ENVIRONMENTAL ASSESSMENT
(FINAL)

MANAGING DAMAGE AND THREATS OF DAMAGE CAUSED BY BIRDS IN THE UNITED STATES VIRGIN ISLANDS

PREPARED BY:

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ANIMAL AND PLANT HEALTH INSPECTION SERVICE
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EXECUTIVE SUMMARY

Wildlife are an important public resource that can provide economic, recreational, emotional, and esthetic benefits to many people. However, wildlife can cause damage to agricultural resources, natural resources, property, and threaten human safety. When people experience damage caused by wildlife or when wildlife threatens to cause damage, people may seek assistance from other entities. The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) program is the lead federal agency responsible for managing conflicts between people and wildlife. Therefore, people experiencing damage or threats of damage associated with wildlife could seek assistance from WS. In the United States Virgin Islands, WS has and continues to receive requests for assistance to reduce and prevent damage associated with several bird species.

The National Environmental Policy Act (NEPA) requires federal agencies to incorporate environmental planning into federal agency actions and decision-making processes. Therefore, if WS provided assistance by conducting activities to manage damage caused by bird species, those activities would be a federal action requiring compliance with the NEPA. The NEPA requires federal agencies to have available and fully consider detailed information regarding environmental effects of federal actions and to make information regarding environmental effects available to interested persons and agencies. To comply with the NEPA, WS prepared this Environmental Assessment (EA) to determine whether the potential environmental effects caused by several alternative approaches to managing bird damage might be significant, requiring the preparation of an Environmental Impact Statement (EIS). WS developed this EA under the 1978 NEPA regulations and existing APHIS NEPA implementing procedures because WS initiated this EA prior to the NEPA revisions that went into effect on September 14, 2020.

Chapter 1 of this EA discusses the need for action and the scope of analysis associated with requests for assistance that WS receives involving several bird species in the United States Virgin Islands. Chapter 2 identifies and discusses the issues that WS identified during the scoping process for this EA and through consultation with federal agencies and agencies within the United States Virgin Islands. Issues are concerns regarding potential effects that might occur from proposed activities. Federal agencies must consider such issues during the decision-making process required by the NEPA. Chapter 2 also discusses the alternative approaches that WS developed to meet the need for action and to address the issues identified during the scoping process.

Issues of concern addressed in detail include: 1) effects on target bird populations, 2) effects on nontarget species, including threatened and endangered species, 3) effects of management methods on human health and safety, and 4) humaneness and animal welfare concerns of methods. Alternative approaches evaluated to meet the need for action and to address the issues include: 1) continuing the current integrated methods approach to managing damage, 2) using an integrated methods approach using only nonlethal methods, 3) addressing requests for assistance through technical assistance only, and 4) no involvement by WS. Depending on the alternative approach, several methods would be available to manage damage caused by birds. Appendix B discusses the methods that WS could consider when responding to a request for assistance.

Chapter 3 provides information needed for making informed decisions by comparing the environmental consequences of the four alternative approaches in comparison to determine the extent of actual or potential impacts on each of the issues. WS will use the analyses in this EA to help inform agency decision-makers on the significance of the environmental effects, which will aid the decision-makers with determining the need to prepare an EIS or concluding the EA process with a Finding of No Significant Impact.

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ACRONYMS

AIV	Avian Influenza Virus
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Survey
CBC	Christmas Bird Count
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWCS	Comprehensive Wildlife Conservation Strategy
DFW	Division of Fish and Wildlife
DPNR	Department of Planning and Natural Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FY	Fiscal Year
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NASS	National Agricultural Statistics Service
NAWCP	North American Waterbird Conservation Plan
NEPA	National Environmental Policy Act
NWRC	National Wildlife Research Center
T&E	Threatened and Endangered
UAV	Unmanned Aerial Vehicle
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USVI	United States Virgin Islands
WS	Wildlife Services

CHAPTER 1: NEED FOR ACTION AND SCOPE OF ANALYSIS

1.1 INTRODUCTION

Wildlife are an important public resource greatly valued by people. In general, people regard wildlife as providing economic, recreational, emotional, and esthetic benefits. Knowing that wildlife exists in the natural environment provides a positive benefit to many people. However, the behavior of animals may result in damage to agricultural resources, natural resources, property, and threaten human safety. Therefore, wildlife can have either positive or negative values depending on the perspectives and circumstances of individual people.

Wildlife damage management is the alleviation of damage or other problems caused by or related to the behavior of wildlife and can be an integral component of wildlife management (Berryman 1991, Reidinger and Miller 2013, The Wildlife Society 2015) and the North American Model of Wildlife Conservation (Organ et al. 2010, Organ et al. 2012). Resolving damage caused by wildlife requires consideration of both sociological and biological carrying capacities. The wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Biological carrying capacity is the land or habitat's ability to support healthy populations of wildlife without degradation to the species' health or their environment during an extended period of time (Decker and Purdy 1988).

Those phenomena are especially important because they define the sensitivity of a person or community to a wildlife species. For any given damage situation, there are varying thresholds of tolerance exhibited by those people directly and indirectly affected by the species and any associated damage. This damage threshold determines the wildlife acceptance capacity. While the biological carrying capacity of the habitat may support higher populations of wildlife, in many cases the wildlife acceptance capacity is lower or already met. Once the wildlife acceptance capacity is met or exceeded, people begin to implement population or damage management to alleviate damage or address threats to human health and safety. Therefore, the wildlife acceptance capacity helps define the range of wildlife population levels and associated damages acceptable to individuals or groups (Decker and Purdy 1988, Decker and Brown 2001).

