Marsh-elder dodder		
Cyperus cephalanthus	Giant sharpstem umbrella-sedge		
Cyperus grayoides	Mohlenbrock's sedge		
Echinacea atrorubens	Topeka purple-coneflower		
Eleocharis austrotexana	South Texas spikesedge		
Helianthus praecox ssp. praecox	Texas sunflower		
Hymenoxys texana	Texas prairie dawn	E	E
Justicia runyonii	Runyon's water-willow		
Leitneria pilosa ssp. pilosa	Corkwood		
Liatris bracteata	Coastal gay-feather		
Liatris cymosa	Branched gay-feather		
Oenothera sessilis	Grand Prairie evening primrose		
Onosmodium helleri	Heller's marbleseed		
Paronychia setacea	Bristle nailwort		
Physostegia correllii	Correll's false dragon-head		
Prenanthes barbata	Barbed rattlesnake-root		
Pseudognaphalium austrotexanum	South Texas false cudweed		
Rayjacksonia aurea	Houston daisy	T	
Rhododon ciliatus	Texas sandmint		
Rhynchospora indianolensis	Indianola beakrush		
Schoenolirion wrightii	Texas sunnybell		
Schoenoplectus deltarum	Delta bulrush		
Silene subciliata	Scarlet catchfly		
Spigelia texana	Texas pinkroot		
Spiranthes brevilabris	Texas ladies'-tresses		
Spiranthes longilabris	Giant spiral ladies'-tresses		
Tauschia texana	Texas tauschia		
Thalictrum texanum	Texas meadow-rue		
Thurovia triflora	Threeflower broomweed		
Valerianella florifera	Texas cornsalad		
Willkommia texana var. texana	Texas willkommia		

Scientific Name	Common Name	State Status	ESA Status
Zephyranthes traubii	Traub's rainlily		
Apalone mutica	Smooth softshell		
Caretta caretta	Loggerhead sea turtle	T	T
Chelonia mydas	Green sea turtle	T	T
Deirochelys reticularia miaria	Western chicken turtle		
Dermochelys coriacea	Leatherback sea turtle	E	E
Eretmochelys imbricata	Atlantic hawksbill sea turtle	E	E
Lepidochelys kempii	Kemp's Ridley sea turtle	E	E
Macrochelys temminckii	Alligator snapping turtle	T	PT
Malaclemys terrapin littoralis	Texas diamondback terrapin		
Nerodia clarkii	Salt marsh snake		
Ophisaurus attenuatus	Slender glass lizard		
Phrynosoma cornutum	Texas horned lizard	T	
Pituophis ruthveni	Louisiana pine snake	T	T
Plestiodon septentrionalis	Prairie skink		
Sistrurus miliarius	Pygmy rattlesnake		
Sistrurus tergeminus	Western massasauga		
Terrapene carolina	Eastern box turtle		
Terrapene ornata	Western box turtle		
Thamnophis sirtalis	Common garter snake		

Source: TDWC 2025.
C = Candidate; E= Endangered; PE = Proposed endangered; PT = Proposed threatened; T = Threatened

U.S. Department of Transportation
Federal Aviation Administration

Aviation Safety

800 Independence Ave., SW.
Washington, DC 20591

Field Office Supervisor
U.S. Fish and Wildlife Service
Texas Coastal and Central Plains Ecological Services Field Office - Clear Lake
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Suite 211
Houston, TX 77058 Submitted to:
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SUBJECT: Endangered Species Act Section 7 Consultation for Unmanned Aircraft Commercial Package Delivery Operations in Houston, Texas Metropolitan Area

USFWS Project Code: 2026-0018158

In accordance with Endangered Species Act (ESA) Section 7 , the Federal Aviation Administration (FAA) is requesting U.S. Fish and Wildlife Service (USFWS) concurrence that the FAA's action of authorizing Wing Aviation LLC (Wing) to expand its unmanned aircraft (UA or drone) small package delivery operations into the Houston metropolitan area ***may affect, but is not likely to adversely affect*** the tricolored bat (*Perimyotis subflavus*), eastern back rail (*Laterallus jamaicensis ssp. jamaicensis*), piping plover (*Charadrius melodus*), red-cockaded woodpecker (*Dryobates borealis*), rufa red knot (*Calidris canutus rufa*), and whooping crane (*Grus americana)*. Our biological evaluation is provided below, including a brief background, project description, identification of the action area, and a discussion of potential effects to ESA-listed species.

The FAA conducted two separate Section 7 consultations with the USFWS for similar undertakings in late 2024 when evaluating Wing's initial proposed operations in the Dallas Fort Worth (DFW) Metro and surrounding area (**Reference: USFWS #2024-0103189)** and in July of 2025 when evaluating Wing's proposed operations in the Atlanta Metro and surrounding area (**Reference: USFWS #2025-0029661)**. For DFW, USFWS concurred with the FAA's finding of ***may affect, not likely to adversely affect***, for the golden-cheeked warbler (*Setophaga chrysoparia*) and whooping crane (*Grus americana*) by letter dated December 3, 2024. For Atlanta, USFWS concurred with the FAA's finding of **may affect, not likely to adversely affect,** the northern long-eared bat (*Myotis septentrionalis*) and the gray bat (*Myotis grisescens*) by letter dated August 6, 2024.

Background

Wing currently operates under 14 Code of Federal Regulations (CFR) Part 135 from the DFW metro area, Texas. Wing has a Part 135 Air Carrier Operating Certificate from the FAA, which allows it to carry the property of another for compensation or hire beyond visual line of sight (BVLOS). The certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in the carrier's Operations Specifications (OpSpecs). Wing is applying to the FAA to

include the Houston metro area by adding launch and staging sites (hereafter drone nests) and expanding operating hours included in its OpSpecs.

Project Description

Wing has requested the FAA amend the OpSpecs in Wing's Part 135 air carrier certificate to enable expansion of its commercial drone package delivery operations to the Houston metropolitan area (see **Figure 1**). Wing projects operating a maximum of 400 flights per operating day from each drone nest, with each flight taking a package to a customer delivery address before returning to a drone nest. Wing projects establishing up to 75 drone nests in the Houston operating area. The UA would be transporting consumer goods in partnership with merchants in the communities they already serve and would provide an alternative to in-store pickup. There would be variability in the number of flights per day based on customer demand and weather conditions. Initially, Wing expects to fly considerably less than 400 deliveries per day from each nest and then gradually increase to 400 deliveries per day as consumer demand rises. The maximum potential number of total eventual operations per day would be 30,000[1]. In addition, operations would include low altitude (<8ft) in-nest hover checks, or Fitness Built in Tests (FitBITs) between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m. Additionally, higher hover flights (approximately 60 feet) may be occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

Wing is proposing to disperse drone nests throughout the operational area (**Figure 1**), each located in a commercial area, such as shopping centers, large individual retailers, and shopping malls. Each nest would contain up to two dozen (24) aircraft on launch pads, and one or more merchants may be partnering with Wing at each nest for drone deliveries. Nests would be distributed throughout the Houston metro area following a measured rollout plan to be developed with Wing's partners and continuing best practices from Wing's established community outreach program, and in compliance with state and local statutory and regulatory requirements. The proposed operations would occur from 6:00am to 10:00pm for 7 days of the week, including holidays. The first hour of the operating window is reserved for flight capability checks and UAs would only leave the drone nest from 7:00am to 10:00pm. Wing is not proposing to conduct operations from 10:00 pm to 6:00 am.

Unmanned Aircraft Specifications

The primary UAs used for the proposed operations are Wing's Hummingbird 7000W-B and 8000-A models. Specifications of these models are as follows:

- Hummingbird 7000W-B.
    - Multi-rotor design with 16 propellers.
    - Weight under 15 pounds when combined with its maximum payload weight of 2.7 pounds.
    - Wingspan of approximately 4.9 feet, a height of approximately 1 foot, and a length of 4 feet.
- 8000-A.
    - Multi-rotor design with 12 propellers.

[1] 400 Ops*75 Drone nests per day

- Weight under 25 pounds when combined with its maximum payload weight of 5 pounds.
- Has a wingspan of approximately 6 feet, a height of approximately 1 foot, and a length of approximately 6.2 feet.

All Wing aircraft use electric power from rechargeable lithium-ion batteries. Aircraft batteries are charged wirelessly from nest charging pads where aircraft sit between deliveries. Charging pads are connected to onsite utilities or temporarily to small diesel generators during the development of utility connections.

Wing anticipates the Houston metro area fleet makeup would be comprised of 70 to 80 percent 7000W-B aircraft and 20 to 30 percent 8000-A aircraft. The fleet mix of individual nests would be variable based on payload, route, and demand characteristics; nests with a wider range of offerings are anticipated to carry higher proportions of 7000W-B Aircraft.

Flight Operations

The UA would generally be operated at an altitude of 150–300 feet above ground level (AGL) and always below an altitude of 400 feet AGL while en route to and from delivery locations. At a delivery location, the UA would descend vertically to a stationary hover at 23 feet AGL and lower a package to the ground by a retractable line for delivery. Once a package has been lowered to the ground, the UA would then retract the line, ascend vertically to a cruise altitude, and depart the delivery area enroute back to a nest.

The UA would fly a predefined flight path that is set prior to takeoff. Flight missions are automatically planned by Wing's flight planning software. A mission originates from a nest location, and Wing's software automatically assigns, deconflicts, and routes each flight to the delivery location and back to a nest. Each nest site would include a controlled area wherein UA flights are launched and recovered.

A typical flight profile can be broken into the following general flight phases: takeoff, enroute outbound, delivery, enroute inbound, and landing.

Note: Each aircraft must complete a daily set of preflight checks before being assigned a delivery mission. These include a brief low height hover flight where the UA exercises various systems. These are termed FitBIT or Fitness Built-In Test and are at a height of approximately 6 feet for approximately 1 minute. Additionally, higher hover flights (approximately 60 feet) may be occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

Takeoff

Once the UA receives a mission and is cleared for takeoff from a launch pad, the UA takes off from the ground vertically to an altitude of 23 feet AGL and hovers for 30 seconds while the package is loaded. The UA then climbs to the enroute altitude (150–300 feet AGL).

En Route Outbound

The en route outbound phase is the part of flight in which the fully loaded UA transits from the nest or a remote pickup location to a delivery point on a predefined flight path. During this flight phase, the UA would typically operate at an altitude of 150–300 feet AGL and a typical airspeed of 59 miles per hour (mph). The UA has a single set cruise airspeed, which would not be exceeded.

Delivery

The delivery phase consists of descent from the enroute altitude to a delivery point, such as a residential yard, driveway, parking lot, or common area. The UA descends vertically to 23 feet AGL while maintaining position over the delivery point. The UA hovers at 23 feet AGL for approximately 30 seconds while lowering its package and then proceeds to climb vertically back to en route altitude.

En Route Inbound

The UA continues to fly at an altitude of 150–300 feet AGL and a speed of 59 mph towards the drone nest.

Landing

Upon reaching the drone nest, the UA slowly descends over its assigned landing pad and lands on the pad.

Remote Pickup Operations

Remote pickup operations from each nest would be supported at up to 12 partner establishments depending upon demand and nest capacity. Pickup operations would follow general flight phases and parameters identical to typical delivery operations and would include the addition of a pickup phase. The pickup phase is similar to the delivery phase. The UA descends from its en route altitude (safe altitude above local terrain and obstacles) to 14.5 feet AGL and lowers the package hook. The UA then passes approximately 10 feet laterally over the autoloader. The autoloader's Y-shaped poles passively guide the package hook to a narrow slot that ensures secure attachment of the package. The package is then retracted to the UA before it proceeds to climb to the en route altitude. Remote pickup operations from descent to finish are expected to take no longer than 1 minute and 30 seconds (90 seconds).

Note: Manual remote pickups loading may also be performed by a person and without a physical autoloader. The profile would be similar to the autoloader pickup profile outlined above but would omit the lateral transition for autoloader engagement.

Predicted Sound Levels

The FAA conducted a noise analysis using sound level measurement data for the UA— the Hummingbird 7000W-B and 8000-A. Generally, the 7000W-B generates larger sound levels during takeoff and landing but lower sound levels during transit than the 8000-A. The estimated maximum sound exposure level (SEL) for the takeoff and landing phases of flight of the 7000W-B is approximately 80.6 A-weighted decibels (dBA) at about 50 feet from the drone whereas the estimated maximum SEL for the same flight phases of the 8000-A is 79.0 dBA as shown in Tables 1–2 in the noise report (see **Attachment B** for the noise report). Both platforms generate similar noise at delivery, with the 7000W-B generating 83.4 dBA SEL and 8000-A generating 83.6 dBA (Tables 1-2, **Attachment B**). The maximum SEL for the en route phase of the 8000-A is approximately 62.0 dBA when the drone is flying 59 mph at 165 feet AGL and the maximum SEL for the en route phase of the 7000W-B with the same flight parameters is 56.5 dBA (Sections 4.1.4 and 4.2.4 in **Attachment B**). Predicted sound levels decrease as distances from the drone increase. The majority of deliveries will be conducted with the quieter 7000W-B platform, although the specific of distribution of operations between platforms would be variable based on payload, route, and demand characteristics.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is defined as Wing's proposed operating area (see **Figure 1**). This area captures all possible flight routes to the delivery areas

and where potential effects (e.g., visual, auditory, physical) to listed species could occur.

According to the Texas Parks & Wildlife Department (TPWD) Ecoregions of Texas, the action area overlaps the Piney Woods ecoregion, Gulf Prairies and Marshes ecoregion, small portions of the Post Oak Savannah and Blackland Prairie ecoregions in the northwest portion of the action area (TPWD n.d.). The Piney woods ecoregion features pine and hardwood forests, fertile bottomlands, and a humid climate with 36 to 50 inches of rainfall annually. Soils are mostly acidic sands or sandy loams.

Gulf Prairies and Marshes ecoregion is characterized by flat, low-lying land with prairies, marshes, woodlands, and barrier islands along the Gulf of Mexico. It receives 30 to 50 inches of rainfall annually, has long growing seasons, and features mainly acidic soils. While much native habitat has been lost to development, it remains crucial for migratory birds and coastal wildlife. The Post Oak Savannah ecoregion features a blend of oak woodlands and grasslands, characterized by a hilly terrain. The area receives 28 to 40 inches of annual rainfall, peaking in May or June, and has varied, often acidic soils. Blackland Prairie ecoregion is known for its productive, rich soils, gentle topography, and lush native grasslands. It is a true prairie grassland community, dominated by a diverse assortment of grasses (TPWD n.d.).

The majority of the land surface within the action area features urban and suburban development. Therefore, wildlife habitats within the action area predominantly include parks and open spaces, lakes, waterways, riparian buffers, and vacant lands. Urban flora and fauna thrive in such environments and typically are well established and populated.

Development is rapidly encroaching upon existing vacant lands both within and surrounding the action area. The urban environment in the action area includes agricultural areas; commercial areas (i.e., business parks, airports, landfills); communities; downtown areas; recreational areas (i.e., public parks, golf courses); residential areas; thoroughfare (i.e., highways, railroads, public roads); undeveloped areas (i.e., open fields, vacant lots, wooded areas); and waterbodies, wetlands, and floodplains. These areas provide habitat for the smaller and more common bird and mammal species of the southern United States, including mammals such as white-tailed deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), and gray squirrels (*Scirius carlinensis*).

ESA-Listed Species and Critical Habitat in the Action Area

The FAA acquired the Official Species List (see **Attachment A**) from the USFWS Information for Planning and Conservation (IPaC) online system to identify ESA-listed species and designated critical habitat in the action area (**Table 1**). The action area contains proposed critical habitat for the Louisiana pigtoe (*Pleurobema riddellii*).

Table 1. ESA-Listed Species that Occur or Potentially Occur in the Action Area

Common Name	Scientific Name	ESA Status
Mammals		
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
West Indian manatee	*Trichechus manatus*	Threatened
Birds		
Eastern back rail	*Laterallus jamaicensis ssp. jamaicensis*	Threatened
Piping plover	*Charadrius melodus*	Threatened
Red-cockaded woodpecker	*Dryobates borealis*	Threatened

Rufa red knot	*Calidris canutus rufa*	Threatened
Whooping crane	*Grus americana*	Endangered
Reptiles		
Alligator snapping turtle	*Macrochelys temminckii*	Proposed Threatened
Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Clams		
Louisiana pigtoe	*Pleurobema riddellii*	Proposed Threatened
Texas fawnsfoot	*Truncilla macrodon*	Threatened
Insects		
Monarch butterfly	*Danaus plexippus*	Proposed Threatened
Flowering Plants		
Texas prairie dawn-flower	*Hymenoxys texana*	Endangered

Potential Effects of the Action on ESA-Listed and Proposed Species and Critical Habitat

The action does not include any ground construction or habitat modification. Wing's nests would be located in established parking lots of commercially zoned areas, such as shopping centers, large individual retailers, and shopping malls. Autoloaders installed within nests would be anchored through existing pavement, to existing poles, or ballasted for temporary use. During nominal operations, the UA would not touch the ground except at the drone nests. As such, the action would not result in any physical disturbance to habitat. Therefore, the proposed action does not have the potential to affect any habitat or designated critical habitat within the action area. The FAA has determined the action would have *no effect* on proposed critical habitat for the Louisiana pigtoe.

UA noise, light emissions, and the potential for airborne strikes with flying species are the action's potential stressors or threats to ESA-listed species. Flight operations would take place mostly in an urban environment, within airspace, and typically remain well above the tree line while en route to and from a drone nest. The duration of exposure by wildlife on the ground to visual or noise impacts from the UA would be of very short duration (approximately 30 seconds during takeoff/landing and delivery and a few seconds during the en route phase).

As noted above and shown in **Attachment B**, the highest estimated average SEL associated with Wing's proposed operations is 83.6 dBA, which would occur during delivery operations. For reference, the sound level of a diesel truck at 50 feet or a noisy urban environment during the day is approximately 80 to 90 dBA. The highest SEL on the ground when either UA is flying in the en route phase at an altitude of 165 feet AGL is estimated to be around 62.0 dBA, which is comparable to the sound of an air conditioning unit at 100 feet (60 dB).

A noise descriptor for noise effects on wildlife has not been universally adopted, but some research indicates SEL is the most useful predictor of responses. Characteristic of the bulk of research to date has been lack of systematic documentation of the source noise event. Many studies report "sound levels" without specifying the frequency spectrum or duration. A notable exception is a study sponsored by U.S. Air Force that identifies SEL as the best descriptor for response of domestic turkey poults to low-altitude aircraft overflights (Bradley et al. 1990). This study identified a threshold of response for disturbance of domestic turkeys ("100 percent rate of crowding") as SEL 100 dB. None of the predicted sound levels for the different flight phases exceed SEL 83.6 dB.

The following sections describe the anticipated effects of the action on the ESA-listed species listed in Table 1.