Animals have no intent to do harm. They utilize habitats (*e.g.*, feed, shelter, reproduce) where they can find a niche. If their activities result in lost value of resources or threaten human safety, people often characterize this as damage. When damage exceeds or threatens to exceed an economic threshold and/or pose a threat to human safety, people often seek assistance. The threshold triggering a person to seek assistance with alleviating damage or threats of damage is often unique to the individual person requesting assistance and many factors (*e.g.*, economic, social, esthetics) can influence when people seek assistance. Therefore, the threshold of damage that triggers a person to seek assistance is often unique to the individual person. What one individual person considers damage, another person may not consider as damage. However, the use of the term "*damage*" is consistently used to describe situations where the individual person has determined the losses associated with an animal or animals is actual damage requiring assistance (*i.e.*, has reached an individual threshold). Many people define the term "*damage*" as economic losses to resources or threats to human safety; however, "*damage*" could also occur from a loss in the esthetic value of property and other situations where the behavior of wildlife was no longer tolerable to an individual person. The threat of damage or loss of resources is often sufficient for people to initiate individual actions and the need for damage management could occur from specific threats to resources.

1.2 PURPOSE OF THIS DOCUMENT

When people experience damage caused by wildlife or when wildlife threatens to cause damage, people may seek assistance from other entities. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program is the lead federal agency responsible for managing conflicts between people and wildlife (USDA 2019) (see WS Directive 1.201)[1]. The primary statutory authority for the WS program is the Act of March 2, 1931 (46 Stat. 1468; 7 United States Code (USC) 8351-8352) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 USC 8353). WS' directives define program objectives and guide WS' activities when managing wildlife damage (see WS Directive 1.201, WS Directive 1.205, WS Directive 1.210). Therefore, people experiencing damage or threats of damage associated with wildlife could seek assistance from WS. The WS program has personnel in the United States Virgin Islands (USVI) that provide assistance with managing damage caused by wildlife when people request such assistance.

In the USVI, WS has and continues to receive requests for assistance to reduce and prevent damage associated with several bird species. WS has identified those bird species most likely to be responsible for causing damage in the USVI based on previous requests for assistance. Those bird species include common ground doves (*Columbina passerina*), rock pigeons (*Columba livia*), zenaida doves (*Zenaida aurita*), cattle egrets (*Bubulcus ibis*), killdeer (*Charadrius vociferous*), barn swallows (*Hirundo rustica*), laughing gulls (*Leucophaeus atricilla*), house sparrows (*Passer domesticus*), pearly-eyed thrashers (*Margarops fuscatus*), gray kingbirds (*Tyrannus dominicensis*), and red junglefowl (*Gallus gallus*).

In addition to those species, WS could also receive requests for assistance to manage damage and threats of damage associated with several other bird species, but requests for assistance associated with those species would occur infrequently and/or requests would involve a small number of individual birds of a species. Damages and threats of damages associated with those species would occur primarily at airports where individuals of those species pose a threat of aircraft strikes. Appendix D contains a list of species that WS could address in low numbers and/or infrequently when those species cause damage or pose a threat of damage. Section 1.4 discusses the need for action associated with requests for assistance that WS receives associated with bird species in the USVI.

The National Environmental Policy Act (NEPA) requires federal agencies to incorporate environmental planning into federal agency actions and decision-making processes (Public Law 9-190, 42 USC 4321 et seq.). Therefore, if WS provided assistance by conducting activities to manage damage caused by bird species, those activities would be a federal action requiring compliance with the NEPA. The NEPA requires federal agencies to have available and fully consider detailed information regarding environmental effects of federal actions and to make information regarding environmental effects available to interested persons and agencies.

1.2.1 Complying with the NEPA

As part of the decision-making process associated with the NEPA, WS follows the Council on Environmental Quality (CEQ) regulations implementing the NEPA (40 Code of Federal Regulations (CFR) 1500 et seq.) along with the implementing procedures of the USDA (7 CFR 1b) and the APHIS (7 CFR 372). The NEPA sets forth the requirement that federal agencies evaluate their actions in terms of their potential to significantly affect the quality of the human environment to avoid or, where possible, to mitigate and minimize adverse impacts, making informed decisions, and including agencies and the public in their planning to support informed decision-making.

[1]At the time of preparation, WS' Directives occurred at the following web address: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/SA_WS_Program_Directives.

To comply with the NEPA and CEQ regulations, WS is preparing this Environmental Assessment (EA) to evaluate alternative approaches of achieving the objectives of WS and to determine whether the potential environmental effects caused by the alternative approaches might be significant, requiring the preparation of an Environmental Impact Statement (EIS). As described by the CEQ (2007), the intent of an EA is to provide brief but sufficient evidence and analysis to determine whether to prepare an EIS, aid in complying with the NEPA when an EIS is not necessary, and to facilitate preparation of an EIS when one is necessary. The CEQ (2007) further states, "*The EA process concludes with either a Finding of No Significant Impact…or a determination to proceed to preparation of an EIS*". WS developed this EA under the 1978 NEPA regulations and existing APHIS NEPA implementing procedures because WS initiated this EA prior to the NEPA revisions that went into effect on September 14, 2020.

1.2.2 Using this EA to Inform WS' Decisions

Although WS only provides assistance when requested, WS is required to comply with the NEPA before making final decisions about actions that could have environmental effects. WS will use the analyses in this EA to help inform agency decision-makers, including a decision on whether the alternative approaches of meeting the need for action requires the preparation of an EIS or the EA process concludes with a Finding of No Significant Impact.

Another major purpose of the NEPA is to include other agencies and the public during the planning process to support informed decision-making. Prior to making and publishing the decision[2] to conclude this EA process, WS will make this EA available to the public, agencies, tribes, and other interested or affected entities for review and comment. Making the EA available to the public, agencies, tribes, and other interested or affected entities during the planning process will assist with understanding applicable issues and reasonable alternative means to meeting the need for action (see Section 1.4) and to ensure that the analyses are complete for informed decision-making.

Chapter 4 summarizes WS' public outreach for this EA and provides a summary of comments that WS received during the public review period. WS will inform the public of the decision using the same venues. In addition, WS coordinated the preparation of this EA with consulting partner agencies to facilitate planning, efficient use of agency expertise, and to promote interagency coordination, which includes the Division of Fish and Wildlife (DFW) of the USVI's Department of Planning and Natural Resources (DPNR). WS has asked each consulting agency to review the draft EA and provide input and direction to WS to ensure proposed activities would comply with applicable federal and territory regulations and policies, federal land management plans, Memorandum of Understandings (MOUs), and cooperative agreements.