Mammals

Tricolored bat

The tricolored bat typically uses trees, caves, or manmade structures for roosting and forages for insects during dusk, nighttime, and dawn time periods. Tricolored bats emerge early in the evening and forage at treetop level or above but may forage closer to ground later in the evening. This species exhibits slow, erratic, fluttery flight while foraging and are known to forage most commonly over waterways and forest edges (USFWS 2023a). This species spends six to nine months per year hibernating in caves or mines (TPWD 2023a). The USFWS has proposed to list the tricolored bat as an endangered species, primarily due to white-nose syndrome. Other factors that influence the tricolored bat's viability include wind-energy-related mortality, habitat loss, and effects from climate change.

Suitable habitat for ESA-listed bat species roosting and feeding in the action area includes wooded areas, open water habitat, and manmade structures. The North American Bat Monitoring Program's (USGS 2023) tricolored bat occupancy model overlaps a very small area of the action area (to the northeast) and indicates that there is a moderate probability of tricolored bats occurring in that part of the action area (see **Figure 3**). However, if the model were to cover the entire action area, it is likely that this probability of occurrence would decrease due to the more suburban/urban environment and highly developed nature of the action area associated with the City of Houston. Drone nests would be located in commercial areas and therefore not within high-quality roosting or foraging habitats.

Tricolored bats at roost or in flight could experience UA noise during the en route and delivery flight phases during the time bats are typically active when drones would be in operation (dawn and dusk/night hours to 10 pm). Bats foraging at or near the tree line at the time a UA flies by would experience the greatest sound levels. Roosting bats or bats foraging near the ground at the time a UA flies by would experience lower sound levels. Bats may exhibit disturbance behaviors and change their flight paths to avoid drones in the event that flights overlap with bat activity areas (Ednie et al. 2021). Research suggests that drones have "minimal impact on bat behavior" (Fu et al. 2018) primarily from noise emissions. However, drone disturbance is temporary, and bats are expected to return to normal foraging and flight activities shortly after the exposure to drone noise ends (Kuhlmann et al. 2022, Ednie et al. 2021). Given the estimated sound levels of the UA, the UA's linear flight profile to and from drone nests and delivery locations, the short period of time the UA would be in any particular location, and the low probability of encountering a bat in the action area, UA noise is not expected to adversely affect ESA-listed bats. Any increase in ambient sound levels caused by the UA's flight would only last a few seconds during the en route phase and approximately 30 seconds during a delivery.

Bats could also be struck by a drone, particularly during nighttime delivery operations while bats are foraging. Given the bat's ability to avoid flying into objects, the short period of time the UA would be in any one place, and the low probability of encountering an ESA-listed bat during operations, the likelihood of the UA striking a bat is discountable.

Based on 1) operations occurring mostly in an urban environment, 2) the altitude at which the UA flies in the en route phase (150–300 feet AGL), 3) the expected low sound levels experienced by a bat, 4) any increase in ambient sound levels would be short in duration, 5) the low probability of bats occurring in the action area, and 6) the low likelihood of the UA striking a bat, the FAA has determined the action ***may affect, but is not likely to adversely affect,*** the tricolored bat. Any effects would be discountable (extremely unlikely to occur) or insignificant (not able to be meaningfully measured, detected, or evaluated).

West Indian manatee

West Indian manatees are not susceptible to disturbance from UA noise, collision risk, or light emissions. The action does not involve any flights over water, ground-disturbing activities, or activities within suitable habitat for this species. As there is no plausible route of effect to this species, the FAA determined the action would have ***no effect*** on the west Indian manatee.

Birds

Eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot, and whooping crane

The eastern black rail is a marsh bird that utilizes dense, shallowly flooded wetlands, including coastal salt marshes and moist grasslands, for survival. Eastern black rails tend to travel through thick vegetation opposed to flying, often using rodent runways to move unseen. Its foraging habits center on small invertebrates such as insects, spiders, and seeds, which it gleans from the ground and low vegetation under cover. Texas serves as a stronghold for the eastern black rail's range in the southeastern coastal United States. Within the action area, eastern black rail's would likely be found in higher elevation wetland zones with some shrubby vegetation. Impounded and unimpounded intermediate marshes, which are marshes that are closer to high elevation areas, also provide habitat for the subspecies. Inland coastal prairies and associated wetlands may also provide habitat for the bird, but are largely uninvestigated (USFWS 2025a).

Piping plovers nest in shallow scrapes on sandy ground during the breeding season, but outside of breeding they are strongly tied to coastal habitats. Their tendencies include running short distances, pausing to tilt their heads, and then quickly picking food items from the sand, a behavior that makes them appear restless and alert. Foraging is focused on small marine invertebrates such as worms, beetles, spiders, crustaceans, and mollusks, which they glean from exposed sand and tidal flats. Piping plovers may occur in the action area starting in July or early august and through the winter months as the Gulf Coast provides wintering grounds for a large portion of the population. Roughly 35–44% of all piping plovers spend the nonbreeding season in Texas, particularly in the lower Laguna Madre where extensive tidal flats offer abundant food and shelter. These habitats allow plovers to remain for up to nine months (TPWD n.d.(b)).

The red-cockaded woodpecker lives in open, mature pine forests across the southeastern U.S. It's different from other woodpeckers in that it makes its cavities for roosting and nesting in live pine trees. Their diet consists mostly of insects, spiders, centipedes, and other animals found on, under, and in the bark of trees. They're also known to eat small berries and seeds (Texas A&M Forest Service, n.d.*)*. Red-cockaded woodpeckers are not migratory birds and live in family groups. In Texas, the species is found in the eastern pine forests, where remnant longleaf stands provide essential habitat. The primary distribution of the species in Texas can be found in the Pineywoods of East Texas and may occur within the action area all year round (TPWD n.d.(c)).

The rufa red knot relies on a wide variety of coastal habitats, including tidal mudflats, sandy beaches, and estuaries, where they primarily feed on small invertebrates. Rufa red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation. The best available information indicates nest sites are within 600 feet of a freshwater wetland, and, although nests are typically within 31 miles of the ocean, knots do not typically use saltwater habitats on the breeding grounds. The species is listed as threatened under the ESA because its survival is tightly linked to the availability of these habitats, many of which are under pressure from coastal development, climate change, and declines in horseshoe crab populations. The rufa red knot is most likely to occur in the

action area during the winter months. The rufa red knot may utilize habitat within the action area (USFWS 2025b).

Whooping cranes use a variety of habitats, including wetlands, estuaries, pastures, agricultural fields, and shallow areas of open water habitats. They are omnivores that eat a variety of food including insects, reptiles, rodents, fish, small birds, mollusks, crustaceans, and berries. Whooping cranes breed in northwest Canada and migrate south and winter in Texas, primarily in the Aransas National Wildlife Refuge located on the Gulf coast (TPWD 2023b). The whooping crane is listed under the ESA primarily due to hunting pressures and habitat loss (USFWS 2023b; Cornell 2023). The whooping crane may occur in the action area in the spring or fall months as it migrates to and from its breeding grounds in Canada and wintering grounds at the Aransas National Wildlife Refuge. The majority of migrant crane observations in Texas occur in the spring from March 19 – April 30 and fall from October 20 – November 24 (Pearse et al. 2020).. Shallow areas of open water, marshes, pastures, and agricultural fields that occur in the action area could potentially provide whooping crane stopover habitat where birds can feed or rest during migration.

The action does not include ground disturbance and therefore would not physically impact any habitat for the eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot, or whooping crane.

If present in the action area during operations, eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot, or whooping crane birds could experience en route noise. Given the estimated sound levels of the UA, the UA's linear flight profile to and from nests and delivery locations, the low probability of encountering an individual of these bird species during operations, and the short period of time the UA would be in any particular location, UA noise is not expected to adversely affect any of these bird species. Further, the chances of any one individual experiencing multiple overflights of a UA are low given the mobility of the birds. One study found that, in most instances, drones within 4 meters of birds did not cause a behavioral response (Vas et al. 2015).

Eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot, and whooping cranes could all be struck by a drone when in flight. The risk of a strike is low given the birds' limited occurrence in the action area due to the largely developed nature of the action area and the birds' ability to fly and avoid the UA. Additionally, Wing has reported that there has never been a bird strike with its drones in the United States.

Based on 1) operations occurring mostly in an urban environment, 2) the altitude at which the UA flies in the en route phase (150–300 feet AGL); 3) the expected low sound levels experienced by an eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot or whooping crane, 4) the short term increase in ambient sound levels, 5) the low probability of these listed bird species occurring in the action area, and 6) the low likelihood of the UA striking these species, the FAA has determined that the action ***may affect, but is not likely to adversely affect***, the eastern back rail, piping plover, red-cockaded woodpecker, rufa red knot, or whooping crane. Any effects would be discountable (extremely unlikely to occur) or insignificant (not able to be meaningfully measured, detected, or evaluated).

Reptiles

Alligator snapping turtle, green sea turtle, and hawksbill sea turtle

Alligator snapping turtle, green sea turtle, and hawksbill sea turtle are not susceptible to disturbance from UA noise, collision risk, or light emissions because the action does not involve any flights over water, ground-disturbing activities, or activities within suitable habitat for this species. As there is no plausible route of effect to this species, the FAA determined the action would have ***no effect*** on alligator

snapping turtle, green sea turtle, and hawksbill sea turtle.

Clams

Louisiana pigtoe and Texas fawnsfoot

Louisiana pigtoe and Texas fawnsfoot are not susceptible to disturbance from UA noise, collision risk, or light emissions because the action does not involve any flights over water, ground-disturbing activities, or activities within suitable habitat for these species. As there is no plausible route of effect to these species, the FAA determined the action would have ***no effect*** on Louisiana pigtoe and Texas fawnsfoot.

Insects

Monarch Butterfly

The primary threat to monarch butterflies is habitat loss, including the loss of breeding, migratory, and overwintering habitat. Pesticide use and climate change are also threats. The action would not physically affect monarch butterfly habitat or host plants. Monarch butterflies could be struck by drones en route to and from delivery; however, strikes are not likely given the species' mobility. Information regarding drone impacts on insects is limited, and there have been no widespread negative impacts identified in the scientific literature. Based on the information available and the limited scale of operations, the action is ***unlikely to jeopardize*** the monarch butterfly.

Flowering Plants

Texas prairie dawn-flower

Flowering plants, ferns and allies, and lichens, such as the Texas prairie dawn-flower, are not susceptible to disturbance from UA noise, collision risk, or light emissions. The action does not involve any ground-disturbing activities or activities within suitable habitat for these species. As there is no plausible route of effect to these species, the FAA determined the action would have ***no effect*** on Texas prairie dawn-flower potentially present within the action area.

Conclusion

Based on the analysis above, the FAA has determined the action ***may affect, but is not likely to adversely affect***, tricolored bat (*Perimyotis subflavus*), eastern back rail (*Laterallus jamaicensis ssp. jamaicensis*), piping plover (*Charadrius melodus*), red-cockaded woodpecker (*Dryobates borealis*), rufa red knot (*Calidris canutus rufa*), and whooping crane (*Grus americana*). The FAA appreciates your review of the proposed project and requests your concurrence with our effects determinations for these three species within 30 days if possible. If you have any questions, please contact Mr. Jonathan "Zack" DeLaune at 9-faa-drone-environmental@faa.gov.

Sincerely,

DEREK W HUFTY

Digitally signed by DEREK W HUFTY
Date: 2026.04.03 12:00:58 -04'00'

Derek Hufty

Manager, General Aviation and Commercial Branch (AFS-750)

Emerging Technologies Division

Office of Safety Standards, Flight Standards Service

Attachments: Figure 1. Action Area
Figure 2. Hummingbird Unmanned Aircraft
Figure 3. Tricolored Bat Mean Occupancy Probabilities
Attachment A. USFWS Official Species List
Attachment B. Noise Assessment Report

References

Bradley, F., C. Book, and A.E. Bowles. 1990. Effects of Low-Altitude Aircraft Overflights on Domestic Turkey Poults. Report No. HSD-TR-90-034, U.S. Air Force Systems Command, Noise and Sonic Boom Impact Technology Program, June.

Cornell University. 2023. Whooping Crane Life History. The Cornell Lab – All About Birds. Available: https://www.allaboutbirds.org/guide/Whooping_Crane/lifehistory#nesting. Accessed: November 21, 2025.

Ednie, G., Bird, D. M., & Elliott, K. H. (2021). Fewer bat passes are detected during small, commercial drone flights. Scientific Reports, 11: 11529. Available at: https://www.nature.com/articles/s41598-021-90905-0. Accessed: November 21, 2025.

Fu, Y., Kinniry, M., and Kloepper, L. N. (2018). The Chirocopter: A UAV for recording sound and video of bats at altitude. Methods in Ecology and Evolution. 9(6): 1531–1535. Available at: https://besjournals.onlinelibrary.wiley.com/doi/10.1111/2041-210X.12992. Accessed: November 21, 2025.

Kuhlmann, K., Fontaine, A., Brisson-Curadeau, E., Bird, D.M., and Eliott, K.H. 2022. Miniaturization eliminates detectable impacts of drones on bat activity. Methods in Ecology and Evolution. 13: 842 - 851. Available at: https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/2041-210X.13807. Accessed: November 21, 2025.

Texas A&M Forest Service. n.d. Red-cockaded Woodpecker (*Leuconotopicus borealis*). Available at: https://tfsweb.tamu.edu/forest-land/wildlife-management/rcw/. Accessed: November 21, 2025.

TPWD. 2023a. Tricolored Bat (*Perimyotis subflavus*). Available at: https://tpwd.texas.gov/huntwild/wild/species/easpip/. Accessed: November 21, 2025.

TPWD. 2023b. Whooping Crane (Grus americana). Available: https://tpwd.texas.gov/huntwild/wild/species/whooper/. Accessed: November 21, 2025.

TPWD. n.d.(a) Texas Ecoregions. https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions. Accessed: September 4, 2025.

TPWD. n.d.(b). Piping Plover (*Charadrius melodus*). Available at: https://tpwd.texas.gov/huntwild/wild/species/piplover/. Accessed: November 21, 2025.

TPWD. n.d.(c). Red-cockaded Woodpecker (*Leuconotopicus borealis*). Available at: https://tpwd.texas.gov/huntwild/wild/species/rcw/. Accessed: November 21, 2025.

USFWS (U.S. Fish and Wildlife Service). 2023a. Tricolored Bat. Available at: https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus. Accessed: November 21, 2025.

USFWS. 2023b. Whooping Crane. Available: https://www.fws.gov/species/whooping-crane-grus-americana. Accessed: November 21, 2025.

USFWS. 2025a. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*). Available at: https://www.fws.gov/species/eastern-black-rail-laterallus-jamaicensis-jamaicensis. Accessed:

November 21, 2025.

USFWS. 2025b. Rufa Red Knot (*Calidris canutus rufa*). Available at: https://www.fws.gov/species/rufa-red-knot-calidris-canutus-rufa. Accessed: November 21, 2025.

U.S. Geological Survey (USGS). 2023. NABat Status and Trends. 2019 Occupancy Map for Tricolored Bat (*Perimyotis subflavus*). Available: https://sciencebase.usgs.gov/nabat/#/results. Accessed: November 21, 2025.

Vas, E., A. Lescroel, O. Duriez, G. Boguszewski, and D. Gremillet. 2015. Approaching Birds with Drones: First Experiments and Ethical Guidelines. Biology Letters (The Royal Society).

Figure 1. Action Area

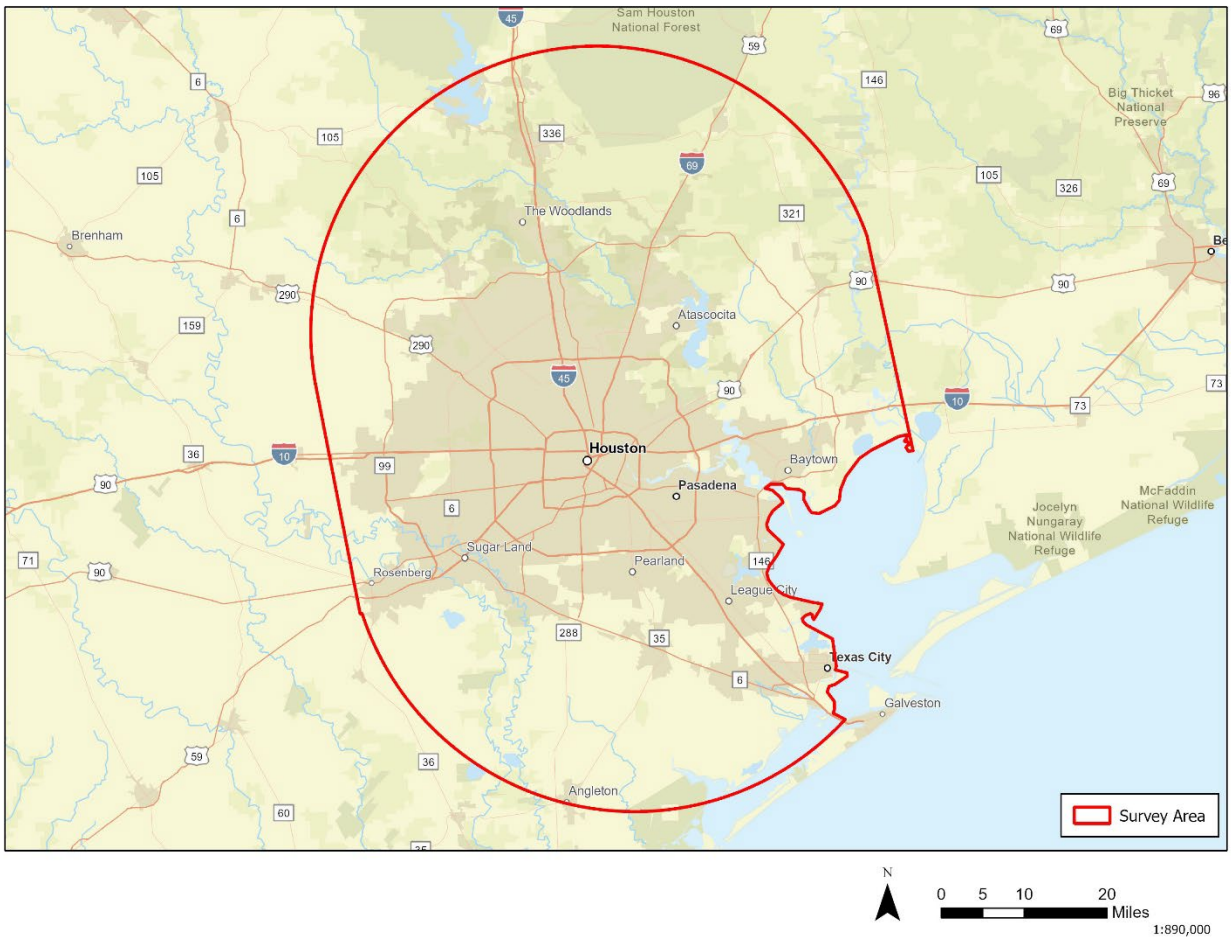
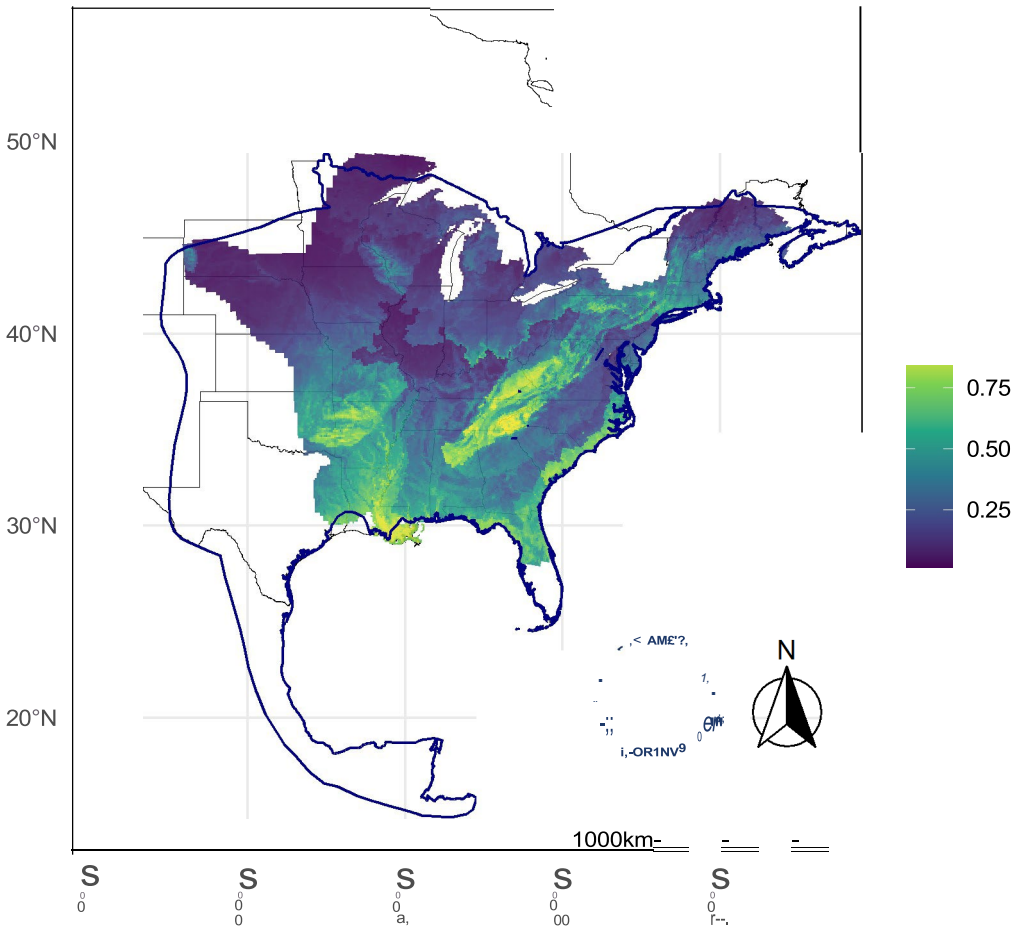