1.2.3 The Geographical Scope of this EA

WS has decided that one EA analyzing potential effects of implementing the alternatives approaches of meeting the need for action for the entire territory of the USVI provides a more comprehensive and less redundant analysis than multiple EAs covering smaller regions. This approach also provides a broader scope for the effective analysis of potential cumulative impacts and for using data and reports from territory and federal wildlife management agencies.

Many of the bird species discussed in Section 1.2 and Appendix D occur across the territory and throughout the year in the USVI. Birds are dynamic and mobile; therefore, damage and threats of damage

[2]As discussed in Section 1.2.1, the EA process concludes with either a Finding of No Significant Impact or the publication of a Notice of Intent to prepare an EIS.

caused by birds can occur wherever those bird species occur in the territory. Responding to requests for assistance falls within the category of actions in which the exact timing or location of individual requests for assistance can be difficult to predict with sufficient notice to describe accurately the locations or times in which WS could reasonably expect to be acting. Although WS could predict some of the possible locations or types of situations and sites where some requests for assistance could occur, WS cannot predict the specific locations or times at which affected resource owners would determine that damage had become intolerable and they request assistance from WS. WS must be ready to provide assistance on short notice anywhere in the USVI when receiving a request for assistance. Therefore, the geographic scope of the actions and analyses in this EA cover the entire territory and this EA analyzes actions that could occur on federal, territory, city, and private lands, when requested.

The analyses in this EA would apply to any actions that WS may conduct to alleviate damage caused by bird species in any locale and at any time within the USVI when WS receives a request for such assistance from the appropriate property owner or property manager. The standard WS Decision Model would be the site-specific procedure for individual actions conducted by WS within the USVI. The WS Decision Model is an analytical thought process used by WS' personnel for evaluating and responding to requests for assistance (Slate et al. 1992). Appendix E contains a copy of WS Directive 2.201, which provides more information on the WS Decision Model. If WS determines that the analyses in this EA do not warrant the preparation of an EIS, the decisions made by WS' personnel using the model would be consistent with the alternative approach that WS selects to meet the need for action. In addition, decisions made using the model would be in accordance with WS' directives as well as relevant laws and regulations.

As discussed previously, the property owner or property manager would determine when assistance from WS was appropriate. WS would only conduct activities after receiving a request from the appropriate property owner or property manager. In addition, WS would only conduct activities after the appropriate property owner or manager signed a work initiation document allowing WS to conduct activities on the property they own or manage. Therefore, this EA meets the intent of the NEPA with regard to site-specific analysis, informed decision-making, and providing the necessary timely assistance to those people requesting assistance from WS.

1.2.4 Period for which this EA is Valid

If WS determines that the analyses in this EA indicate that an EIS is not warranted, this EA remains valid until WS determines that new or additional needs for action, changed conditions, new issues, and/or new alternatives having different environmental impacts need to be analyzed to keep the information and analyses current. At that time, this analysis and document would be reviewed and, if appropriate, supplemented if the changes would have "*environmental relevance*" (40 CFR 1502.9(c)), or a new EA prepared pursuant to the NEPA.

If WS provides assistance with managing damage caused by birds, WS would monitor activities conducted by its personnel to ensure those activities and their impacts remain consistent with the activities and impacts analyzed in this EA and selected as part of the decision. Monitoring activities would ensure that the effects of WS' activities occurred within the limits of evaluated/anticipated activities. Monitoring involves review of the EA for all of the issues evaluated in Chapter 3 to ensure that the activities and associated impacts have not changed substantially over time.

1.2.5 Relationship of this Document to Other Documents

Additional environmental documents relate to activities that WS could conduct to manage damage or threats of damage associated with bird species in the territory. The relationship of those documents to this EA occurs below for each of those documents.

Comprehensive Wildlife Conservation Strategy for the U.S. Virgin Islands, 2005

In 2005, the DFW developed a comprehensive wildlife conservation strategy entitled "*A Comprehensive Wildlife Conservation Strategy for the U.S. Virgin Island*" (CWCS). The CWCS described the terrestrial species and their habitats found throughout the USVI. The CWCS also detailed a checklist of priority actions towards species management.

USVI Wildlife Action Plan, Volume 1: Management Framework and USVI Wildlife Action Plan, Volume 2: Habitats and Species, 2018

In 2018, the DFW replaced the 2005 CWCS with a two volume Wildlife Action Plan, entitled the "*USVI Wildlife Action Plan, Volume 1: Management Framework*" and the "*USVI Wildlife Action Plan, Volume 2: Habitats and Species*". Volume 1 serves as the management section, identifying the status of the wildlife species found in the USVI, threats to resources, and strategic and action priorities towards addressing threats and resource needs within the USVI (Platenberg and Valiulis 2018*a*). Volume 2 serves as a comprehensive catalog of the current knowledge of habitat and species resources within the USVI (Platenberg and Valiulis 2018*b*). Both volumes have appendices to provide supplemental information, including a comprehensive list of species in the USVI and the extent of habitats within the USVI.

Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands (Bird Conservation Region 69)

In 2015, the United States Fish and Wildlife Service (USFWS), the Atlantic Coast Joint Venture, and the Caribbean Landscape Conservation Cooperative issued a collaborative report to guide island-wide and regional avian conservation planning priorities in Puerto Rico and the USVI. The report, entitled "*Avian Conservation Planning Priorities for Puerto Rico and the US Virgin Islands (Bird Conservation Region 69)*," focused on habitat threats, conservation opportunities, and management strategies to protect native and migratory birds. The report assigned priority rankings to 144 bird species (104 species in the USVI), and then established population objectives for each species to be achieved or surpassed in the next 20 to 25 years. The report also identified priority habitat areas and established conservation objectives.

North American Waterfowl Management Plan

The United States signed a joint venture with Canada in 1986, and later with Mexico 1994, in an international effort to conserve declining populations of migratory waterfowl and to protect and restore sustainable habitat. The North American Waterfowl Management Plan has been updated several times, with the most recent update signed in 2018. Some of the goals of the 2018 update were to: 1) focus conservation actions on waterfowl habitat and population management objectives and incorporate social science into planning and program delivery, 2) help people understand the opportunities for outdoor recreation resulting from North American Waterfowl Management Plan activities and how society benefits from waterfowl habitat conservation, and 3) compel people to take action to conserve waterfowl habitat (North American Waterfowl Management Plan Committee 2018).