Figure 2. Wing Hummingbird Unmanned Aircraft with Package Attached

Figure 3. Tricolored Bat Mean Occupancy Probabilities



Perimyotis subflavus (PESU) mean occupancy probabilities (color bar) predicted in each NABat grid cell in the modeled species range for 2019. Probabilities are depicted against the reference range map (blue polygon; M. Turner written communication, August 20, 2021) and borders of U.S. states and Canadian provinces/territories.

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Attachment A. USFWS Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal & Central Plains Esfo
17629 El Camino Real, Suite 211
Houston, TX 77058-3051
Phone: (281) 286-8282 Fax: (281) 488-5882

In Reply Refer To: 04/03/2026 12:05:36 UTC
Project Code: 2026-0018158
Project Name: Wing Houston Unmanned Aerial Package Delivery

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies threatened, endangered, proposed, and candidate species, as well as designated and proposed critical habitat, that may occur within the boundary of your project area and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Project related correspondence or questions should be directed to the appropriate field office based on the county of occurrence (refer to the map of Texas field office jurisdictions for contact information).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the attached list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether

projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal action agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant.?This determination requires formal section 7 consultation.

More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook.

Non-Federal entities may coordinate under Sections 9 and 10 of the Act. Section 9 and Federal regulations prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such

conduct. Should the proposed project have the potential to take listed species, the Service recommends that the applicant develop a Habitat Conservation Plan and obtain a section 10(a)(1)(B) permit (see the Habitat Conservation Planning Handbook Toolbox for more information).

Migratory Birds and Eagles:

The attached list also provides information on the potential occurrence of migratory birds and eagles, which are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. For more information, including contacts for our Migratory Bird Offices, visit the Migratory Bird Program page.

We appreciate your concern for threatened and endangered species. The Service encourages Federal action agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Bald & Golden Eagles
- Migratory Birds
- Marine Mammals
- Coastal Barriers
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Texas Coastal & Central Plains Esfo
17629 El Camino Real, Suite 211
Houston, TX 77058-3051
(281) 286-8282

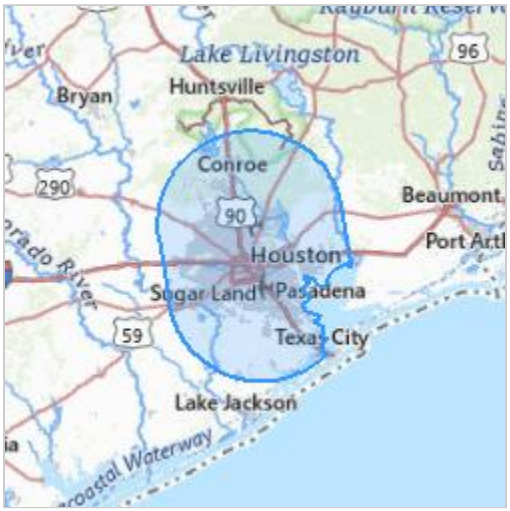
PROJECT SUMMARY

Project Code: 2026-0018158
Project Name: Wing Houston Unmanned Aerial Package Delivery
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: Wing is proposing to conduct UA retail package delivery operations, establishing up to 75 sites in the Houston metro area using Wing's Hummingbird 7000W-B and 8000-A UAS. Wing's intent is to offer service throughout the Houston metro area from a network of nests, where each would serve a specific area, thereby avoiding an over-concentration of flights surrounding any given nest. Each nest houses up to 24 aircraft and has a delivery range of approximately 6 miles. Wing proposes a total commercial maximum of 75 nest locations in Houston. Wing's nests would be located in commercial areas, such as shopping centers, large individual retailers, and shopping malls. Wing projects operating a maximum of 400 delivery flights per operating day from each site, with operations initially occurring between 7:00 a.m. and 7:00 p.m. and then extending to 7:00 a.m. to 10:00 p.m. In addition, operations would include low altitude (<8ft) in-nest checkout flights (referred to as FitBITs) between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m.

Nests would be distributed throughout the Houston metro area following a measured rollout plan to be developed with Wing's partners and continuing best practices from Wing's established community outreach program, and in compliance with state and local statutory and regulatory requirements. Wing's nests would be located in established parking lots of commercially zoned areas whose use is consistent with local zoning and land use requirements, such as shopping centers, large individual retailers, and shopping malls. Remote pickup infrastructure consisting of an autoloader would be installed within existing or proposed nests or at offsite locations (i.e., partner locations offering Wing delivery services) and would also be located within commercial areas. Individual autoloader locations (either within a nest or offsite) would typically include up to three autoloaders within or in the vicinity of most nest sites, with a handful more distributed locations having up to 10 autoloaders, depending on market demand, for a total installation of 100-300 autoloaders distributed throughout the operating area. The autoloaders would consist of "Y"-shaped passive stands designed for automated pick up of packages without landing. Autoloaders would not require ground disturbance for installation and would be anchored through existing pavement, to existing poles, or ballasted for temporary use. The autoloaders would be controlled and operated by Wing and its partners, would be approximately 10 feet tall, 7 feet wide at the mouth, and 6 feet long, and would include a clear zone of approximately 2 parking spaces.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@29.8501163,-95.31689801847375,14z



Counties: Texas

ENDANGERED SPECIES ACT SPECIES

There is a total of 14 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469 General project design guidelines: https://ipac.ecosphere.fws.gov/project/KV4JR2VMYJD33N63YRSBEBTHSI/documents/generated/11436.pdf	Threatened

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039 General project design guidelines: https://ipac.ecosphere.fws.gov/project/KV4JR2VMYJD33N63YRSBEBTHSI/documents/generated/11502.pdf	Threatened
Red-cockaded Woodpecker *Dryobates borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864 General project design guidelines: https://ipac.ecosphere.fws.gov/project/KV4JR2VMYJD33N63YRSBEBTHSI/documents/generated/11502.pdf	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
Hawksbill Sea Turtle *Eretmochelys imbricata* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3656	Endangered

CLAMS

NAME	STATUS
Louisiana Pigtoe *Pleurobema riddellii* Population: There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10233	Proposed Threatened
Texas Fawnsfoot *Truncilla macrodon* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8965 General project design guidelines: https://ipac.ecosphere.fws.gov/project/KV4JR2VMYJD33N63YRSBEBTHSI/documents/generated/11767.pdf	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Texas Prairie Dawn-flower *Hymenoxys texana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6471	Endangered

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Louisiana Pigtoe *Pleurobema riddellii* https://ecos.fws.gov/ecp/species/10233#crithab	Proposed

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence

Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

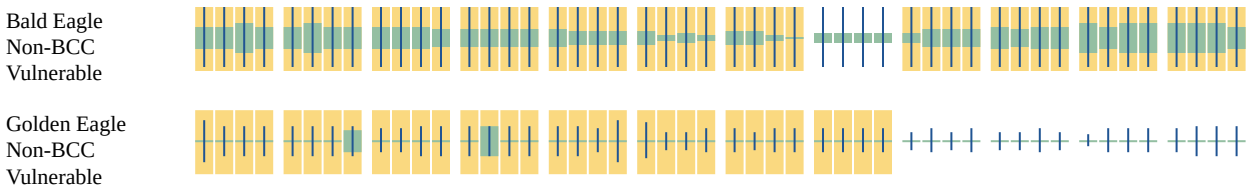
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10561	Breeds elsewhere
American Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31

NAME	BREEDING SEASON
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31
Bachman's Sparrow *Peucaea aestivalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6177	Breeds May 1 to Sep 30
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black Scoter *Melanitta nigra* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10413	Breeds elsewhere
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black-legged Kittiwake *Rissa tridactyla* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10459	Breeds elsewhere
Brown Pelican *Pelecanus occidentalis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/6034	Breeds Jan 15 to Sep 30
Brown-headed Nuthatch *Sitta pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9427	Breeds Mar 1 to Jul 15
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25

NAME	BREEDING SEASON
Chuck-will's-widow *Antrostomus carolinensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9604	Breeds May 10 to Jul 10
Common Loon *gavia immer* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4464	Breeds Apr 15 to Oct 31
Dickcissel *Spiza americana* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9453	Breeds May 5 to Aug 31
Double-crested Cormorant *phalacrocorax auritus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/3478	Breeds Apr 20 to Aug 31
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Forster's Tern *Sterna forsteri* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11953	Breeds Mar 1 to Aug 15
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Gull-billed Tern *Gelochelidon nilotica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
Henslow's Sparrow *Centronyx henslowii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds elsewhere

NAME	BREEDING SEASON
Hudsonian Godwit *Limosa haemastica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
Kentucky Warbler *Geothlypis formosa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
King Rail *Rallus elegans* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Le Conte's Sparrow *Ammospiza leconteii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9469	Breeds elsewhere
Least Tern *Sternula antillarum antillarum* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11919	Breeds Apr 25 to Sep 5
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Little Blue Heron *Egretta caerulea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9477	Breeds Mar 10 to Oct 15
Long-billed Curlew *Numenius americanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5511	Breeds elsewhere
Long-tailed Duck *Clangula hyemalis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/7238	Breeds elsewhere
Magnificent Frigatebird *Fregata magnificens* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9588	Breeds elsewhere

NAME	BREEDING SEASON
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Painted Bunting *Passerina ciris* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9511	Breeds Apr 25 to Aug 15
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Pomarine Jaeger *Stercorarius pomarinus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10458	Breeds elsewhere
Prairie Loggerhead Shrike *Lanius ludovicianus excubitorides* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8833	Breeds Feb 1 to Jul 31
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red Knot *Calidris canutus roselaari* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8880	Breeds elsewhere
Red Phalarope *Phalaropus fulicarius* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10469	Breeds elsewhere

NAME	BREEDING SEASON
Red-breasted Merganser *Mergus serrator* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10693	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Red-necked Phalarope *Phalaropus lobatus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10467	Breeds elsewhere
Red-throated Loon *Gavia stellata* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/9589	Breeds elsewhere
Reddish Egret *Egretta rufescens* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/7617	Breeds Mar 1 to Sep 15
Ring-billed Gull *Larus delawarensis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10468	Breeds elsewhere
Royal Tern *Thalasseus maximus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10471	Breeds Apr 15 to Aug 31
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Sandwich Tern *Thalasseus sandvicensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9731	Breeds Apr 25 to Aug 31

NAME	BREEDING SEASON
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Sooty Tern *Onychoprion fuscatus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10695	Breeds Mar 10 to Jul 31
Sprague's Pipit *Anthus spragueii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8964	Breeds elsewhere
Surf Scoter *Melanitta perspicillata* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10463	Breeds elsewhere
Swallow-tailed Kite *Elanoides forficatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Whimbrel *Numenius phaeopus hudsonicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
White-winged Scoter *Melanitta fusca* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10462	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wilson's Plover *Charadrius wilsonia* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9722	Breeds Apr 1 to Aug 20

NAME	BREEDING SEASON
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31
Yellow Rail *Coturnicops noveboracensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9476	Breeds elsewhere

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

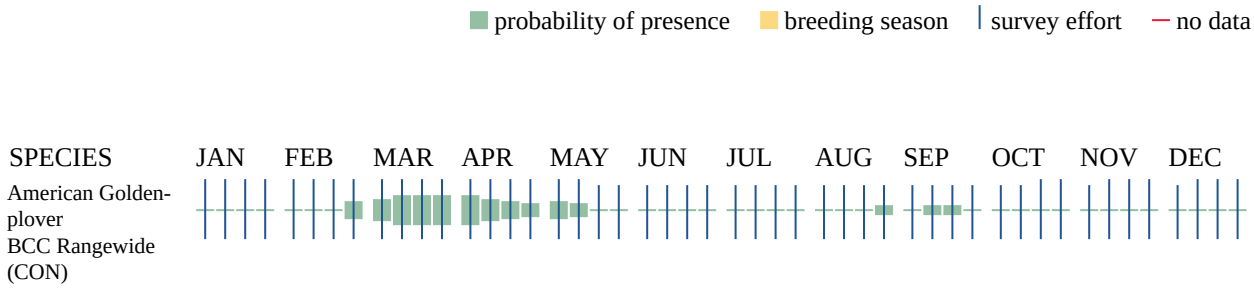
Probability of Presence (■)

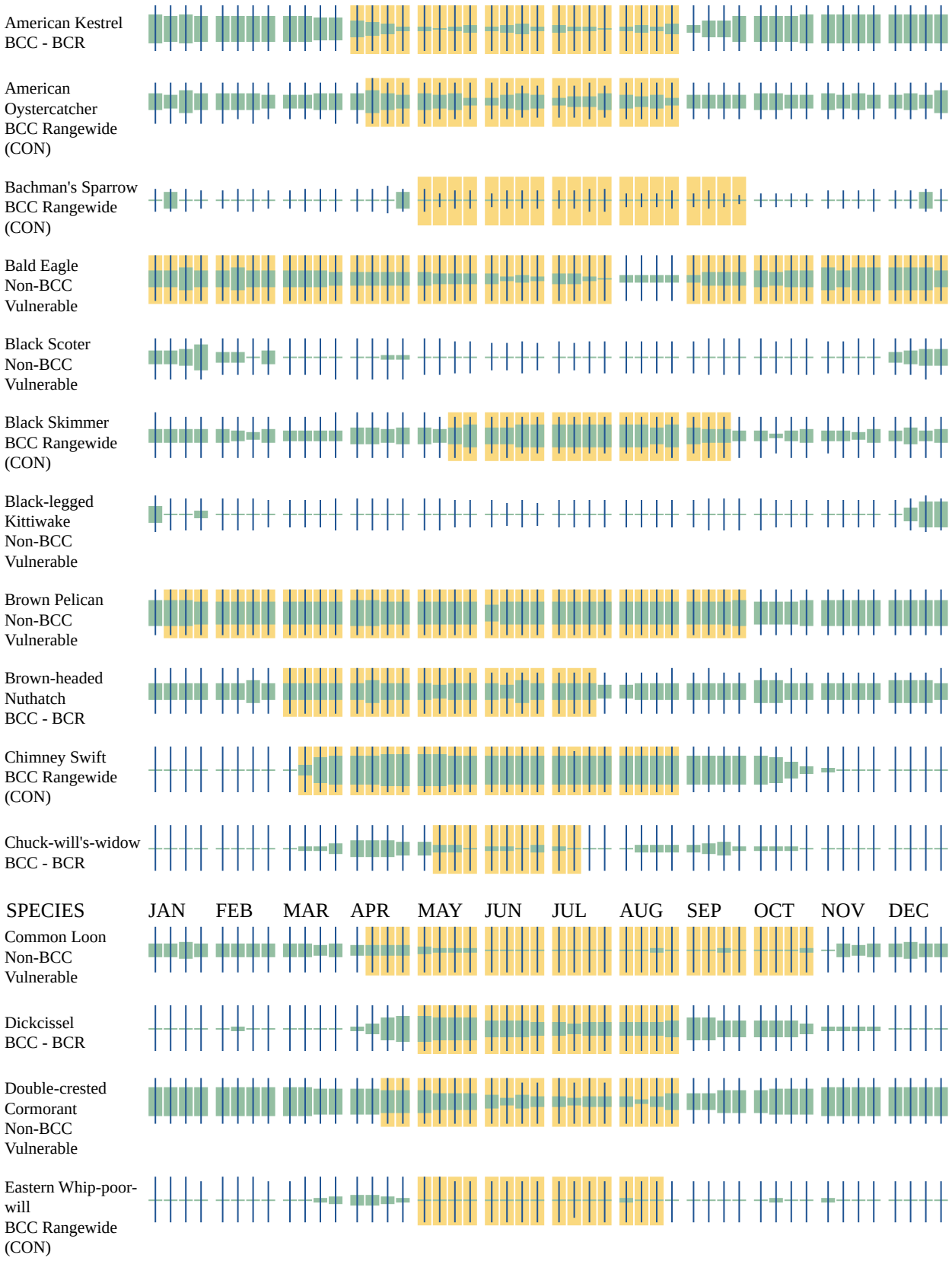
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