North American Waterbird Conservation Plan

The North American Waterbird Conservation Plan (NAWCP) provides a framework for the conservation and management of 210 species of waterbirds in 29 nations. The NAWCP names many threats to waterbird populations including the destruction of inland and coastal wetlands, the introduction of predators and invasive species, pollutants, mortality from fisheries and industries, disturbance, and conflicts arising from over-abundant species. The NAWCP also highlights important habitats of the southeast region including pelagic areas, marshes, forested wetlands, and barrier and sea island complexes.

United States Shorebird Conservation Plan

The United States Shorebird Conservation Plan is a partnership effort throughout the United States that works to ensure the protection and restoration of stable and self-sustaining populations of shorebird species. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country. It identifies conservation goals, critical habitat conservation needs, key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

1.3 PREPARATION OF AN EA INSTEAD OF AN EIS

One comment that WS often receives during the public involvement process associated with the development of an EA is that WS should have prepared an EIS instead of an EA or that proposed activities require the development of an EIS. As discussed in Section 1.2, the primary purpose for developing an EA is to determine if the alternative approaches developed to meet the need for action could potentially have significant individual and/or cumulative impacts on the quality of the human environment that would warrant the preparation of an EIS (see 40 CFR 1501.4, 40 CFR 1508.9(a)(3)). WS prepared this EA so that WS can make an informed decision on whether or not an EIS would be necessary if WS implemented the alternative approaches to meeting the need for action.

WS is preparing this EA to facilitate planning, promote interagency coordination, streamline program management, clearly communicate to the public the analysis of individual and cumulative impacts of proposed activities, and to evaluate and determine if there would be any potentially significant or cumulative effects from the alternative approaches developed to meet the need for action. The analyses contained in this EA are based on information derived from WS' Management Information System, available documents (see Appendix A), interagency consultations, and public involvement.

If WS makes a determination that implementation of a selected alternative approach would have a significant impact on the quality of the human environment based on this EA, WS would publish a Notice of Intent to prepare an EIS. This EA would be the foundation for developing that EIS in accordance with the 1978 NEPA implementing regulations of the CEQ (40 CFR 1508.9(a)(3)).

1.3.1 How WS will Evaluate Significant Impacts

The process for determining if a project or program may have significant impacts is based on the 1978 NEPA implementing regulations of the CEQ at 40 CFR 1508.27. Chapter 3 evaluates the direct, indirect, and cumulative impacts associated with the alternative approaches of meeting the need for action. The need for action involves the requests for assistance that WS receives to manage damage to agricultural resources, natural resources, and property caused by several bird species in the USVI. In addition, WS receives requests for assistance to reduce risks to human health and safety associated with bird species in the territory.

Most of the factors included in 40 CFR 1508.27(b) of the 1978 NEPA implementing regulations include the phrase "*the degree to which*" a particular type of resource might be adversely affected, not a determination of no adverse impact at all. Therefore, WS evaluates the impacts to resources and documents the predicted effects in this EA. WS will use those effect analyses to determine if the levels of impact are indeed "*significant*" impacts for which a Finding of No Significant Impact would not be appropriate; thus, requiring the need to prepare an EIS. If WS determines that the levels of impacts are not significant, WS will document the rationale for not preparing an EIS in a publicly available Decision and Finding of No Significant Impact in accordance with guidance from the CEQ. WS will review the impacts evaluated in Chapter 3 of this EA in two ways: the severity or magnitude of the impact on a resource and the context of the impact. For example, WS may consider the context of activities when the resource is rare, vulnerable, not resilient, or readily changed long-term with even a short-term stressor.

The factors identified in 40 CFR 1508.27 are not checklists, nor do they identify thresholds of impacts, but they are factors for consideration by the agency while making the decision regarding whether to prepare a Finding of No Significant Impact or preparing an EIS. WS will determine how to consider those factors in its decision on whether to prepare a Finding of No Significant Impact or an EIS. WS will determine the *degree* to which a factor applies or does not apply to the impacts documented in the EA. An outline of how WS will use this EA, and the criteria at 40 CFR 1508.27, to make the decision regarding whether a Finding of No Significant Impact or an EIS is appropriate occurs below (see Section 1.3.2 through Section 1.3.6).

1.3.2 Controversy Regarding Effects

The factor at 40 CFR 1508.27(b)(4) of the 1978 NEPA implementing regulations is described as "*the degree to which the effects on the quality of the human environment are likely to be highly controversial*." The failure of any particular organization or person to agree with every act of a federal agency does not create controversy regarding effects. Dissenting or oppositional public opinion, rather than concerns expressed by agencies with jurisdiction by law or expertise and/or substantial doubts raised about an agency's methodology and data, is not enough to make an action "*controversial*". This EA evaluates peer-reviewed and other appropriate available literature, reports, and data from agencies with jurisdiction by law to conduct the impact analyses and evaluate the potential for significant impacts. This EA also includes and evaluates differing professional opinions and recommendations expressed in publications where they exist and that are applicable to the informed decision-making of WS.

1.3.3 Unique or Unknown Risks

Another concern commonly expressed in comments involves the potential for unknown or unavailable information (40 CFR 1502.22) to potentially result in uncertain, unique, or unknown risks (40 CFR 1508.27(b)(5)), especially related to population numbers and trends and the extent and causes of mortality of wildlife species. Throughout the analyses in this EA, WS uses the best available data and information. For example, the EA uses data from the USFWS, which has jurisdiction by law to manage migratory bird populations in the United States. In addition, WS will use the scientific literature to make informed decisions.

Population and mortality data for many native wildlife species are typically nonexistent from any source, in or outside of the USVI. WS recognizes that estimating wildlife populations over large areas can be extremely difficult, labor intensive, and expensive. Instead, the USFWS and the DPNR may choose to monitor population health using other factors, such as indices of abundance and/or trend data to evaluate the status of populations that do not have direct population data. This EA uses the best available

information from wildlife management agencies, including the USFWS and the DPNR when available, and peer-reviewed literature to assess potential impacts to bird species.

If population estimates are available, then the analyses will use the lowest density or number estimates for wildlife species populations (where high and low population estimates are provided in the text) to arrive at the most conservative impact analysis. Coordination with the USFWS and the DPNR and providing the opportunity for agency review of and involvement in this EA ensure that analyses are as robust as possible. The analyses in this EA provide information to determine if the cumulative mortality from all known sources, including mortality that could occur by WS, would adversely affect target bird populations, and nontarget wildlife species.

1.3.4 Threatened or Endangered Species, Unique Geographic Areas, Cultural Resources, and Compliance with Environmental Laws

This EA also provides analyses and documentation related to threatened and endangered (T&E) species, areas with special designations, such as wilderness areas, cultural and historic resources, and compliance with other environmental laws, including territory laws. This will be used to address the significance criteria at 40 CFR 1508.27(b)(3), CFR 1508.27(b)(8), CFR 1508.27(b)(9), and CFR 1508.27(b)(10) in the 1978 NEPA implementing regulations.

Evaluation of those issues occurs in the following sections of this EA:

- Impacts to T&E species occurs in Section 3.2.2
- Impacts to unique geographic areas occurs in Section 2.1.2
- Impacts to cultural and historic resources occurs in Section 2.1.2
- Compliance with other environmental laws occurs in Sections 1.4.6

1.3.5 Cumulatively Significant Impacts

Another common comment involves the criterion for the analysis of "*cumulatively significant impacts*" (40 CFR 1508.27(b)(7)), which this EA considers in various ways. Cumulative impacts, as defined by the 1978 NEPA implementing regulations of the CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time. Cumulative impacts could potentially occur from either damage management activities over time by WS or from the aggregate effects of those activities combined with the activities of other agencies and private entities. Many of the issues identified in Section 2.1.1 and evaluated in detail in Section 3.2 are inherently cumulative impact analyses. For example:

- Impacts to target bird populations would evaluate known sources of mortality, only one of which could be removal by WS
- Impacts to wildlife species listed as threatened or endangered pursuant to the Endangered Species Act (ESA), as these species' populations are already cumulatively impacted by many sources of mortality, loss of habitat, climate change, and other stressors, causing them to be listed

The underlying intent for preparing an EA is to determine if a proposed action might have a significant impact on the human environment. The EA development process is issue driven, meaning issues that were raised during the interdisciplinary process and through public involvement that were substantive, would be used to drive the analysis and determine the significance of the environmental impacts of the

alternatives. Therefore, the level of site specificity must be appropriate to the issues. The issues raised during the scoping process of this EA drove the analysis. As discussed previously, one EA analyzing impacts for the entire territory would provide a more comprehensive and less redundant analysis that allows for a better cumulative impact analysis. If WS determined through this EA that the alternative approaches developed to meet the need for action could result in a significant impact on the quality of the human environment, then an EIS would be prepared.

1.3.6 Public and Employee Health and Safety

The concern regarding public health and safety (significance criterion at 40 CFR 1508.27(b)(2) of the 1978 NEPA implementing regulations) is evaluated in several analyses in this EA. For example:

- The deposition of lead into the environment from ammunition used in firearms occurs in Section 2.1.2
- The risk of injury to the public from methods available to alleviate bird damage occurs in Section 3.2.3
- The risk of injury to WS' employees occurs in Section 3.2.3

1.4 NEED FOR ACTION

As discussed in Section 1.2, when people seek assistance with managing bird damage, they may seek assistance from WS. Therefore, the need for action to manage damage and threats associated with birds in the USVI arises from requests for assistance[3] that WS could receive to reduce and prevent damage from occurring. WS has identified those bird species most likely to be responsible for causing damage in the USVI based on previous requests for assistance and assessments of the threat of bird strike hazards at airports in the territory (see Section 1.2). Birds can cause damage to agricultural resources, natural resources, property, and pose threats to human safety.

Table 1.1 and Appendix D show the bird species associated with requests for assistance that WS could receive and the resource types those bird species could damage in the USVI. Most requests for assistance that WS receives are associated with aircraft strike hazards at airports. For example, all of those bird species listed in Table 1.1 and Appendix D could pose a threat to aircraft when those bird species occur at or near air facilities. Bird strikes can cause substantial damage to aircraft, which can require costly repairs. In addition, bird strikes can lead to the catastrophic failure of aircraft, which can pose a threat to the safety of people.

Table 1.1 – Primary bird species that WS could address and the resource types damaged

	Resource*					Resource			
Species	**A**	**N**	**P**	**H**	**Species**	**A**	**N**	**P**	**H**
Common ground dove			X	X	**Laughing gull**	X	X	X	X
Rock pigeon	X	X	X	X	**House sparrow**	X	X	X	X
Zenaida dove			X	X	**Pearly-eyed thrasher**	X	X	X	X
Cattle egret	X	X	X	X	**Gray kingbird**			X	X
Killdeer			X	X	**Red junglefowl**		X	X	X
Barn swallow			X	X					

*A=Agriculture, N =Natural Resources, P=Property, H=Human Safety

[3]WS would only conduct bird damage management after receiving a request for assistance. Before initiating bird damage activities, WS and the entity requesting assistance must sign a Memorandum of Understanding, work initiation document, or another comparable document that lists all the methods the property owner or manager would allow WS to use on property they own and/or manage.

WS also receives requests for assistance to manage damage to many other resources. For example, WS could provide assistance with projects to reduce damage to structures from bird droppings or nesting materials. Damage could also occur to agricultural resources, primarily from birds that consume livestock feed, feed on livestock, or pose disease risks to livestock. Similarly, threats to natural resources would primarily be associated with birds preying upon threatened or endangered species or competing with other wildlife species for resources.