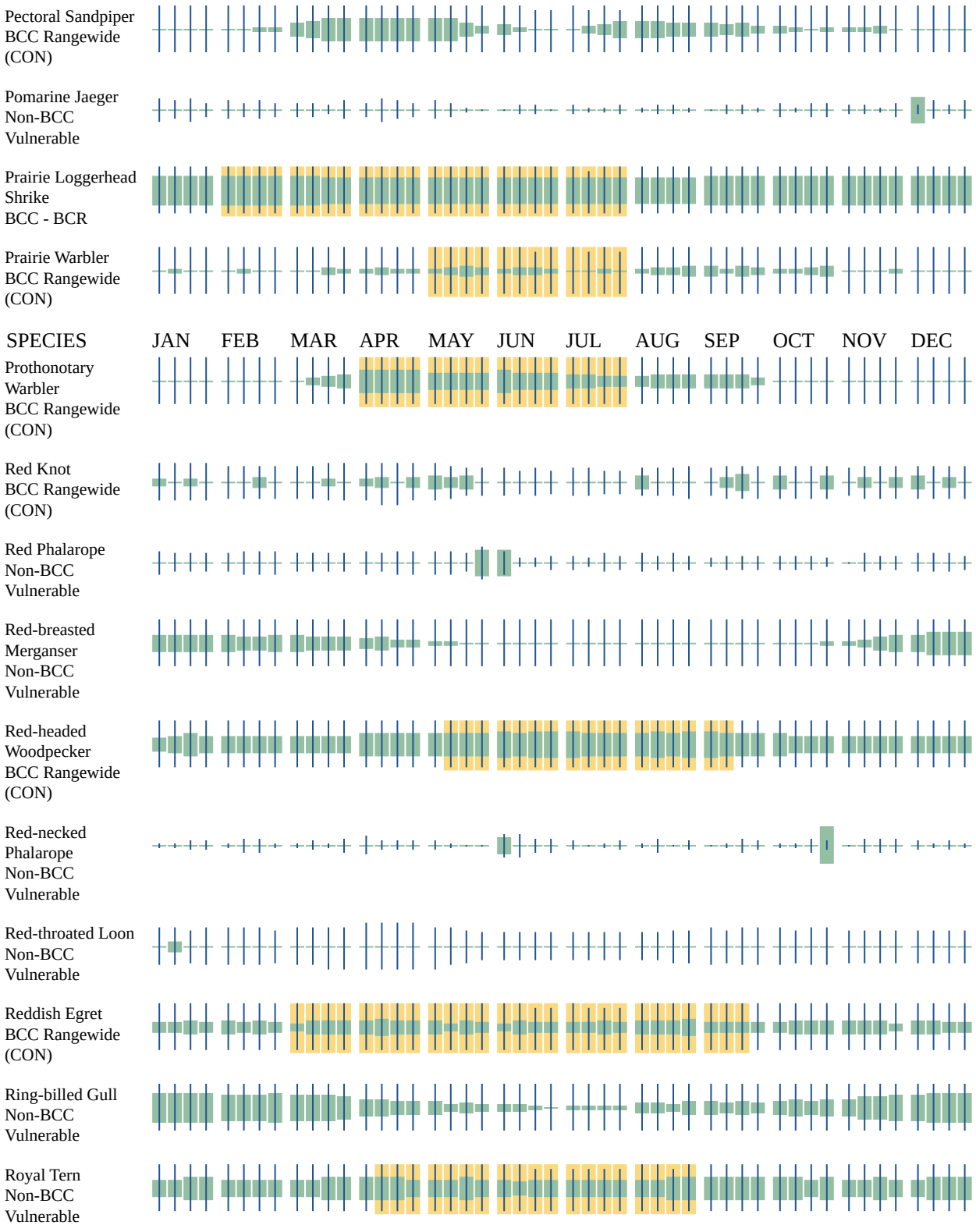
Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

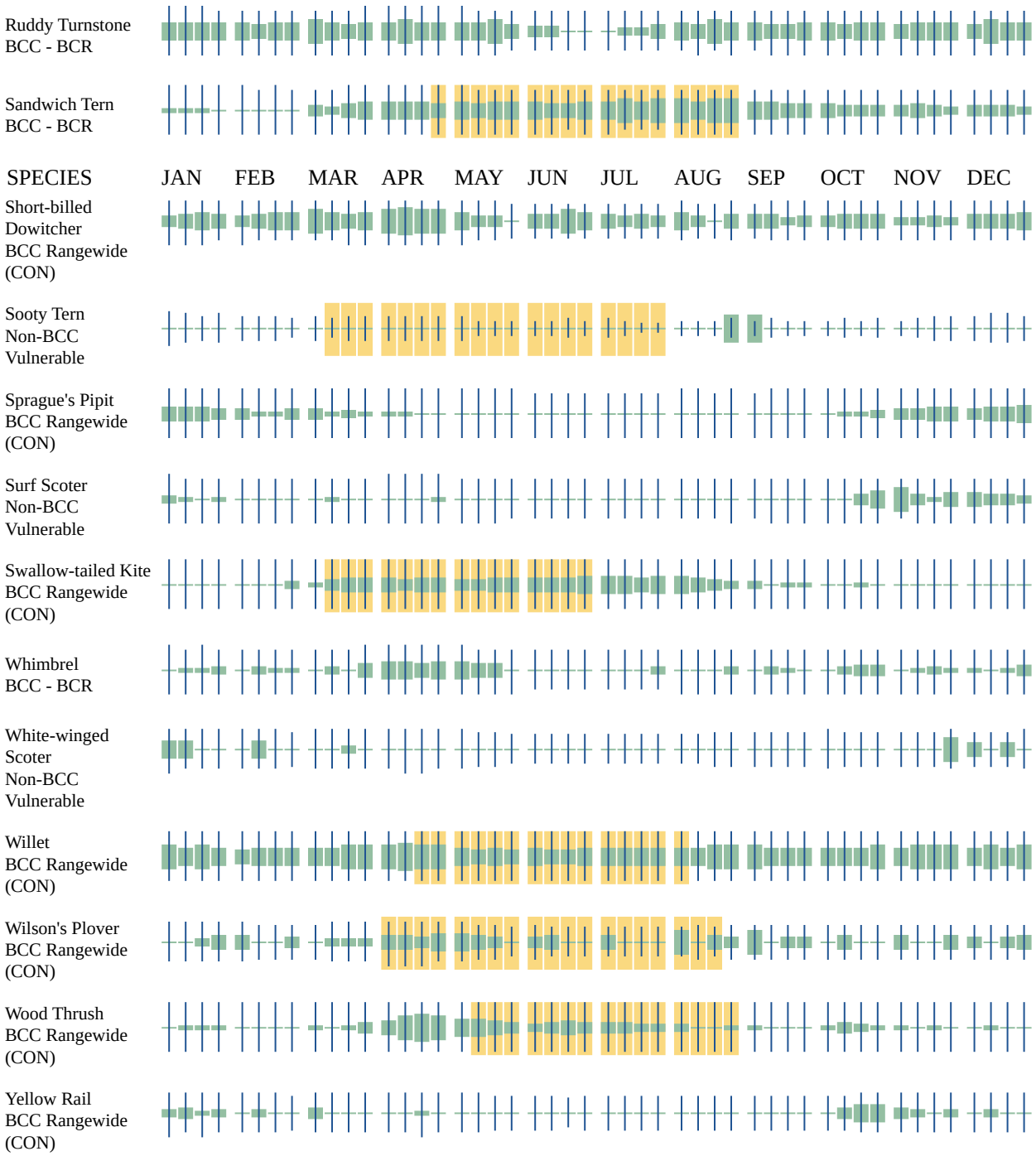
No Data (–)
A week is marked as having no data if there were no survey events for that week.




American Kestrel BCC - BCR
American Oystercatcher BCC Rangewide (CON)
Bachman's Sparrow BCC Rangewide (CON)
Bald Eagle Non-BCC Vulnerable
Black Scoter Non-BCC Vulnerable
Black Skimmer BCC Rangewide (CON)
Black-legged Kittiwake Non-BCC Vulnerable
Brown Pelican Non-BCC Vulnerable
Brown-headed Nuthatch BCC - BCR
Chimney Swift BCC Rangewide (CON)
Chuck-will's-widow BCC - BCR
SPECIES
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Common Loon Non-BCC Vulnerable
Dickcissel BCC - BCR
Double-crested Cormorant Non-BCC Vulnerable
Eastern Whip-poor-will BCC Rangewide (CON)


Forster's Tern
BCC - BCR
Golden Eagle
Non-BCC
Vulnerable
Gull-billed Tern
BCC Rangewide
(CON)
Henslow's Sparrow
BCC Rangewide
(CON)
Hudsonian Godwit
BCC Rangewide
(CON)
Kentucky Warbler
BCC Rangewide
(CON)
King Rail
BCC Rangewide
(CON)
Le Conte's Sparrow
BCC Rangewide
(CON)
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Least Tern
BCC Rangewide
(CON)
Lesser Yellowlegs
BCC Rangewide
(CON)
Little Blue Heron
BCC - BCR
Long-billed Curlew
BCC - BCR
Long-tailed Duck
Non-BCC
Vulnerable
Magnificent
Frigatebird
BCC - BCR
Marbled Godwit
BCC Rangewide
(CON)
Painted Bunting
BCC - BCR


Pectoral Sandpiper
BCC Rangewide
(CON)
Pomarine Jaeger
Non-BCC
Vulnerable
Prairie Loggerhead
Shrike
BCC - BCR
Prairie Warbler
BCC Rangewide
(CON)
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Prothonotary
Warbler
BCC Rangewide
(CON)
Red Knot
BCC Rangewide
(CON)
Red Phalarope
Non-BCC
Vulnerable
Red-breasted
Merganser
Non-BCC
Vulnerable
Red-headed
Woodpecker
BCC Rangewide
(CON)
Red-necked
Phalarope
Non-BCC
Vulnerable
Red-throated Loon
Non-BCC
Vulnerable
Reddish Egret
BCC Rangewide
(CON)
Ring-billed Gull
Non-BCC
Vulnerable
Royal Tern
Non-BCC
Vulnerable



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds

- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

SYSTEM UNIT (SU)

Most new Federal expenditures and financial assistance, including Federal flood insurance, are prohibited within System Units. ***Federally-funded projects within System Units require consultation with the Service.*** *Consultation is not required for projects using private, state, or local funds.*

OTHERWISE PROTECTED AREA (OPA)

OPAs are denoted with a "P" at the end of the unit number. The only prohibition within OPAs is on Federal flood insurance. ***CBRA consultation is not required for projects within OPAs.*** *However, agencies providing disaster assistance that is contingent upon a requirement to purchase flood insurance after the fact are advised to disclose the OPA designation and information on the restrictions on Federal flood insurance to the recipient prior to the commitments of funds.*

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
TX-04	Swan Lake	SU	11/16/1990	11/16/1990
TX-04P	Swan Lake	OPA	N/A	11/16/1991
TX-05P	Galveston Island	OPA	N/A	11/16/1991

MARINE MAMMALS

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins,

and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

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1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: https://ecos.fws.gov/ecp/species/4469

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit https://www.fws.gov/wetlands/data/mapper.HTML

FRESHWATER POND

- PAB3H
- PAB3Fx
- PAB3Hx
- PAB3Fh
- PAB4F
- PAB4Fh

- PAB3F

LAKE

- L1UBHx
- L2AB4H
- L2UBFx
- L2USC
- L2AB4Gh
- L2EM2K
- L2AB4Hh
- L1UBHh
- L2UBH
- L1AB4Hx
- L2AB4Fh
- L2USCx
- L1UBV
- L2USKx
- L2EM2Fh
- L2AB4F
- L2AB3Hh
- L1UBKx
- L1UBVx
- L2UBHh
- L2AB4Fx
- L2UBF
- L2USAx
- L2USCh
- L1UBK
- L2USK
- L2UBFh
- L2USAh
- L1UBH

ESTUARINE AND MARINE WETLAND

- E2EM1Nx
- E2USM
- E2EM1Nh
- E2USNs

- E2EM1Ph
- E2USP
- E2SS3P
- E2EM1P
- E2EM1Ps
- E2EM1Px
- E2USN
- E2USMs
- E2USPs
- E2USPx
- E2SS1P
- E2USMx
- E2EM1Ns
- E2EM1N

ESTUARINE AND MARINE DEEPWATER

- E1UBL
- E1UBLx

IPAC USER CONTACT INFORMATION

Agency: Federal Aviation Administration
Name: Jonathan DeLaune
Address: 1 Aviation Plaza
City: Jamaica
State: NY
Zip: 11434
Email jonathan.delaune@faa.gov
Phone: 7185534969

Attachment B. Noise Assessment Report

Please see Appendix D, Noise, of this EA

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Texas Coastal and Central Plains Ecological Services Office
Houston Sub-Office
17629 El Camino Real, Suite 211
Houston, Texas 77058
PHONE: 281/286-8282
FAX: 281/488-5882

In Reply Refer To:
2026-0018158

May 28, 2026

Jonathan DeLaune
Environmental Protection Specialist
General Aviation and Commercial Branch (AFS-752)
Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591

RE: Endangered Species Act Section 7 Consultation for Drone Commercial Package Delivery Operations in Houston, Texas.

Dear Mr. DeLaune,

This responds to the Federal Aviation Administration's (FAA) April 4, 2026, letter and accompanying biological evaluation requesting consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544) (Act) for the authorization of Wing Aviation LLC (Wing) to expand its commercial unmanned aircraft (UA) drone package delivery operations into the Houston metropolitan area (Figure 1).

The FAA made a determination of may affect but is not likely to adversely affect the following species: Eastern black rail (*Laterallus jamaicensis spp. Jamaicensis*), piping plover (*Charadrius melodus*), rufa red knot (*Caliris canutus rufa*), whooping crane (*Grus americana*), red cockaded woodpecker (*Dryobates borealis*), and the proposed tricolored bat (*Perimyotis subflavus*).

Wing is seeking authorization to conduct commercial package deliveries in the Houston metropolitan area. The primary UAs used for the proposed operations are Wing's Hummingbird 7000W-B and 8000-A models. Wing projects operating a maximum of 400 flights per operating day from each drone nest, with each flight taking a package to a customer delivery address before returning to a drone nest. Wing projects establishing up to 75 drone nests in the Houston operating area. There would be variability in the number of flights per day based on customer demand and weather conditions. Initially, Wing expects to fly considerably less than 400 deliveries per day from each nest and then gradually increases to 400 deliveries per day as

consumer demand rises. The maximum potential number of total eventual operations per day would be 30,000 (400 flights from each of the 75 drone staging nest locations). In addition, operations would include low altitude (<8ft) in-nest hover checks, or Fitness Built in Tests (FitBITs) between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m. Additionally, higher hover flights (approximately 60 feet) may be occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

Drone flights could be conducted up to 365 days a year between 7 A.M. and 10 P.M. with a typical air speed of 59 miles per hour. Drones can weigh up to 30 pounds. The drone would be operated at an altitude of 150 -300 feet above ground level (AGL). Remote pickup operations from each nest would be supported at up to 12 partner establishments depending upon demand and nest capacity. Pickup operations would follow general flight phases and parameters identical to typical delivery operations and would include the addition of a pickup phase. The pickup phase is similar to the delivery phase. The UA descends from its en route altitude (safe altitude above local terrain and obstacles) to 14.5 feet AGL and lowers the package hook. The UA then passes approximately 10 feet laterally over the autoloader. The autoloader's Y-shaped poles passively guide the package hook to a narrow slot that ensures secure attachment of the package. The package is then retracted to the UA before it proceeds to climb to the en route altitude. Remote pickup operations from descent to finish are expected to take no longer than 1 minute and 30 seconds (90 seconds).

The FAA conducted a noise analysis using sound level measurement data for the UA— the Hummingbird 7000W-B and 8000-A. Generally, the 7000W-B generates larger sound levels during takeoff and landing but lower sound levels during transit than the 8000-A. The estimated maximum sound exposure level (SEL) for the takeoff and landing phases of flight of the 7000W-B is approximately 80.6 A-weighted decibels (dBA) at about 50 feet from the drone whereas the estimated maximum SEL for the same flight phases of the 8000-A is 79.0 dBA. Both platforms generate similar noise at delivery, with the 7000W-B generating 83.4 dBA SEL and 8000-A generating 83.6 dBA. The maximum SEL for the en route phase of the 8000-A is approximately 62.0 dBA when the drone is flying 59 mph at 165 feet AGL and the maximum SEL for the en route phase of the 7000W-B with the same flight parameters is 56.5. Predicted sound levels decrease as distances from the drone increase. The majority of deliveries will be conducted with the quieter 7000W-B platform, although the specific distribution of operations between platforms would be variable based on payload, route, and demand characteristics.

Additional information can be found in the biological evaluation.