Some of the species addressed in this EA are gregarious (*i.e.*, form large flocks), especially during the fall and spring migration periods or during the breeding season. Although damage and threats can occur throughout the year, damage or the threat of damage is often highest during those periods when birds are concentrated into large flocks, such as migration periods, and during winter months when food sources are limited. For some bird species, high concentrations of birds occur during the breeding season where suitable nesting habitat exists. The flocking behavior of many bird species during migration periods and during the breeding season can pose increased risks when those species occur near or on airport properties. When an aircraft strikes multiple birds, damage to the aircraft can occur, and there is an increased risk of catastrophic failure of the aircraft, especially if multiple birds are ingested into aircraft engines. The following subsections of the EA provide additional information regarding the need to manage bird damage.

1.4.1 Need to Resolve Bird Damage to Agricultural Resources

Agriculture is an important industry in the USVI. During 2018, the National Agricultural Statistics Service (NASS) reported 9,324 acres were devoted to agricultural production in the USVI with a market value of agricultural products sold estimated over $3.3 million (NASS 2020). The top three farm commodities for sales were vegetables; nursery crops (including ornamental plants); and fruits and nuts (NASS 2020). The cattle and calf inventory in the territory in 2018 was 1,332 individuals, with over $100,000 in sales (NASS 2020). There were also over 10,000 poultry in the territory during 2018, with over $145,000 in sales between poultry and eggs (NASS 2020).

The combined production value of field and forage crops, vegetables, and fruits and nuts grown in the USVI accounted for over $1.8 million (NASS 2020). Some of the crops, vegetables, fruits, and nuts with the most pounds harvested include sweet potatoes; sugarcane; Cassava (tapioca); cucumbers; eggplants; lettuce; okra; peppers; squash; tomatoes; herbs; avocados; bananas; coconuts; mangoes; papayas; plantains; other vegetables; and other fruits, nuts, and tree crops.

As shown in Table 1.1 and Appendix D, many of the bird species addressed in this EA can cause damage to or pose threats to agricultural resources in the territory. Damage and threats of damage to agricultural resources are often associated with bird species that exhibit flocking behaviors (*e.g.*, starlings) or colonial nesting behavior (*e.g.*, rock pigeons). Damage occurs through direct consumption of agricultural resources, the contamination of resources from fecal droppings, or the threat of disease transmission to livestock from contact with fecal matter.

Damage to Aquaculture Resources

Aquaculture is a small industry in the USVI, with only four operating facilities according to the most recent NASS report (NASS 2020). However, birds can cause damage to aquaculture resources in several ways. Damage to aquaculture resources occurs primarily from the economic losses associated with birds consuming fish and other commercially raised aquatic organisms. Damage can also result from the death of fish and other aquatic wildlife from injuries associated with bird predation. Many of the birds addressed in this EA are known to consume fish, including herons, egrets, ospreys (*Pandion haliaetus*), and to a lesser extent waterfowl, red-tailed hawks (*Buteo jamaicensis*), gulls, and kingfishers (Parkhurst et

al. 1987). Also of concern at aquaculture facilities is the transmission of pathogens by birds between impoundments and from facility to facility as birds move between sites. Given the confinement of aquatic organisms inside impoundments at aquaculture facilities and the high densities of those organisms in impoundments, the introduction of a disease could result in substantial economic losses. Although actual transmission of pathogens by birds is difficult to document, they have the potential to spread diseases through fecal droppings and through other mechanical means such as on feathers, feet, and regurgitation.

Damage and Threats to Livestock Operations

Damage to livestock operations can be caused by several bird species in the USVI. Economic damage can occur from birds feeding on livestock feed, livestock, and from the increased risks of pathogen transmission associated with large concentrations of birds. Birds also defecate while feeding, increasing the possibility of pathogen transmission if livestock directly contact or consume fecal droppings. Birds can also cause damage by defecating on fences, shade canopies, and other structures, which can accelerate corrosion of metal components and can be esthetically displeasing. Large concentrations of birds at livestock feeding operations can also pose potential health hazards to feedlot/dairy operators and their personnel through direct contact with fecal droppings or when droppings create unsafe working conditions.

Although damage and disease threats to livestock operations can occur throughout the year, damage can be highest during those periods when birds are concentrated into large flocks, such as during migration periods and during winter months when food sources are limited. For some bird species, such as barn swallows, high concentrations of birds can occur during the breeding season where suitable nesting habitat exists. Of primary concern to livestock feedlots and dairies in the USVI are European starlings (*Sturnus vulgaris*), house sparrows, rock pigeons, shiny cowbirds (*Molothrus bonariensis*), and to a lesser extent barn swallows. The flocking behavior of those species either from roosting and/or nesting behavior can lead to economic losses to agricultural producers from the consumption of livestock feed and from the increased risks associated with the transmission of pathogens from fecal matter being deposited in feeding areas and in water used by livestock.

Economic damages associated with starlings feeding on livestock rations has been documented in France and Great Britain (Feare 1984), and in the United States (Besser et al. 1968, Dolbeer et al. 1978, Glahn and Otis 1981, Glahn 1983, Glahn and Otis 1986). Diet rations for cattle contain all of the nutrients and fiber that cattle need and are thoroughly mixed to prevent cattle from selecting any single component over others. Livestock feed and rations are often formulated to ensure proper health of the animal. Higher fiber roughage in livestock feed is often supplemented with corn, barley, and other grains to ensure weight gain and in the case of dairies, for dairy cattle to produce milk. Livestock are unable to select for certain ingredients in livestock feed while birds often can selectively choose to feed on the corn, barley, and other grains formulated in livestock feed. Livestock feed provided in open troughs is most vulnerable to feeding by birds. Birds often select for those components of feed that are most beneficial to the desired outcome of livestock. When large flocks of birds selectively forage for components in livestock feeds, the composition and the energy value of the feed can be altered, which can negatively affect the health and production of livestock. The removal of this high-energy source by European starlings may reduce milk yields and weight gains, which can be economically critical (Feare 1984, Carlson et al. 2018*a*, Carlson et al. 2018*b*). Glahn and Otis (1986) reported that starling damage was also associated with proximity to roosts, temperatures, and the number of livestock on feed.

Besser et al. (1968) reported the value of losses in feedlots to starlings near Denver, Colorado was $84 per 1,000 starlings during the winter in 1967. Forbes (1990) reported European starlings consumed up to 50% of their body weight in feed each day. Glahn and Otis (1981) reported losses of 4.8 kg of pelletized

feed consumed per 1,000 bird minutes. Glahn (1983) reported that 25.8% of farms in Tennessee experienced starling depredation problems of which 6.3% experienced considerable economic loss. Depenbusch et al. (2011) estimated that feed consumption by European starlings increased the daily production cost by $0.92 per animal.

Damage and threats to livestock operations can also occur from the risk of or actual transmission of pathogens from birds to livestock. Although birds may be carriers (vectors) of diseases that are transmissible to livestock, the rate that transmission occurs is unknown but is likely to be low. Identifying a specific source of transmission can be difficult. Birds are known to be vectors of pathogens, which increases the threat of transmission when large numbers of birds defecate on surfaces and areas used by livestock. Agricultural areas provide ideal habitat for many bird species, which can attract a large number of birds to those locations. Large concentrations of birds feeding, roosting, or loafing in those areas increases the possibility of and the concern over the transmission of diseases from birds to livestock. This concern can have far-reaching implications (Daniels et al. 2003, Fraser and Fraser 2010, Miller et al. 2013). Birds feeding alongside livestock in open livestock feeding areas or feeding on stored livestock feed can leave fecal deposits, which can be consumed by livestock. Fecal matter can also be deposited in sources of water for livestock, which if consumed could result in pathogen transmission. Many bird species, especially those encountered at livestock operations, are known to carry pathogens that can be excreted in fecal matter and pose not only a risk to individual livestock operations, but can be a source of transmission to other livestock operations as birds move from one area to another.

A number of pathogens that affect livestock have been associated with rock pigeons, European starlings, and house sparrows (Weber 1979, Carlson et al. 2010, Carlson et al. 2011*a*). Pigeons, starlings, and house sparrows can be carriers of the pathogens that cause erysipeloid, salmonellosis, pasteurellosis, avian tuberculosis, streptococcosis, vibrosis, and listeriosis (Weber 1979, Gough and Beyer 1981). Weber (1979) also reported pigeons, starlings, and house sparrows as carriers of several viral, fungal, protozoal, and rickettsial diseases that can infect livestock and pets. Numerous studies have focused on starlings and the transmission of *Escherichia coli* (LeJeune et al. 2008, Gaukler et al. 2009, Cernicchiaro et al. 2012). LeJeune et al. (2008) found that starlings could play a role in the transmission of *E. coli* between dairy farms. Carlson et al. (2010) found *Salmonella enterica* in the gastrointestinal tract of starlings at cattle feedlots in Texas and suggested starlings could contribute to the contamination of cattle feed and water. *Salmonella* contamination levels can be directly related to the number of European starlings present at a feedlot (Carlson et al. 2010, Carlson et al. 2011*b*, Carlson et al. 2012). Poultry operations can be highly susceptible to pathogens, such as *Salmonella* spp., campylobacter, and clostridium, carried by wild birds, such as European starlings and house sparrows (Craven et al. 2000).

Contamination of livestock facilities through fecal accumulation by various bird species has been identified as an important concern. Numerous pathogens are transmitted through feces, with *Salmonella* spp. and *E. coli* being two pathogens of concern. Salmonellosis is caused by infection with *Salmonella* bacteria and numerous bird species have been documented as reservoirs for these bacteria (Friend and Franson 1999, Tizard 2004). *E. coli* is a fecal coliform bacteria associated with the fecal material of warm-blooded animals. Multiple studies have found that birds can be an important source of *E. coli* contamination of both land and water sources (Fallacara et al. 2001, Kullas et al. 2002, Hansen et al. 2009, Silva et al. 2009, Franklin et al. 2020). Multiple species can carrying pathogenic strains of *E. coli*, including gulls, pigeons, and starlings (Pedersen and Clark 2007). European starlings can harbor various strains of *E. coli* (Gaukler et al. 2009), including O157:H7, a strain that has been documented as the cause of human mortality (LeJeune et al. 2008, Cernicchiaro et al. 2012).

Salmonella transmission by gulls to livestock can also be a concern (Williams et al. 1977, Johnston et al. 1979, Coulson et al. 1983). Williams et al. (1977) and Johnston et al. (1979) reported that gulls can transmit *Salmonella* spp. to livestock through droppings and contaminated drinking water. Pedersen and

Clark (2007) did an extensive review of the literature and found gulls, pigeons, house sparrows, cowbirds, and starlings have the potential to play a role in the direct transmission of *E. coli* and *S. enterica* among cattle at feedlots and dairies and from livestock operation to livestock operation. Migratory birds are capable of spreading pathogens over a larger area, and domestic livestock might serve as reservoirs within farm operations. The birds also cause damage by defecating on fences, shade canopies, and other structures, which can accelerate corrosion of metal components and can be esthetically displeasing. Large concentrations of birds at livestock feeding operations can also pose potential health hazards to feedlot/dairy operators and their personnel through directly contacting fecal droppings or by droppings creating unsafe working conditions.

Although it is difficult to document, there is a strong association of wild birds and the contamination of food and water sources at livestock facilities. The potential for introduction of *E. coli* or *Salmonella* spp. to a livestock operation or the transmission of these pathogens between sites by wild birds is a strong possibility (Pedersen and Clark 2007).

Starlings, gulls, and other species can transfer pathogens that are specific to certain livestock, such as transmittable gastroenteritis (Faulkner 1966, Gough et al. 1979). Many bird species that use barn areas, pastures, manure pits, or carcass disposal areas can directly or indirectly contract a pathogen and transfer it to another farm or to healthy animals at the same farm. In some cases, if carcasses were not disposed of correctly, then scavenging birds could infect healthy animals through droppings or by the transfer of disease carrying particles on their bodies. Due to the ability of those bird species to move large distances and from one facility to another, farm-to-farm transmission can be an important concern.