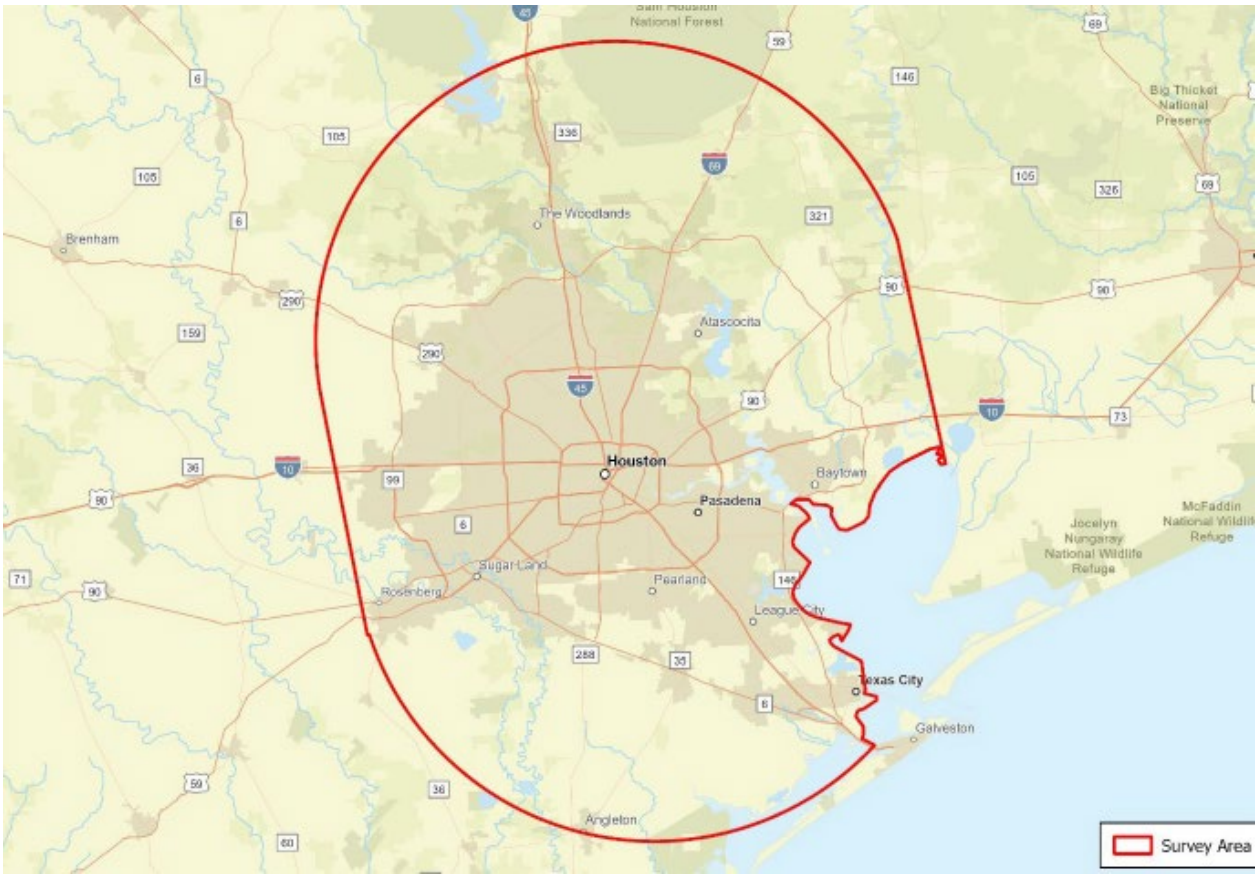


Figure 1. Action Area

The tri-colored bat is proposed to be listed. Proposed species are not currently protected under the Act; however, conferencing is necessary if it is determined a federal action is likely to jeopardize the continued existence of a proposed species. Your species evaluation does not indicate the need for conferencing on the proposed species. In addition, there is a lack of information on the potential effects of drone flights on the tricolored bat. Should the tricolored bat be listed, you should re-evaluate the project to determine the extent of effects on the species. Tri-colored bats are documented to occur within the Houston area (https://www.inaturalist.org/). While the proposed action is not expected to directly affect bat habitat, U.S. Fish and wildlife (the Service) strongly encourages the reduction of drone operations outside of their most active periods, specifically avoiding night, dusk, and dawn. In addition, we recommend avoiding flying drones linearly parallel along rivers, streams, wetlands, coastal shorelines, and other waterbodies and adjacent habitat to such waters. Bats tend to fly over watercourses or over pastures and woodlands, favoring watercourses.

As outlined in an e-mail dated April 15, 2026, the Service recommended avoidance or a substantial reduction of flights in areas where large congregations of birds occur, including federally listed piping plovers and red knots. The recommendations are listed below:

- Avoidance of Galveston Bay and surrounding shorelines.
- Avoidance of colonial waterbird nesting sites during peak nesting season March to July. In order to reduce disturbance, an avoidance buffer of 700 to 1000 feet is recommended. Documented nest occurrences can be found at: https://www.arcgis.com/apps/dashboards/79a5d105746b46a0bcfb47027902a09d and https://www.texaswaterbirds.org/
- Avoidance of bald eagle nesting sites during peak nesting from October through July. In order to reduce disturbance, an avoidance buffer of 700 to 1000 feet is recommended. Additional information on location and avoidance guidelines for eagle nesting can be found at: https://www.fws.gov/media/national-bald-eagle-management-guidelines and https://www.inaturalist.org/projects/texas-eagle-nests.
- Avoidance or substantial reduction of flights in extensive contiguous unfragmented areas of undeveloped habitats. Including but not limited to nature preserves, nature parks, etc. These areas can clearly be seen in aerial photographs provided in the species evaluation.

Both the FAA and Wing stated these recommendations will be integrated into the proposed projects. We will continue to work with the FAA, as needed, to understand and manage potential project impacts along sensitive areas in Texas and along the coast.

FAA in coordination with Wing will implement the following biological monitoring program in effort to better understand the interactions between drones and wildlife:

- Record and analyze daily maintenance and telemetry records to document any potential drone / wildlife interactions.
- If applicable, report wildlife movement / activity in and around airport property that may be obtained from operations or wildlife management staff from nearby airports.
- If applicable, recover and analyze potential biological materials (e.g., snarge, feathers, etc.), generally in accordance with existing protocols used in cases of aircraft bird strikes at airports, and
- Report findings to the Service on an annual basis.

Based on the information provided within the species biological evaluation, agency correspondence including e-mails, and the implementation of the above avoidance and minimization measures, we concur with the determination that the project, as proposed, may affect, but is not likely to adversely affect the Eastern black rail, piping plover, rufa red knot, whooping crane, and the red cockaded woodpecker. A complete administrative record of this consultation is on file at the Texas Coastal and Central Plains Ecological Services Field Office (TCCPESFO-Houston).

No further Section 7 consultation will be required unless: 1) the identified action is subsequently modified in a manner that causes an effect on a listed species or designated critical habitat; 2) new information reveals the identified action may affect federally listed species or designated critical habitat in a manner or to an extent not previously considered; or 3) a new species is listed

or a critical habitat is designated under the Act that may be affected by the identified action. If new effects are identified in the future, Section 7 consultation may need to be reinitiated.

Thank you for the opportunity to review and provide information on the proposed project. Please reference the Service's consultation code 2026-0018158 in future correspondence. If you have any questions, please contact Moni Belton at 281-286-8282 or moni_belton@fws.gov.

Sincerely,

DAVID HOTH

Digitally signed by DAVID HOTH
Date: 2026.05.29 07:34:26 -05'00'

For
Catherine Yeargan
Project Leader

Appendix F
SHPO Consultation

Mr. Joseph Bell
Executive Director and State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Via electronic submission to https://xapps.thc.state.tx.us/106Review/

Dear Mr. Bell:

The Federal Aviation Administration (FAA) is currently evaluating a proposal from Wing Aviation, LLC (Wing) to conduct unmanned aircraft (UA; also referred to as a drone) small package delivery operations in the Houston metropolitan (metro) area. Operations will occur specifically within Brazoria, Chambers, Fort Bend, Galveston, Grimes, Harris, Liberty, Montgomery, San Jacinto, and Waller counties. Wing must obtain approval from the FAA prior to conducting operations in the Houston metro using its Hummingbird 7000W-B and 8000-A UAs. The FAA has determined the proposed action, which would encompass all FAA approvals necessary to enable expanded operations, is an undertaking as defined under the regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (36 CFR § 800.16(y)). The purpose of this letter is to initiate Section 106 consultation with the SHPO and request concurrence on the definition of the Area of Potential Effects (APE) and assessment of effects.

Project Background and Description

Wing currently operates under 14 Code of Federal Regulations (CFR) Part 135 from the DFW metro area. Wing has a Part 135 Air Carrier Operating Certificate from the FAA, which allows it to carry the property of another for compensation or hire beyond visual line of sight (BVLOS). The certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in the carrier's Operations Specifications (OpSpecs), which is a document that defines the scope of aircraft operations authorized by the FAA. Wing has requested the FAA amend the OpSpecs in Wing's Part 135 air carrier certificate to enable expansion of its commercial drone package delivery operations to the Houston metropolitan area (see **Attachment A**) through adding launch and staging sites (hereafter drone nests) and expanding operating hours.

Wing projects operating a maximum of 400 flights per operating day from each drone nest, with each flight taking a package to a customer delivery address before returning to a drone nest. Wing projects establishing up to 75 drone nests in the Houston operating area. The UA would be transporting consumer goods in partnership with merchants in the communities they already serve and would provide an alternative to in-store pickup. There would be variability in the number of flights per day based on customer demand and weather conditions. Initially, Wing expects to fly considerably less than 400 deliveries per day from each nest and then gradually increase to 400 deliveries per day as consumer demand rises. The maximum potential number of total eventual operations per day would be 30,000[1]. In addition, operations would include low altitude (<8ft) in-nest hover checks, or Fitness Built in Tests (FitBITs) between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m. Additionally, higher hover flights (approximately 60 feet) may be

[1] 400 Ops*75 Drone nests per day

occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

For this consultation the project is divided into two components: installation of Wing Infrastructure, consisting of nests and autoloader locations; and Flight Operations, which details UA models, UA flight, and delivery. The effects of each component are different in degree and scale, with the effects of installation of Wing Infrastructure being more permanent but impacting a much smaller area, while Flight Operations will involve only very brief, temporary effects but would impact a much greater area.

Project Component: Wing Infrastructure

Wing is proposing to distribute nests throughout the operating area (**see Attachment A**). Wing's nests would be sited on paved landing areas established in pre-existing parking lots in commercially zoned areas, with use consistent with local zoning and land use requirements, such as shopping centers, large individual retailers, and shopping malls. Each nest would house up to two dozen (24) UA on launch pads and would be surrounded by temporary fencing. One or more merchants will partner with Wing at each nest for UA deliveries. Nests would be distributed throughout the Houston metro area following a measured rollout plan to be developed with Wing's partners and continuing best practices from Wing's established community outreach program, and in compliance with state and local statutory and regulatory requirements. The only infrastructure erected for this project would be autoloaders, "Y"-shaped passive stands designed for automated pick up of packages without landing (**see Attachment B**). ***Autoloaders would not require ground disturbance for installation and would be anchored through existing pavement, to existing poles, or ballasted for temporary use.*** The autoloaders would be controlled and operated by Wing and its partners. The autoloaders would be approximately 10 feet tall, 7 feet wide at the mouth, and 6 feet long, and would include a clear zone of approximately 2 parking spaces. Individual autoloader locations (either within a nest or offsite) would typically include up to three autoloaders within or in the vicinity of most nest sites, with a handful more distributed locations

having up to 10 autoloaders, depending on market demand, for a total installation of 100-300 autoloaders distributed throughout the operating area.

Project Component: Flight Operations

Unmanned Aircraft

The primary UAs used for the proposed operations are Wing's Hummingbird 7000W-B and 8000-A models. Specifications of these models are as follows:

- Hummingbird 7000W-B.
    - Multi-rotor design with 16 propellers.
    - Weight under 15 pounds when combined with its maximum payload weight of 2.7 pounds.
    - Wingspan of approximately 4.9 feet, a height of approximately 1 foot, and a length of 4 feet.
- 8000-A.
    - Multi-rotor design with 12 propellers.
    - Weight under 25 pounds when combined with its maximum payload weight of 5 pounds.
    - Has a wingspan of approximately 6 feet, a height of approximately 1 foot, and a length of approximately 6.2 feet.

All Wing aircraft use electric power from rechargeable lithium-ion batteries. Aircraft batteries are charged wirelessly from nest charging pads where aircraft sit between deliveries. Charging pads are connected to onsite utilities or temporarily to small diesel generators during the development of utility connections.

Wing anticipates the Houston metro area fleet makeup would be comprised of 70 to 80 percent 7000W-B aircraft and 20 to 30 percent 8000-A aircraft. The fleet mix of individual nests would be variable based on payload, route, and demand characteristics; nests with a wider range of offerings are anticipated to carry higher proportions of 7000W-B Aircraft.

A typical flight profile can be broken into the following general flight phases: takeoff, enroute outbound, delivery, enroute inbound, and landing.

Note: Each aircraft must complete a daily set of preflight checks before being assigned a delivery mission. These include a brief low height hover flight where the UA exercises various systems. These are termed FitBIT or Fitness Built-In Test and are at a height of approximately 6 feet for approximately 1 minute. Additionally, higher hover flights (approximately 60 feet) may be occasionally performed, up to 7 times per nest, per week, where the UA makes a separate hover flight to update the reference map of

the nest; these flights are termed GeoBITs because of their similarity to the FitBIT stationary hover flight over the nest.

Takeoff

The UA would fly a predefined flight path that is set prior to takeoff. Flight missions are automatically planned by Wing's flight planning software. A mission originates from a nest location, and Wing's software automatically assigns, deconflicts, and routes each flight to the delivery location and back to a nest. Each nest site would include a controlled area wherein UA flights are launched and recovered.

Once the UA receives a mission and is cleared for takeoff from a launch pad, the UA takes off from the ground vertically to an altitude of 23 feet AGL and hovers for 30 seconds while the package is loaded. The UA then climbs to the enroute altitude (150–300 feet AGL).

En Route Outbound

The en route outbound phase is the part of flight in which the fully loaded UA transits from the nest or a remote pickup location to a delivery point on a predefined flight path. During this flight phase, the UA would typically operate at an altitude of 150–300 feet AGL (but always below 400 feet AGL) and a typical airspeed of 59 miles per hour (mph). The UA has a single set cruise airspeed, which would not be exceeded.

Delivery

The delivery phase consists of descent from the enroute altitude to a delivery point, such as a residential yard, driveway, parking lot, or common area. The UA descends vertically to 23 feet AGL while maintaining position over the delivery point. The UA hovers at 23 feet AGL for approximately 30 seconds while lowering its package to the ground by a retractable line for delivery. Once a package has been lowered to the ground, the UA retracts the line, ascends vertically to a cruise altitude, and departs the delivery area enroute back to a nest.

En Route Inbound

The UA continues to fly at an altitude of 150–300 feet AGL and a speed of 59 mph towards the drone nest.

Landing

Upon reaching the drone nest, the UA slowly descends over its assigned landing pad and lands on the pad.

Remote Pickup Operations

Remote pickup operations from each nest would be supported at up to 12 partner establishments depending upon demand and nest capacity. Pickup operations would follow general flight phases and parameters identical to typical delivery operations and would include the addition of a pickup phase. The pickup phase is similar to the delivery phase. The UA descends from its en route altitude (safe altitude above local terrain and obstacles) to 14.5 feet AGL and lowers the package hook. The UA then passes approximately 10 feet laterally over the autoloader. The autoloader's Y-shaped poles passively guide the package hook to a narrow slot that ensures secure attachment of the package. The package is

then retracted to the UA before it proceeds to climb to the en route altitude. Remote pickup operations from descent to finish are expected to take no longer than 1 minute and 30 seconds (90 seconds).

Note: Manual remote pickups loading may also be performed by a person without a physical autoloader. The profile would be similar to the autoloader pickup profile outlined above but would omit the lateral transition for autoloader engagement.

Predicted Sound Levels

The FAA conducted a noise analysis using sound level measurement data for the UA— the Hummingbird 7000W-B and 8000-A. Generally, the 7000W-B generates larger sound levels during takeoff and landing but lower sound levels during transit than the 8000-A. The noise analysis utilizes the Sound Exposure Level (SEL) metric, which represents all the acoustic energy (a.k.a. sound pressure) of an individual noise event as if that event had occurred within a one-second time period. SEL captures both the level (magnitude) and the duration of a sound event in a single numerical quantity, by "squeezing" all the noise energy from an event into one second. This provides a uniform way to make comparisons among noise events of various durations. The estimated maximum sound exposure level (SEL) for the takeoff and landing phases of flight of the 7000W-B is approximately 80.6 A-weighted decibels (dBA) at about 50 feet from the drone whereas the estimated maximum SEL for the same flight phases of the 8000-A is 79.0 dBA as shown in Tables 1–2 in the noise report (see **Attachment E** for the noise report). Both platforms generate similar noise at delivery, with the 7000W-B generating 83.4 dBA SEL and 8000-A generating 83.6 dBA (Tables 1-2, **Attachment E**). The maximum SEL for the en route phase of the 8000-A is approximately 62.0 dBA when the drone is flying 59 mph at 165 feet AGL and the maximum SEL for the en route phase of the 7000W-B with the same flight parameters is 56.5 dBA, (Sections 4.1.4 and 4.2.4 in **Attachment E**). Predicted sound levels decrease as distances from the drone increase. The majority of deliveries will be conducted with the 7000W-B platform, although the specifics of distribution of operations between platforms would be variable based on payload, route, and demand characteristics.

Area of Potential Effects (APE)

In accordance with 36 CFR § 800.4(a)(1), the FAA has defined the APE in consideration of the undertaking's potential direct and indirect effects. The APE is the operating area outlined in red in **Attachment A**. The operating area would include all or portions of Brazoria, Chambers, Fort Bend, Galveston, Grimes, Harris, Liberty, Montgomery, San Jacinto, and Waller Counties within the Houston metro area.

Identification of Historic Properties

The proposed undertaking does not have the potential to affect below-ground or archaeological resources because the undertaking does not include ground disturbance. Therefore, the FAA focused its identification efforts on above-ground historic properties.

FAA is taking into account the magnitude and nature of the undertaking and the nature and extent of potential effects on historic properties in this identification effort pursuant to 36 CFR § 800.4(b)(1). Given the massive geographic area of the project (the entirety or portions of 10 counties in Texas), its light infrastructure footprint, and intermittent, short-term, minor visual and audible effects, FAA has determined that a reasonable and good faith effort for identification will consist of a review of existing information on historic properties within the APE utilizing the National Park Service (NPS) National

Register of Historic Places (NRHP) online database. According to the NPS database, there are 402 historic properties and 39 historic districts located in the APE (see **Attachments C and D**). Six historic properties and districts are National Historic Landmarks (NHLs) and are denoted in the "Name" field of the table in **Attachments C and D** with an (NHL) after the resource name. Additional properties in the APE may be otherwise recognized for historic significance by the SHPO. Most of the historic properties in the APE are residences and businesses, but also include churches, public buildings (such as city halls, schools, courthouses), bridges, archaeological sites and districts, cemeteries, sports facilities, and space exploration-related facilities.

Assessment of Effects

Pursuant to 36 CFR § 800.5(a), FAA applied the criteria of adverse effects to historic properties in the APE. Establishment of Wing nests would involve no ground disturbance and would have no effect on subsurface historic properties. The nests themselves will utilize extant parking areas. There are potential minor visual effects to aboveground historic properties through installation of autoloaders, but because historic properties, including NHLs, would be considered noise-sensitive areas, there would be a standoff distance of 45 to 80 feet (depending on a given area's airspace classification) between an autoloader and a historic property. With an autoloader height of 10 feet, this would incur only a minor visual effect should a historic property be within viewshed of an autoloader site.

Given the small size of the UA and predicted sound levels, UA operations would not produce vibrations that could impact the architectural structure or contents of any structure in the APE. While the UA is not expected to generate significant noise levels at or within any historic property, the FAA considered UA delivery noise and potential visual effects on historic properties where a quiet setting or visually unimpaired sky might be a key attribute of the property's significance. However, any visual or audible effects that may occur within a flight path would be negligible and temporary.

Taking into account the minimal infrastructure required for the project, consideration of historic properties in the OpSpecs as noise-sensitive areas, and the temporary nature of potential audible and visual effects, the FAA determined that the undertaking's effects do not meet the criteria of adverse effect listed in 36 CFR § 800.5(a)(1). Therefore, FAA has made a finding of ***no adverse effect*** to historic properties pending consultation with the SHPO and other consulting parties.

Consultation

In 2026, FAA will initiate government-to-government consultation regarding the proposed undertaking with Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Tonkawa Tribe of Indians of Oklahoma, and the Wichita and Affiliated Tribes. FAA will invite the Tribes to provide input to inform the NEPA and Section 106 review and consultation processes, including information about any Tribal lands or sites of religious or cultural significance that may be affected by the proposed undertaking.

FAA will utilize the NEPA process to invite comment from both the public and local governments within the APE on the FAA's Section 106 finding of *no adverse effect* for this project. FAA welcomes input from the SHPO on additional consulting parties that may be invited to consult under Section 106.

In accordance with 36 CFR § 800.10, should an undertaking incur direct and adverse effects on an NHL, the FAA must notify the National Park Service (NPS) of any consultation regarding an NHL, and request Advisory Council on Historic Preservation (Council) participation in consultation to resolve adverse

effects. However, because the FAA has determined that this project will result in no adverse effect to any NHLs, the FAA is not extending consultation invitations to either the NPS or the Council at this time.

Conclusion

The FAA requests your concurrence on the definition of the APE and finding of *no adverse effect.* Your response within the next 30 days will greatly assist us in our environmental review process.

If you have any questions or need additional information, please contact Mr. Jonathan “Zack” DeLaune at Jonathan.DeLaune@faa.gov .

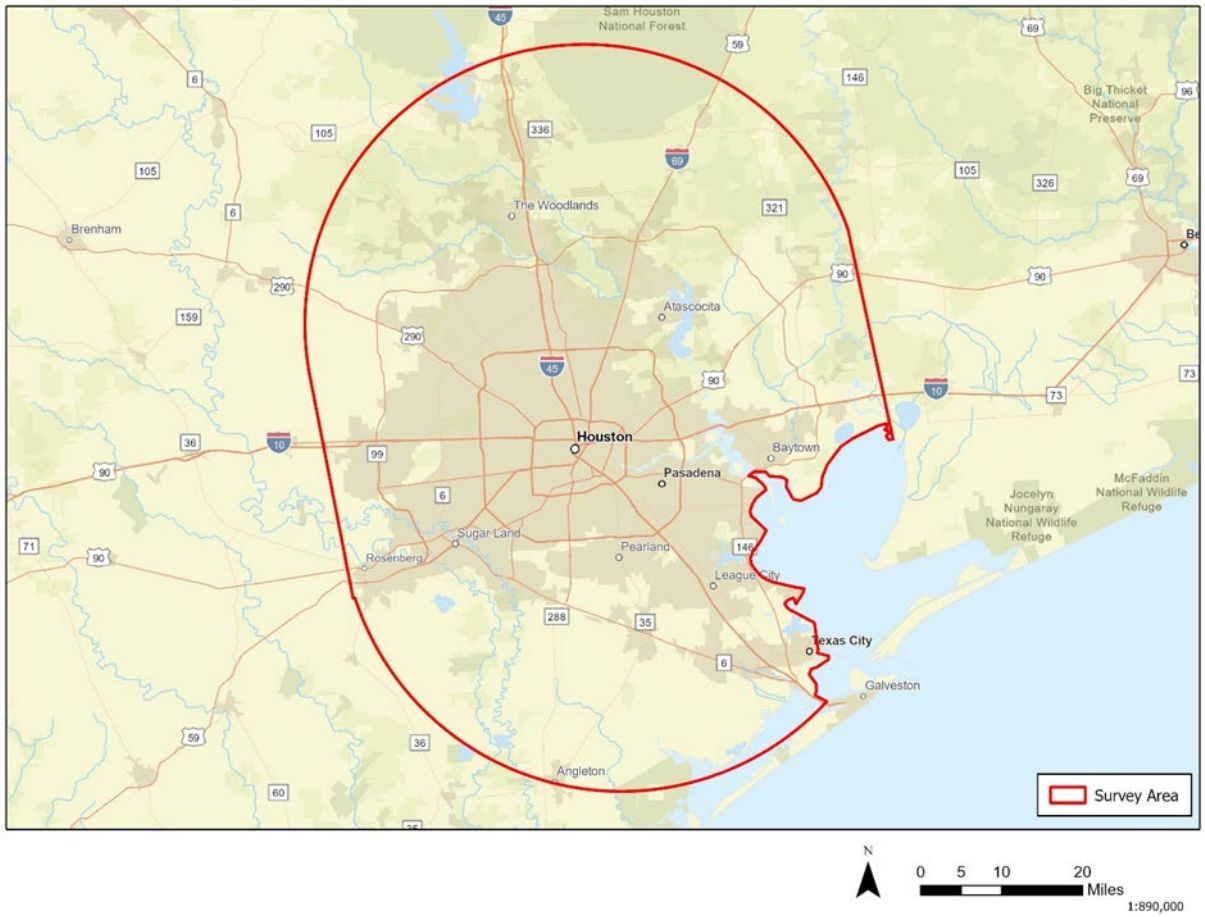
Sincerely,

Joseph K. Hemler Jr

Digitally signed by Joseph K. Hemler Jr
Date: 2026.04.23 13:47:26 -04'00'

Joseph K Hemler
Manager, AFS-752
Emerging Technologies Division
Office of Safety Standards, Flight Standards Service

Attachment A. Action Area



Attachment B. Wing's Hummingbird 7000W-B and 8000-A Unmanned Aircraft

Figure 1. Wing Hummingbird 7000W-B UA

Figure 2. Wing Hummingbird 8000-A UA

Attachment C. Historic Districts

Reference Number	Property Name	Street & Number	City	County
80004081	Durazno Plantation	S of Jones Creek off TX 36	Jones Creek	Brazoria
91001602	East Columbia Historic District	S. Main St.	East Columbia	Brazoria
82004495	Old Wallisville Town Site	Address Restricted	Wallisville	Chambers
71000925	Orcoquisac Archeological District	Address Restricted	Wallisville	Chambers
100001253	Imperial Sugar Company Refinery Historic District	198 Kempner St.	Sugar Land	Fort Bend
100006547	Bayou Brae Historic District	All properties on Bayou Dr., Brae Ln., Coryell St., Oboe Trail, Woodwind Way, and Viola Dr.	League City	Galveston
14000340	Broadway Cemetery Historic District	6 blks. between Broadway Ave., Ave. L, 43rd & 40th Sts.	Galveston	Galveston
02001570	Cedar Lawn Historic District	Bounded by 45th. St., 48th St., Ave. L, and Ave. N,	Galveston	Galveston
01001471	Denver Court Historic District	Roughly bounded by Aves. S1/2 and U1/2, 43rd and 52nd Sts.	Galveston	Galveston
75001979	East End Historic District **(NHL)**	Irregular pattern including both sides of Broadway and Market Sts.	Galveston	Galveston
05000247	Fort Travis	TX 87 at Loop 108	Port Bolivar	Galveston
100001224	Lost Bayou Historic District	Roughly bounded by Broadway, Ave. N, 14th & 21st Sts.	Galveston	Galveston
100007354	Parkland Apartments	3916 Winnie St. (Ave. G)	Galveston	Galveston
96000539	Silk Stocking Residential Historic District	Roughly bounded by Ave. K, 23rd St., Ave. P, and 26th St.	Galveston	Galveston
70000748	Strand Historic District **(NHL)**	Roughly bounded by Ave. A, 20th St., alley between Aves. C and D, and railroad depot	Galveston	Galveston

Reference Number	Property Name	Street & Number	City	County
10000268	The Settlement Historic District	Centered on the intersection of N Bell Dr and the 100 block of S Bell Dr with cross-streets Carver Ave and Eunice St	Texas City	Galveston
74002072	Anderson Historic District	Anderson and environs	Anderson	Grimes
82001737	Navasota Commercial Historic District	Roughly bounded by La Salle, Holland, 9th, and Brule Sts.	Navasota	Grimes
78002952	Armand Bayou Archeological District	Address Restricted	Seabrook	Harris
02000117	Boulevard Oaks Historic District	Roughly bounded by North Blvd., South Blvd., Hazard and Mandell Sts.	Houston	Harris
80004128	Broadacres Historic District	1300-1506 North Blvd. and 1305-1515 South Blvd.	Houston	Harris
79002952	Cedar Bayou Archeological District	Address Restricted	Baytown	Harris
80004129	Courtlandt Place Historic District	2--25 Courtlandt Pl.	Houston	Harris
85000186	Freedmen's Town Historic District	Roughly Bounded by Genesse, West Dallas, Arthur and W. Gray Sts.	Houston	Harris
100000697	Houston National Cemetery	10410 Veterans Memorial Dr.	Houston	Harris
11000425	Idylwood Historic District	Roughly bounded by Lawndale Ave., N. MacGregor Wy., Sylvan Rd. & Wayside Dr.	Houston	Harris
97000542	Independence Heights Residential Historic District	Roughly bounded by N. Yale and E. 34th Sts., and I-610	Houston	Harris
83004471	Main Street/Market Square Historic District	Roughly bounded by Buffalo Bayou, Fannin, Texas, and Milamsts	Houston	Harris
84001811	Main Street/Market Square Historic District (Boundary Increase)	110 Milam, 112-114 Milam, 202-204 Milam, 715 Franklin	Houston	Harris
94001160	Morgan's Point Historic District	89--835 Bayridge Rd. and 300--322 Vinsonia	Morgan's Point	Harris
03000936	Myers-Spalti Manufacturing Plant	2115 Runnels St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
10000960	Near Northside Historic District	Roughly bounded by Little White Oak Bayou on the N; Hogan on the S; I-45 on the W and the block between N Main and Keene	Houston	Harris
78002946	Old Sixth Ward Historic District	Bounded by Washington, Union, Houston, Capitol and Glenwood Cemetery	Houston	Harris
88000042	San Felipe Courts Historic District	1 Allen Pkwy. Village	Houston	Harris
98000407	San Felipe Courts Historic District (Boundary Decrease)	1600 Allen Pkwy	Houston	Harris
97000317	West Eleventh Place Historic District	1--8 W. 11th Pl.	Houston	Harris
94000859	Westmoreland Historic District	Bounded by Hawthorne, Burlington and Marshall Aves., and Garott St.	Houston	Harris
04000547	Willow Street Pump Station	811 N. San Jacinto	Houston	Harris
100002602	W-K-M Company, Inc. Historic District	Roughly bounded by Commerce, Sampson, Preston & Velasco Sts.	Houston	Harris

Attachment D. Historic Properties

Reference Number	Property Name	Street & Number	City	County
100003467	Alvin Gulf, Colorado and Santa Fe Railway Passenger Depot	200 Depot Centre Blvd.	Alvin	Brazoria
91000783	Brazoria Bridge	0.9 mi. E of TX 36 on TX 332	Brazoria	Brazoria
10000050	Dow, Alden B., Office and Lake Jackson City Hall	101 S. Parking Pl.	Lake Jackson	Brazoria
04001173	Gazebo for James Richard Marmion	1214 County Rd.	Sweeny	Brazoria
94001119	GEN. C. B. COMSTOCK (dredge) Shipwreck Site	Address Restricted	Surfside	Brazoria
75001958	McCroskey, John, Cabin	2 mi. NE of Cedar Lake on Stringfellow Ranch	Cedar Lake	Brazoria
79002922	Old Brazoria County Courthouse	Public Sq.	Angleton	Brazoria
04001172	Palapa Table for James Richard Marmion	1214 County Rd.	Sweeny	Brazoria
100003040	Smith, Henry, Statue	Intersection of N Brooks & W Smith Sts.	Brazoria	Brazoria
76002011	Underwood, Ammon, House	Main St.	East Columbia	Brazoria
80004082	Varner-Hogg Plantation	2 mi. NE of West Columbia off SR 2852	West Columbia	Brazoria
71000924	Archeological Site 41 CH 110	Address Restricted	Cove	Chambers
08000339	Chambers County Courthouse	404 Washington St.	Anahuac	Chambers
79002925	Chambersea	Washington and Cummings Sts	Anahuac	Chambers
81000626	Fort Anahuac	TX 564	Anahuac	Chambers
80004119	Fort Bend County Courthouse	400 Jackson St.	Richmond	Fort Bend
96001016	Green, Henry G. and Annie B., House	.5 mi SE of old US 59 and TX 118	Kendleton	Fort Bend
100007913	Holy Rosary Catholic Church	1416 George St.	Rosenberg	Fort Bend
05000244	Lamar-Calder House	915 Front St.	Richmond	Fort Bend
14000339	Methodist Church of Richmond	400 Jackson St.	Richmond	Fort Bend
01000104	Moore, John M. and Lottie D., House	406 S. Fifth St.	Richmond	Fort Bend
03001377	Woods, B. Ray and Charlotte, House	610 Woods Ln.	Katy	Fort Bend

Reference Number	Property Name	Street & Number	City	County
100006539	American National Insurance Company (ANICO)	1 Moody Ave. (1902 Market St.)	Galveston	Galveston
69000203	Ashbel Smith Building	914-916 Ave. B	Galveston	Galveston
69000204	Ashton Villa	2328 Broadway	Galveston	Galveston
78002929	Beissner, Henry, House	2818 Ball Ave.	Galveston	Galveston
70000746	Bishop's Palace	1402 Ave. J (Broadway)	Galveston	Galveston
84001671	Building at 1921-1921 1/2 Avenue D	1921-1921 1/2 Ave. D	Galveston	Galveston
84001668	Building at 1925-1927 Market Street	1925-1927 Market St.	Galveston	Galveston
100011883	Christensen Castle	12902 Hwy. 6	Santa Fe	Galveston
84001676	City Hall	823 25th St.	Galveston	Galveston
84001680	City National Bank	2219 Ave. D	Galveston	Galveston
100009737	Congregation Beth Jacob	2401 Avenue K	Galveston	Galveston
76002033	Davison, Frank B., House	109 3rd Ave.	Texas City	Galveston
84001683	Eiband's	2001 Central Plaza	Galveston	Galveston
78002930	ELISSA (NHL)	Seawolf Park	Galveston	Galveston
100002841	Falstaff Brewery	3302 Church St. (Ave. F)	Galveston	Galveston
84001688	First Evangelical Lutheran Church	2401 Ave. G	Galveston	Galveston
79002942	First Presbyterian Church	1903 Church St.	Galveston	Galveston
76002028	Galveston Causeway	Spans Galveston Bay from Virginia Point to Galveston Island	Galveston	Galveston
79002943	Galveston Orphans Home	1315 21st St.	Galveston	Galveston
77001443	Galveston Seawall	Seawall Blvd.	Galveston	Galveston
01000438	Galveston US Post Office, Custom House and Courthouse	25th St. and F Ave.	Galveston	Galveston
100004866	Galveston, Houston & Henderson (GH&H) Freight Depot	325 33rd St.	Galveston	Galveston
79002944	Galvez Hotel	2024 Seawall Blvd.	Galveston	Galveston
77001444	Garten Verein Pavilion	27th St. and Avenue O (Kempner Park)	Galveston	Galveston
75001980	Grace Episcopal Church	1115 36th St.	Galveston	Galveston
74002071	Grand Opera House	2012-2020 Ave. E	Galveston	Galveston

Reference Number	Property Name	Street & Number	City	County
82004505	Hagemann, John, House	3301 Ave. L	Galveston	Galveston
84001698	House at 2017-2023 Avenue I	2017-2023 Ave. I	Galveston	Galveston
84001700	House at 2528 Postoffice St.	2528 Postoffice St.	Galveston	Galveston
94000796	Hutchings, Sealy, House	2805 Ave. O	Galveston	Galveston
84001703	I.O.O.F. Lodge	505 20th St.	Galveston	Galveston
95001028	Illies Building-Justine Apartments	503 21st St.	Galveston	Galveston
84001705	Jean Lafitte Hotel	2105 Ave. F	Galveston	Galveston
79002945	Kempner, Daniel Webster, House	2504 Ave. O	Galveston	Galveston
83003140	Lasker Home for Homeless Children	1019 16th St.	Galveston	Galveston
03001163	Levy, E.S., Building	2221-2225 Market St.	Galveston	Galveston
84001706	Marschner Building	1914-1916 Mechanic St.	Galveston	Galveston
76002030	McKinney-McDonald House	926 Winnie St.	Galveston	Galveston
98001246	Melrose Apartment Building	2002 Post Office St.	Galveston	Galveston
76002031	Menard, Michel B., House	1605 33rd St.	Galveston	Galveston
85000121	Merimax Building	521 22nd St.	Galveston	Galveston
84001707	Model Laundry	513-523 25th St.	Galveston	Galveston
94001241	Moore, Col. Hugh B. and Helen, House	8 Ninth Ave., N.	Texas City	Galveston
75001981	Mosquito Fleet Berth, Pier 19	N end of 20th St., Pier 19	Galveston	Galveston
70000747	Old Galveston Customhouse	SE corner 20th and Post Office (Ave. E) Sts.	Galveston	Galveston
84001713	Pix Building	2128 Postoffice St.	Galveston	Galveston
77001445	Point Bolivar Lighthouse	TX 87	Port Bolivar	Galveston
75001982	Powhatan House	3427 Ave. O	Galveston	Galveston
15000618	Quigg-Baulard House	2628 Broadway	Galveston	Galveston
84001717	Reedy Chapel-AME Church	2013 Broadway	Galveston	Galveston
84001720	Robinson Building	2009-2011 Postoffice St.	Galveston	Galveston
84001722	Rosenberg Library	2310 Sealy St.	Galveston	Galveston
100009946	Rosewood Cemetery	2825 63rd Street	Galveston	Galveston
84001724	Scottish Rite Cathedral	2128 Church St.	Galveston	Galveston
69000205	Sealy, George, House	2424 Broadway	Galveston	Galveston

Reference Number	Property Name	Street & Number	City	County
84001728	Shaw, M. W., Building	2427 Ave. D	Galveston	Galveston
93001449	SS SELMA (steamship)	Address Restricted	Galveston	Galveston
76002032	St. Joseph's Church	2202 Ave. K	Galveston	Galveston
73001964	St. Mary's Cathedral	2011 Church Ave.	Galveston	Galveston
84001731	Star Drug Store	510 23rd St.	Galveston	Galveston
88002671	Steffens-Drewa House Complex	2701, 2705, and 2709 Ave. O	Galveston	Galveston
13000043	Stringfellow Orchards	7902 TX 6	Hitchcock	Galveston
78002931	Sweeney-Royston House	2402 Ave. L	Galveston	Galveston
84001734	Texas Building	2200 Central Plaza	Galveston	Galveston
84001737	Texas Heroes Monument	25th and Broadway	Galveston	Galveston
79002946	Trinity Protestant Episcopal Church	22nd St. and Ave. G	Galveston	Galveston
71000933	Trueheart-Adriance Building	212 22nd St.	Galveston	Galveston
84001739	U.S. National Bank	2201 Ave. D	Galveston	Galveston
08000477	USS CAVALLA (submarine)	E.end of Seawolf Park	Galveston	Galveston
77001567	USS HATTERAS (41GV68)	Address Restricted	Galveston	Galveston
07000689	USS STEWART	East End of Seawolf Park	Galveston	Galveston
71000934	Williams, Samuel May, House	361 Ave. P	Galveston	Galveston
94000410	Willis-Moody Mansion	2618 Broadway	Galveston	Galveston
80004123	Foster House	E of Navasota on TX 90	Navasota	Grimes
76002036	P. A. Smith Hotel	Railroad St.	Navasota	Grimes
82004506	Piedmont Springs Archeological Site	Address Restricted	Anderson	Grimes
78002939	Steele House	217 Brewer St.	Navasota	Grimes
76002037	1879 Houston Waterworks	27 Artesian St.	Houston	Harris
71000938	1884 Houston Cotton Exchange Building	202 Travis St.	Houston	Harris
100003492	500 Jefferson Building	500 Jefferson St.	Houston	Harris
83004425	All Saints Roman Catholic Church	201 E. 10th St.	Houston	Harris
83004426	Allbach House	2023 Arlington St.	Houston	Harris
07001234	Almeda Road Bridge over Brays Bayou	Almeda Rd. at Brays Bayou	Houston	Harris
87002241	Anderson, John W., House	711 Columbia	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
75001988	Annunciation Church	1618 Texas Ave.	Houston	Harris
76002038	Antioch Missionary Baptist Church	313 Robin St.	Houston	Harris
85002815	Apollo Mission Control Center (NHL)	Lyndon B. Johnson Space Flight Center	Houston	Harris
13001099	Astrodome, The	8400 Kirby Dr.	Houston	Harris
79002953	Autry, James L., House	5 Courtlandt Pl.	Houston	Harris
05000858	Aviary at the Houston Zoo	1513 N. McGregor	Houston	Harris
83004427	Banta House	119 E. 20th St.	Houston	Harris
87002242	Baring, Otto H., House	1030 Rutland	Houston	Harris
84001754	Barker House	121 E. 16th St.	Houston	Harris
84001753	Barker-Cypress Archeological Site (41HR436)	Address Restricted	Houston	Harris
100004966	Battelstein's	812 Main St.	Houston	Harris
79002954	Bayou Bend	1 Westcott St.	Houston	Harris
83004428	Beaconsfield	1700 Main St.	Houston	Harris
02001063	Benjamin Apartments	1218 Webster St.	Houston	Harris
97001626	Bethel Baptist Church	801 Andrews	Houston	Harris
84001755	Borgstrom House	1401 Cortlandt St.	Houston	Harris
83004430	Burge House	1801 Heights Blvd.	Houston	Harris
87002243	Burlingame, George L., House	1238 Harvard	Houston	Harris
83004671	Burnett House	219 W. Eleventh St.	Houston	Harris
94000677	Bute, James, Company Warehouse	711 William St.	Houston	Harris
100004967	Cameron Iron Works	711 Milby St.	Houston	Harris
90001048	Carden, David A., House	718 W. 17th Ave.	Houston	Harris
79002955	Carroll, J. J., House	16 Courtlandt Pl.	Houston	Harris
79002956	Carter, W. T., Jr., House	18 Courtlandt Pl.	Houston	Harris
16000350	Cheek-Neal Coffee Company Building	2017 Preston	Houston	Harris
79002957	Christ Church	1117 Texas Ave.	Houston	Harris
00000291	City National Bank Building	1001 McKinney Ave.	Houston	Harris
90001040	Clanton, Moses A., House	1025 Arlington	Houston	Harris
87002244	Clare, J. H., House	939 Arlington	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
94000354	Clarke & Courts Building	1210 W. Clay Ave.	Houston	Harris
84001756	Clayton, William L., Summer House	3376 Inwood Dr.	Houston	Harris
79002958	Cleveland, A. S., House	8 Courtlandt Pl.	Houston	Harris
85002771	Cohn, Arthur B., House	1711 Rusk Ave.	Houston	Harris
90001041	Coombs, Charles E., House	1037 Columbia	Houston	Harris
84001757	Coop, Dr. B. F., House	1536 Heights Blvd.	Houston	Harris
87002248	Copeland, Austin, House I	921 Arlington	Houston	Harris
87002245	Copeland, Austin, House II	925 Arlington	Houston	Harris
83004431	Countryman House	402 E. 9th St.	Houston	Harris
83004432	Cummings House	1418 Heights Blvd.	Houston	Harris
97000549	Cyrus, Ben C. and Jenetter, House	325 E. 25th St.	Houston	Harris
94000248	Dawson, James A., House	400 Emerson Ave.	Houston	Harris
84001759	DePelchin Faith Home	2700 Albany St.	Houston	Harris
84001761	Dexter House	224 W. 17th St.	Houston	Harris
79002959	Donoghue, Thomas J., House	17 Courtlandt Pl.	Houston	Harris
79002960	Dorrance, John M., House	9 Courtlandt Pl.	Houston	Harris
90001046	Doughty, Lula J., House	1233 Yale St.	Houston	Harris
100002087	Downtown Houston Post Office, Processing and Distribution Center	401 Franklin St.	Houston	Harris
100001374	Duncan, Charles W., Sr. and Mary, House	3664 Inverness Dr.	Houston	Harris
87002246	Durham, Jay L., House	921 Heights Blvd.	Houston	Harris
83004433	Eaton House	510 Harvard St.	Houston	Harris
100007402	Eldorado Ballroom	2310 Elgin St.	Houston	Harris
83004434	Elkins House	602 E. 9th St.	Houston	Harris
83004435	Ellis, Dr. Billie V., House	1515 Heights Blvd.	Houston	Harris
97001599	Eppes, Ned A. and Linda S., House	5322 Institute Ln.	Houston	Harris
84001762	Ezzell House	1236 Rutland St.	Houston	Harris
09000866	Farnsworth & Chambers Building	2999 S. Wayside	Houston	Harris
06000923	Farrar, Roy and Margaret, House	511 Lovett Blvd.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
85003238	Fire Engine House No. 9	1810--1812 Keene St.	Houston	Harris
06001066	First Evangelical Church	1311 Holman St.	Houston	Harris
87002247	Fluegel, William F., House	1327 Ashland	Houston	Harris
78002942	Foley, W. L., Building	214--218 Travis St.	Houston	Harris
88001053	Forum of Civics	2503 Westheimer Rd.	Houston	Harris
90001047	Gerloff House	221 E. 12th Ave.	Houston	Harris
84001764	Gillette House	301-303 E. 15th St.	Houston	Harris
83004436	Gulf Building	710-724 Main St.	Houston	Harris
79002961	Harris County Boy's School Site	Address Restricted	Houston	Harris
81000629	Harris County Courthouse of 1910	301 Fannin St.	Houston	Harris
83004437	Hartley House	315 W. 17th St.	Houston	Harris
84001765	Hawkins House	1015 Heights Blvd.	Houston	Harris
84001766	Heights Boulevard Esplanade	Heights Boulevard from White Oak Bayou to 20th St.	Houston	Harris
83004438	Heights Christian Church	1703 Heights Blvd.	Houston	Harris
83004439	Heights State Bank Building	3620 Washington St.	Houston	Harris
100001375	Heights Theater	339 W. 19th St.	Houston	Harris
100004968	Hermann Park Municipal Golf Clubhouse	6201 Hermann Park Dr.	Houston	Harris
94000266	Heyne, Fred J., House	220 Westmoreland Ave.	Houston	Harris
07001131	Hill Street Bridge over Buffalo Bayou	S. Jensen Dr. at Buffalo Bayou	Houston	Harris
78002943	Hogg Building	401 Louisiana St.	Houston	Harris
100006770	Hollyfield Laundry and Cleaners,	1731 Westheimer Rd.	Houston	Harris
84001768	House at 1111 Heights Boulevard	1111 Heights Blvd.	Houston	Harris
84001771	House at 112 W. 4th Street	112 W. 4th St.	Houston	Harris
84001774	House at 1210 Harvard Street	1210 Harvard St.	Houston	Harris
87002249	House at 1217 Harvard	1217 Harvard	Houston	Harris
84001776	House at 122 East Fifth Street	122 E. 5th St.	Houston	Harris
87002250	House at 1220 Harvard	1220 Harvard	Houston	Harris
90001043	House at 1222 Harvard Street	1222 Harvard St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
84001777	House at 1227 Rutland Street	1227 Rutland St.	Houston	Harris
84001780	House at 1230 Oxford Street	1230 Oxford St.	Houston	Harris
83004456	House at 1237 Rutland Street	1237 Rutland St.	Houston	Harris
84001784	House at 1304 Cortlandt Street	1304 Cortlandt St.	Houston	Harris
83004443	House at 1343 Allston Street	1343 Allston St.	Houston	Harris
83004449	House at 1421 Harvard St.	1421 Harvard St.	Houston	Harris
83004452	House at 1421 Heights Boulevard	1421 Heights Blvd.	Houston	Harris
83004459	House at 1421-1423 Waverly Street	1421-1423 Waverly St.	Houston	Harris
87002251	House at 1435 Heights Boulevard	1435 Heights Blvd.	Houston	Harris
83004453	House at 1437 Heights Boulevard	1437 Heights Blvd.	Houston	Harris
83004458	House at 1437 Waverly Street	1437 Waverly St.	Houston	Harris
83004442	House at 1443 Allston Street	1443 Allston St.	Houston	Harris
83004441	House at 1509 Allston Street	1509 Allston St.	Houston	Harris
83004440	House at 1515 Allston Street	1515 Allston St.	Houston	Harris
83004446	House at 1517 Cortland Street	1517 Cortland St.	Houston	Harris
83004457	House at 1537 Tulane Street	1537 Tulane Street	Houston	Harris
83004450	House at 1640 Harvard Street	1640 Harvard St.	Houston	Harris
83004460	House at 201 W. 15th Street	201 W. 15th St.	Houston	Harris
83004455	House at 2035 Rutland Street	2035 Rutland St.	Houston	Harris
84001786	House at 217 E. 5th Street	217 E. 5th St.	Houston	Harris
83004454	House at 2402 Rutland Street	2402 Rutland St.	Houston	Harris
83004447	House at 402 E. 11th Street	402 E. 11th Street	Houston	Harris
84001788	House at 444 West 24th Street	444 W. 24th St.	Houston	Harris
84001791	House at 505 W. 18th Street	505 W. 18th St.	Houston	Harris
83004448	House at 532 Harvard Street	532 Harvard St.	Houston	Harris
83004451	House at 828 Heights Boulevard	828 Heights Blvd.	Houston	Harris
83004445	House at 844 Columbia Street	844 Columbia St.	Houston	Harris
83004444	House at 844 Courtlandt	844 Cortlandt	Houston	Harris
84001793	House at 917 Heights Boulevard	917 Heights Blvd.	Houston	Harris
84003972	House at 943 1/2 Cortlandt Street	943 1/2 Cortlandt St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
100005898	Houses at 1217 and 1219 Tulane Street	1217 Tulane St.	Houston	Harris
100001254	Houston Bar Center Building	723 Main St.	Houston	Harris
90001471	Houston City Hall	901 Bagby St.	Houston	Harris
100000696	Houston Fire Station No. 3	1919 Houston Ave.	Houston	Harris
86000798	Houston Fire Station No. 7	2304 Milam St.	Houston	Harris
83004461	Houston Heights Fire Station	Yale and 12th Sts.	Houston	Harris
83004462	Houston Heights Waterworks Reservoir	W. 20 and Nicolson Sts.	Houston	Harris
83004463	Houston Heights Woman's Club	1846 Harvard St	Houston	Harris
100009738	Houston Light Guard Armory	3820 Caroline Street	Houston	Harris
100003488	Houston Municipal Airport Terminal	8325 Travelair Rd.	Houston	Harris
82004856	Houston Negro Hospital	3204 Ennis St.	Houston	Harris
82004857	Houston Negro Hospital School of Nursing Building	Holman Ave. and Ennis St.	Houston	Harris
100002269	Houston Post	2410 Polk St.	Houston	Harris
02000072	Houston Post-Dispatch Building	609 Fannin	Houston	Harris
84001795	Houston Public Library	1302 Heights Blvd.	Houston	Harris
99000068	Humble Oil Building	1212 Main St.	Houston	Harris
100011429	Humble-Exxon Building	800 Bell Street and 1616 Milam Street	Houston	Harris
77001447	Ideson, Julia, Building	500 McKinney St.	Houston	Harris
83004464	Immanuel Lutheran Church	1448 Cortlandt St.	Houston	Harris
97000544	Independence Park	Roughly bounded by 1000 Blk. of E. 40th St.	Houston	Harris
94000628	Isabella Court	3909--3917 S. Main St.	Houston	Harris
83004465	Isbell House	639 Heights Blvd.	Houston	Harris
100006493	J. A. Folger and Company Plant	235 North Norwood St.	Houston	Harris
05000859	Jefferson Davis Hospital	1101 Elder	Houston	Harris
90001039	Jensen, James L., House	721 Arlington	Houston	Harris
97000550	Johnson, Charles, House	301 E. 35th St.	Houston	Harris
97000541	Johnson, Morris and Mary, House	3818 Spencer St.	Houston	Harris
83004466	Jones House	1115-1117 Allston St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
79002962	Jones-Hunt House	24 Courtlandt Pl.	Houston	Harris
84001797	Keller House	1448 Heights Blvd.	Houston	Harris
75001989	Kellum-Noble House	212 Dallas St.	Houston	Harris
79002963	Kennedy Bakery	813 Congress St.	Houston	Harris
87002252	Kennedy, Marshall W., House	1122 Harvard	Houston	Harris
83004467	Kleinhaus House	803 Yale St.	Houston	Harris
100010652	Knapp Building (1940)	1230 Houston Avenue	Houston	Harris
100009949	K'nesseth Israel Synagogue	100 West Sterling Avenue	Baytown	Harris
83004468	Knittel House	1601 Ashland St.	Houston	Harris
02001102	Kress Building	705 Main St.	Houston	Harris
83004469	Kronenberger House	612 W. 26th St.	Houston	Harris
96000587	Lewis Apartment Building	2815--2817 Smith St.	Houston	Harris
97000543	Lewis, Ella, Store and Rental Houses	3404--3406--3408 Courtland St.	Houston	Harris
100009922	Lightfoot, Ewart H. and Lillian, House	3702 Audubon Place	Houston	Harris
87002253	Lindenburg, Emil, House	1445 Harvard	Houston	Harris
97000546	Lindsay, Oscar, House	7415 N. Main St.	Houston	Harris
00000751	Link-Lee House	3800 Montrose	Houston	Harris
98000428	Logue House	1101 Milford	Houston	Harris
90001045	Lowry, Fayette C., House	2009 Harvard	Houston	Harris
83004470	Lund House	301 E. 5th St.	Houston	Harris
05000387	Macatee, Leonard W., House	1220 Southmore Blvd.	Houston	Harris
97000547	Mackey, William, House	313 E. 37th St.	Houston	Harris
83004472	Mansfield House	1802 Harvard St.	Houston	Harris
78002945	Mansfield Street Archeological Site	Address Restricted	Houston	Harris
100002435	Maria Boswell Flake Home for Old Women	1103 Berry St.	Houston	Harris
87002254	McCain, Henry Hicks, House	1026 Allston	Houston	Harris
90001049	McCollum, D. C., House	433 W. 24th St.	Houston	Harris
83004473	McDonald House	1801 Ashland St.	Houston	Harris
02000729	McKee Street Bridge	McKee St. and Buffalo Bayou	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
100006045	Mechanical Laboratory and Power House	6100 Main St.	Houston	Harris
16000918	Medical Towers	1709 Dryden Rd.	Houston	Harris
94000247	Meek, James V., House	3704 Garrott Ave.	Houston	Harris
84001813	Meitzen House	725 Harvard St.	Houston	Harris
12000351	Mellinger, Marguerite Meachum & John S., House	3452 Del Monte Dr.	Houston	Harris
14000627	Melrose Building	1121 Walker	Houston	Harris
80004130	Merchants and Manufacturers Building	1 Main St.	Houston	Harris
84001814	Miller House	1245 Yale St.	Houston	Harris
83003788	Miller, Ezekial and Mary Jane, House	304 Hawthorne St.	Houston	Harris
83004474	Milroy House	1102 Heights Blvd.	Houston	Harris
80004131	Milroy, John, House	1102 Heights Blvd.	Houston	Harris
84001816	Milroy-Muller House	1602 Harvard St.	Houston	Harris
00001496	Minchen, Simon and Mamie, House	1753 North Blvd.	Houston	Harris
06000818	Minella, Angelo and Lillian, House	6328 Brookside Dr.	Houston	Harris
100009405	Moncrief-Lenoir Manufacturing Company	2103 Lyons Ave.	Houston	Harris
90001044	Morris, Glenn W., House	1611 Harvard St.	Houston	Harris
87002255	Morton Brothers Grocery	401 W. Ninth	Houston	Harris
84001819	Mulcahy House	1046 Harvard St.	Houston	Harris
79002964	Myer, Sterling, House	4 Courtlandt Pl.	Houston	Harris
87002256	Nairn, Forrest A., House	1148 Heights Blvd.	Houston	Harris
90001293	Nash, William R., House	215 Westmoreland Ave.	Houston	Harris
98000141	National Biscuit Company Building	15 N. Chenevert	Houston	Harris
79002965	Neuhaus, C. L., House	6 Courtlandt Pl.	Houston	Harris
05000246	Neuhaus, Hugo V., Jr. House	2910 Lazy Ln.	Houston	Harris
83004475	Ogle, Joseph, House	530 Harvard St.	Houston	Harris
75001990	Old Houston National Bank	202 Main St.	Houston	Harris
06001063	Orange Show, The	2401 Munger St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
83004476	Oriental Textile Mill	2201 Lawrence St.	Houston	Harris
84001820	Otto House	835 Rutland St.	Houston	Harris
06000825	Palace Hotel	216 La Branch	Houston	Harris
84000388	Palmer, Edward Albert, Memorial Chapel and Autry House	6221 and 6265 Main St.	Houston	Harris
79002966	Parker, John W., House	2 Courtlandt Pl.	Houston	Harris
100007523	Pasadena Post Office	102 Munger St.	Pasadena	Harris
79002967	Paul Building	1018 Preston Ave.	Houston	Harris
91000889	Peden, D. D., House	2 Longfellow Ln.	Houston	Harris
83004477	Perry-Swilley House	1101 Heights Blvd.	Houston	Harris
100004250	Petroleum Building	1314 Texas Avenue	Houston	Harris
03000329	Pomeroy Homestead	202 and 204 S. Main St.	Pasadena	Harris
90001038	Reed, Thomas B., House	933 Allston St.	Houston	Harris
78002947	Rice Hotel	Main St. and Texas Ave.	Houston	Harris
100010951	River Oaks Theatre	2050 West Gray Street	Houston	Harris
87002257	Roessler, Charles, House	736 Cortland	Houston	Harris
90001042	Rogers, Ghent W., House	1150 Cortlandt	Houston	Harris
00000883	Rothko Chapel	1409 Sul Ross Ave.	Houston	Harris
07001023	Sabine Street Bridge over Buffalo Bayou	Sabine St. at Buffalo Bayou	Houston	Harris
02000276	Sam Houston Hotel	1117 Prairie St.	Houston	Harris
66000815	San Jacinto Battlefield	22 mi. E of Houston on TX 134	Houston	Harris
12001000	San Jacinto Senior High School	1300 Holman St.	Houston	Harris
07001098	San Jacinto Street Bridge over Buffalo Bayou	San Jacinto St. at Buffalo Bayou	Houston	Harris
100011510	San Jacinto Warehouse	1101-1125 Providence Street	Houston	Harris
02001731	Saturn V Launch Vehicle	Johnson Space Center	Houston	Harris
80004132	Scanlan Building	405 Main St.	Houston	Harris
84001823	Schlesser-Burrows House	1123 Harvard St.	Houston	Harris
100002601	Schlumberger Well Surveying Corporation Building	2720 Leeland St.	Houston	Harris

Reference Number	Property Name	Street & Number	City	County
100005314	Sears, Roebuck and Company Warehouse and Service Center	5901 Griggs Rd.	Houston	Harris
98001344	Sessums-James House	3802 Spencer	Houston	Harris
75001991	Sewall, Cleveland Harding, House	3452 Inwood St.	Houston	Harris
84001825	Sheridan Apartments	802-804 McGowen St.	Houston	Harris
87002258	Shoaf, John H., House	2030 Arlington	Houston	Harris
100010026	Sills Building	5804 Canal Street	Houston	Harris
78002948	South Texas National Bank	215 Main St.	Houston	Harris
16000574	Southwestern Bell Capitol Main Office	1121 Capitol St. & 1114 Texas Ave.	Houston	Harris
85002810	Space Environment Simulation Laboratory (NHL)	Lyndon B. Johnson Space Center	Houston	Harris
100003489	St. Elizabeth's Hospital	4514 Lyons Ave.	Houston	Harris
100007914	St. Mark’s Methodist Church	600 Pecore St.	Houston	Harris
100004373	St. Paul's Methodist Episcopal Church	5501 Main St.	Houston	Harris
94001521	Star Engraving Company Building	3201 Allen Pkwy.	Houston	Harris
96001110	State Highway 35 Bridge at the West Fork of the San Jacinto River	US 59, 1.4 mi. N of jct. with FM 1960	Humble	Harris
82004843	State National Bank Building	412 Main St.	Houston	Harris
82004858	Sterling, Ross,S., House	515 Bayridge Rd.	Morgan's Point	Harris
83004479	Sterling-Berry House	4515 Yoakum Blvd.	Houston	Harris
96000275	Stevenson, Joseph R. and Mary M., House	804 Harold St.	Houston	Harris
96000067	Stewart, Dr. James M. and Dove, House	5702 Fourth St.	Katy	Harris
15000335	Stowers Building	820 Fannin	Houston	Harris
74002074	Sweeney, Coombs & Fredericks Building	301 Main St.	Houston	Harris
10000738	Sylvan Beach Pavilion	554 N Bayshore Dr	La Porte	Harris
79002968	Taylor, Judson L., House	20 Courtlandt Pl.	Houston	Harris
07001235	Telephone Road Bridge over Brays Bayou	Telephone Rd. at Brays Bayou	Houston	Harris
84001826	Temple Beth Israel	3517 Austin St.	Houston	Harris

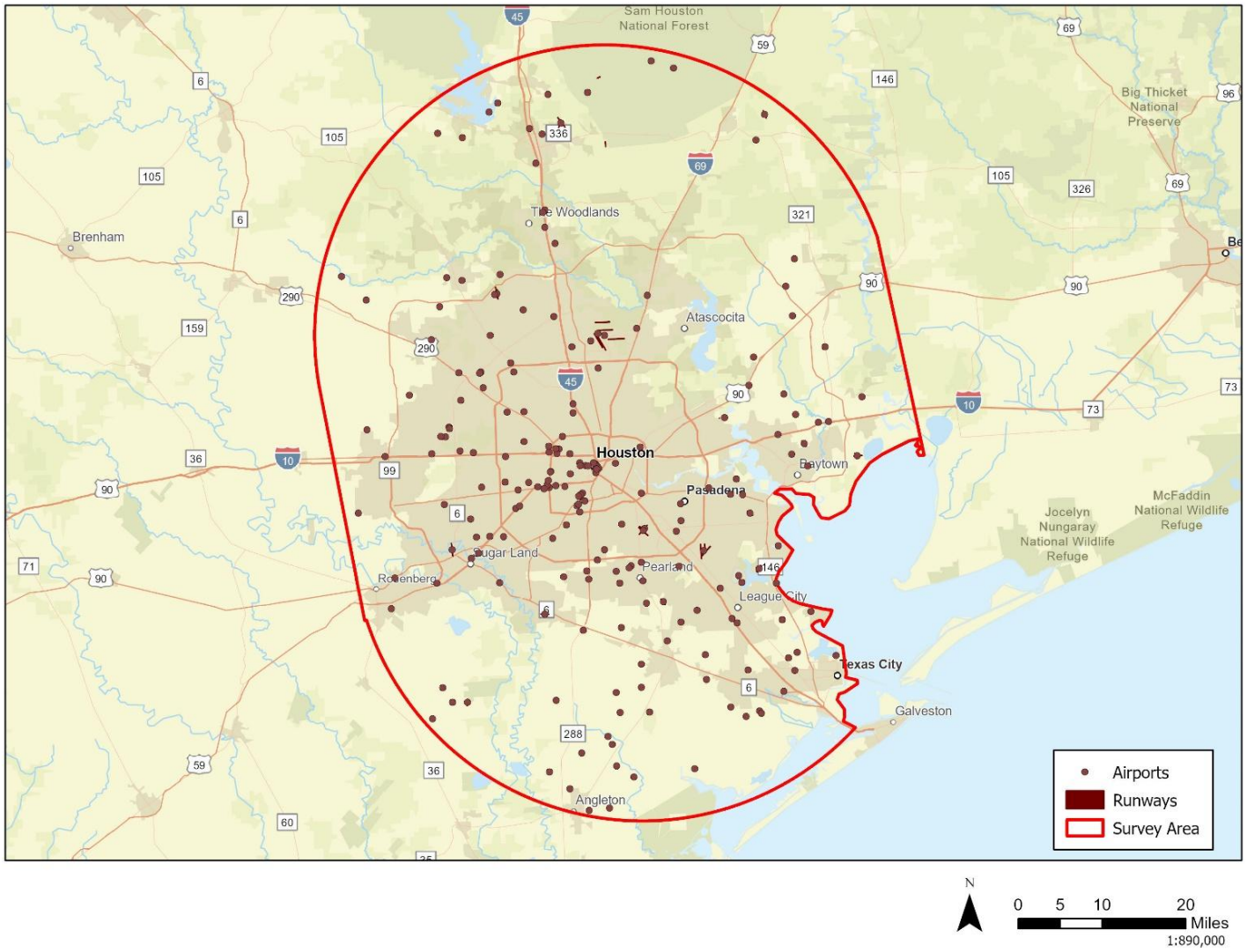
Reference Number	Property Name	Street & Number	City	County
03000185	Texas Company Building	1111 Rusk	Houston	Harris
07001384	Texas State Hotel	720 Fannin	Houston	Harris
83004480	Thornton, Dr. Penn B., House	1541 Tulane St.	Houston	Harris
100002842	Todd, Lucie Wray and Anderson, House	9 Shadowlawn Cir.	Houston	Harris
83004481	Trinity Church	3404 S. Main St.	Houston	Harris
74002075	U.S. Customhouse	San Jacinto at Rusk St.	Houston	Harris
76002039	U.S.S. TEXAS (NHL)	22 mi. E of Houston on TX 134 at San Jacinto Battleground	Houston	Harris
77001448	Union Station	501 Crawford St.	Houston	Harris
00001665	Union Transfer and Storage Building	1113 Vine St.	Houston	Harris
83004482	Upchurch House	301 E. 14th St.	Houston	Harris
12000195	Walker House	3534 Miramar Dr.	Shoreacres	Harris
83004483	Ward House	323 W. 17th St.	Houston	Harris
08000316	Washburn Tunnel	3100 Federal Rd.	Houston	Harris
84001829	Webber House	1011 Heights Blvd.	Houston	Harris
83004484	Webber, Samuel H., House	407 Heights Blvd.	Houston	Harris
94001015	West, James and Jessie, Mansion	3303 NASA Rd. 1	Pasadena	Harris
84001831	Wilkins House	1541 Ashland St.	Houston	Harris
83004485	Williams-Brueder House	245 W. 18th St.	Houston	Harris
84001841	Wilson House	1206 Cortlandt St.	Houston	Harris
84001843	Wimberly House	703 Harvard St.	Houston	Harris
84001844	Wisnoski House	1651 Columbia St.	Houston	Harris
84001847	Woodard House	740 Rutlant St.	Houston	Harris
04001174	Woodlawn Garden of Memories Cemetery	1101 Antoine	Houston	Harris
83004486	Woodward House	1605 Heights Blvd.	Houston	Harris
93000844	Wray, Andrew Jackson and Margaret Cullinan, House	3 Remington Ln.	Houston	Harris
97000202	Wunderlich, Peter and Sophie, Farm	18202 Theiss Mail Rd.	Klein	Harris
84001849	Wunsche Bros. Saloon and Hotel	103 Midway St.	Spring	Harris

Reference Number	Property Name	Street & Number	City	County
11000981	Yale Street Bridge over White Oak Bayou	Yale St. at White Oak Bayou	Houston	Harris
92001401	Black Cloud	Address Restricted	Liberty	Liberty
11000156	Chambers, Thomas Jefferson, House	624 Milam St	Liberty	Liberty
84001907	Cleveland-Partlow House	2131 Grand Ave.	Liberty	Liberty
02001514	Liberty County Courthouse	1923 Sam Houston Blvd.	Liberty	Liberty
71000947	Site 41 Lb 4	Address Restricted	Dayton	Liberty
96001114	State Highway 3 Bridge at the Trinity River	US 90, 1.3 mi. W of jct. with FM 2684	Liberty	Liberty
73001970	Kirbee Kiln Site	Address Restricted	Montgomery	Montgomery
100010230	Montgomery County Hospital	301 S. 1st Street	Conroe	Montgomery
03000332	San Jacinto County Courthouse	#1 TX 150 at Byrd Ave.	Coldspring	San Jacinto
80004148	San Jacinto County Jail	Slade and Loyd St.	Coldspring	San Jacinto
99000611	Anderson, L.C., Hall	L.W. Minor St., building #0541	Prairie View	Waller
99000612	Banks, W.R., Library	L.W. Minor St., building #0508	Prairie View	Waller
99000613	Evans, Annie Laurie, Hall	L.W. Minor St., building #0544	Prairie View	Waller
99000614	Hilliard Hall	A.G. Cleaver St., building #0537	Prairie View	Waller
71000970	Liendo Plantation	2 mi. NE of Hempstead off FM 1488	Hempstead	Waller
99000617	Veterninary Hospital	E.M. Norris St., building #0517	Prairie View	Waller
99000616	Woolfolk, G.R., Social and Political Science Building	A.G. Cleaver St., building #0503	Prairie View	Waller

Attachment E. Noise Assessment Report

Please see Appendix D, Noise, of this EA

Appendix G
Houston Area Airports



Appendix H
NOA and Distribution List

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Washington, D.C.

Notice of Availability, Notice of Public Comment Period, and Request for Comment on the Draft Environmental Assessment for Wing Aviation, LLC, Proposed Package Delivery Operations in Houston, Texas

The Federal Aviation Administration (FAA) provides notice that a Draft Environmental Assessment (EA), prepared pursuant to the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321–4355), to assess Wing Aviation, LLC (Wing), proposed commercial drone delivery service in the Houston metropolitan area is available for review and comment.

Wing is seeking to amend its air carrier Operations Specifications (OpSpecs) and other FAA approvals necessary to expand commercial drone package delivery operations in the Houston metro area. The FAA's approval of the amended OpSpecs is considered a major federal action under NEPA and requires a NEPA review. This Draft EA is submitted for review pursuant to NEPA, FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures*, Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303), Section 7 of the Endangered Species Act (16 U.S.C. § 1531 et seq.), and Section 106 of the National Historic Preservation Act (16 U.S.C. § 470). The Draft EA will be available for a 30-day public review beginning on May 4, 2026, and ending on June 3, 2026.

The Draft EA is available for online review at
https://www.faa.gov/uas/advanced_operations/nepa_and_drones

Comments on the Draft EA may be submitted electronically to 9-FAA-Drone-Environmental@faa.gov. Written comments may be submitted via U.S. mail to the address below. Please ensure adequate time for receipt. All comments must be received by 5:00 p.m. Central Time on June 3, 2026.

Federal Aviation Administration, Suite 802W
C/O AVS Environmental
800 Independence Ave SW
Washington, DC 20591

All substantive comments received will be responded to in the Final EA.

Privacy Notice: Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

This Draft EA becomes a federal document when evaluated, signed, and dated by the Responsible FAA Official.

Responsible FAA Official:

Joseph K. Hemler Jr

Digitally signed by Joseph K. Hemler Jr
Date: 2026.05.04 10:23:43 -04'00'

Date: _____

Joseph K Hemler
Manager, AFS-752
Emerging Technologies Division
Office of Safety Standards, Flight Standards Service

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Appendix I
Coastal Resources

Notice and Opportunity to Comment on Requests for Consistency – Wing Aviation, LLC

Notice and Opportunity to Comment on Requests for Consistency Agreement/Concurrence Under the Texas Coastal Management Program

On January 10, 1997, the State of Texas received federal approval of the Coastal Management Program (CMP) (62 *Federal Register* pp. 1439 - 1440). Under federal law, federal agency activities and actions affecting the Texas coastal zone must be consistent with the CMP goals and policies identified in 31 TAC Chapter 26. Requests for federal consistency review were deemed administratively complete for the following project(s) during the period of June 8, 2026 to June 12, 2026. As required by federal law, the public is given an opportunity to comment on the consistency of proposed activities in the coastal zone undertaken or authorized by federal agencies. Pursuant to 31 TAC §§30.20(f), 30.30(h), and 30.40(e), the public comment period extends 30 days from the date published on the Texas General Land Office web site. The notice was published on the web site on Friday, June 19, 2026. The public comment period for this project will close at 5:00 p.m. on Sunday, July 19, 2026.

Federal License and Permit Activities:

Applicant: Wing Aviation, LLC

Location: Houston, Harris, Chambers, Galveston, Brazoria Counties, Texas

Project Description: Wing is proposing to conduct unmanned aircraft (UA) retail package delivery operations, establishing up to 75 sites in the Houston metro area. Wing's intent is to offer service throughout the Houston metro area from a network of nests, where each would serve a specific area, thereby avoiding an over-concentration of flights surrounding any given nest. The nests would be located in commercial areas, such as shopping centers, large individual retailers, and shopping malls. Each nest houses up to 24 aircraft and has a delivery range of approximately 6 miles. The proposed action does not involve ground-disturbing activity outside of existing commercial areas and does not include any operations over water.

Two UAs would be primarily used for deliveries: Wing's Hummingbird 7000W-B and 8000-A. The Hummingbird 7000W-B - multi-rotor design with 16 propellers, weighs under 15 pounds when combined with its maximum payload weight of 2.7 pounds, and has a wingspan of approximately 4.9 feet, a height of approximately 1 foot, and a length of 4 feet. The 8000-A has a multi-rotor design with 12 propellers, weight under 25 pounds when combined with its maximum payload weight of 5 pounds, and has a wingspan of approximately 6 feet, a height of approximately 1 foot, and a length of approximately 6.2 feet. All Wing aircraft use electric power from rechargeable lithium-ion batteries. Aircraft batteries are charged wirelessly from nest charging pads where aircraft sit between deliveries. Charging pads are connected to onsite utilities or temporarily to small diesel generators during the development of utility connections. Wing anticipates the Houston metro area fleet makeup would consist of 70 to 80 percent 7000W-B aircraft and 20 to 30 percent 8000-A aircraft.

The UA would generally be operated at an altitude of 150–300 feet above ground level (AGL) and always below an altitude of 400 feet AGL while en route to and from delivery locations. At a delivery location, the UA would descend vertically to a stationary hover at 23 feet AGL and lower a package to the ground by a retractable line for delivery. Once a package has been lowered to the ground, the UA would then retract the line, ascend vertically to a cruise altitude, and depart the delivery area enroute back to a nest.

Wing projects operating a maximum of 400 delivery flights per operating day from each site, with operations initially occurring between 7:00 a.m. and 7:00 p.m. and then extending to 7:00 a.m. to 10:00 p.m. In addition, operations

would include low altitude (<8 ft) in-nest checkout flights between 6:00 a.m. and 7:00 a.m. in preparation for the normal operational day which would begin no earlier than 7:00 a.m.

Type of Application: Draft Environmental Assessment to amend Federal Aviation Administration air carrier Operation Specifications authorization.

CMP Project No: 26-1159-F1

Further information on the applications listed above, including a copy of the consistency certifications or consistency determinations for inspection, may be obtained from the Texas General Land Office Public Information Officer at 1700 N. Congress Avenue, Austin, Texas 78701, or via email at pialegal@glo.texas.gov (mailto:pialegal@glo.texas.gov). Comments should be sent to the Texas General Land Office Coastal Management Program Coordinator at the above address or via email at federal.consistency@glo.texas.gov (mailto:federal.consistency@glo.texas.gov)

Send a comment about this notice to the GLO

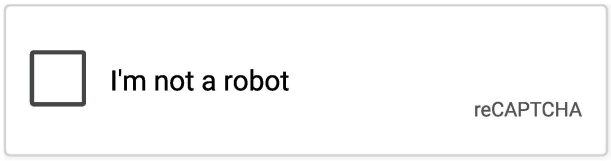
Name*

Email*

Phone*

Comment*

With few exceptions, an individual is entitled on request to be informed about the information that the state governmental body collects about the individual. Under Sections 552.021 and 552.023 of the Texas Government Code, the individual is entitled to receive and review the information. Under Section 559.004 of the Texas Government Code, the individual is entitled to have the state governmental body correct information about the individual that is incorrect. (/open-government/important-links-and-information#Site-Policies)



SUBMIT

TEXAS GENERAL LAND OFFICE
COMMISSIONER DAWN BUCKINGHAM, M.D.

July 20, 2026

Wing Aviation, LLC

Re: Unmanned aircraft retail package delivery operations at up to 75 locations in Houston, Texas
Houston, Harris, Chambers, Galveston, Brazoria Counties, Texas
CMP#: 26-1159-F1

Dear Applicant:

The project referenced above has been reviewed for consistency with the Texas Coastal Management Program (CMP) pursuant to 31 Texas Administrative Code §30.30. It has been determined that the project, as proposed, is consistent with the CMP goals and enforceable policies.

Please note that this letter does not authorize the use of Coastal Public Land. No work may be conducted or structures placed on State-owned land until you have obtained all necessary authorizations, including any required by the General Land Office and the U.S. Army Corps of Engineers.

If you have any questions or concerns, please contact me at (512) 463-7497 or at federal.consistency@glo.texas.gov.

Sincerely,

Leslie Koza

Leslie Koza
Federal Consistency Coordinator
Texas General Land Office