Waterfowl can also be a concern to livestock producers because the fecal droppings of waterfowl can carry pathogens that can cause diseases in livestock. Fraser and Fraser (2010) provided a literature review of disease pathogens of concern to livestock from Canada geese and other waterfowl. This review highlighted several bacterial, viral, and fungal diseases, and parasites that can infect livestock, including swine, cattle, and poultry. However, Fraser and Fraser (2010) pointed out that due to a lack of data, they could not perform an evidence-based risk assessment on the health risks to humans or livestock from free ranging waterfowl. Livestock producers may have concerns that waterfowl droppings in and around ponds that provide drinking water for livestock could affect water quality and could be a source of several different types of pathogens. For example, *Salmonella* spp. can cause shedding of the intestinal lining and severe diarrhea in cattle. If undetected and untreated, salmonellosis can kill cattle and calves. In addition, the contamination of feed by waterfowl through droppings in pastures, crops, or harvested grasses is also a possible method of pathogen transmission to livestock (*e.g.*, see Fraser and Fraser 2010).

Another disease often associated with waterfowl is avian influenza. Avian influenza is a viral disease caused by various strains of avian influenza viruses. Avian influenza viruses (AIV) occur naturally among many bird species throughout the world. Wild and domestic waterfowl, as well as a variety of other bird species, can be reservoirs for a variety of avian influenza viruses (Davidson and Nettles 1997, Alexander 2000, Stallknecht 2003, Brown et al. 2006, Keawcharoen et al. 2008, Pedersen et al. 2010, United States Geological Survey (USGS) 2020*a*). Scientists often categorize the different types of AIVs as either a low pathogenic AIV or a highly pathogenic AIV, which refers to the viruses ability to produce disease (Centers for Disease Control and Prevention 2017, USGS 2020*a*).

Most of the avian influenza viruses that circulate naturally in wild birds are low pathogenic avian influenza viruses. Typically, the low pathogenic avian influenza viruses circulate among wild birds without clinical signs, and is not an important mortality factor in wild birds (Davidson and Nettles 1997, Clark and Hall 2006, Centers for Disease Control and Prevention 2017, USGS 2020*a*). However, highly pathogenic avian influenza viruses can cause severe disease and high mortality in birds, especially in domestic poultry and domestic waterfowl (Nettles et al. 1985, Clark 2003, Gauthier-Clerc et al. 2007,

Pedersen et al. 2010, Centers for Disease Control and Prevention 2017, USGS 2020*a*). The potential for AIV to produce devastating disease in domestic poultry makes its occurrence in waterfowl an important issue (Davidson and Nettles 1997, Hahn and Clark 2002, Clark and Hall 2006, Gauthier-Clerc et al. 2007). The potential impacts of a severe outbreak of highly pathogenic avian influenza in domestic poultry could cripple the industry through losses in trade, consumer confidence, and eradication efforts (Pedersen et al. 2010).

Another viral disease that is often associated with wild birds and can be a concern to the poultry industry is Newcastle disease. More than 230 species of birds may be susceptible to natural or experimental infections with the viruses that cause Newcastle disease, but in most cases were asymptomatic. In wild birds, the effects appear to vary depending on the species of bird and the virulence of the particular strain of viruses that causes Newcastle disease. Newcastle disease can cause high rates of mortality in some bird populations, such as double-crested cormorants (*Phalacrocorax auritus*), but often show little effect on other species (Glaser et al. 1999), although poultry have been found to be highly susceptible (Docherty and Friend 1999, Alexander and Senne 2008). Other species, such as pigeons, may carry avian paramyxoviruses, which may pose a risk of transmission because of their close association with livestock (Kommers et al. 2001).

Economic losses can also result from raptors, particularly red-tailed hawks, feeding on domestic fowl, such as chickens and waterfowl (Washburn 2016). Free-ranging fowl or fowl allowed to range outside of confinement are particularly vulnerable to predation by raptors.

Damage to Agricultural Crops

Besser (1985) estimated damage to agricultural crops associated with birds exceeded $100 million annually in the United States. Bird damage to agricultural crops occurs primarily from the consumption of crops (*i.e.*, loss of the crop and revenue), but also consists of trampling of emerging crops and compaction of soil by waterfowl, consumption of cover crops used to prevent erosion and condition soil, damage to fruits associated with feeding, and fecal contamination. WS has not received requests to alleviate damage to crops from birds in the past. However, several bird species found in the USVI can cause damage to agricultural crops. Thus, it is likely WS could receive requests for assistance in the future. Because the average farm size is relatively small at 16.5 acres (NASS 2020), any damage could be result in substantial losses to the landowner or manager. Damage to agricultural crops in the USVI would likely occur from starlings, sparrows, cowbirds, and pigeons.

Several studies have shown that European starlings and house sparrows can pose an economic threat to agricultural producers (Besser et al. 1968, Dolbeer et al. 1978, Feare 1984). Pimentel et al. (2000, 2005) estimated starlings damage $800 million worth of agricultural resources per year. Starlings and sparrows can have a detrimental impact on agricultural food production by feeding at vineyards, orchards, gardens, crops, and feedlots (Weber 1979). Starlings were found to damage ripening corn (Homan et al. 2017) and are known to feed on the green, milk, and dough stage kernels of sorghum (Weber 1979). Additionally, starlings may pull sprouting grains, especially winter wheat, and feed on planted seed (Homan et al. 2017). Sparrows damage crops by pecking seeds, seedlings, buds, flowers, vegetables, and maturing fruits, and localized damage can be considerable because sparrows often feed in large flocks within a small area (Fitzwater 1994).

Bird damage to sweet corn can also result in economic losses to producers. Damage to sweet corn caused by birds can make the ear of corn unmarketable because the damage is unsightly to the consumer (Besser 1985). Damage occurs when birds rip or pull back the husk exposing the ear for consumption. Most bird damage occurs during the development stage known as the milk and dough stage when the kernels are soft and filled with a milky liquid. Birds will puncture the kernel to ingest the contents. Once punctured,

the area of the ear damaged often discolors and is susceptible to disease introduction into the ear (Besser 1985). Damage usually begins at the tip of the ear as the husk is ripped and pulled back but can occur anywhere on the ear (Besser 1985). Damage can also occur to sprouting corn as birds pull out the sprout or dig the sprout up to feed on the seed kernel (Besser 1985).

The most common waterfowl damage to agriculture is crop consumption, but also consists of unacceptable accumulations of feces on pastures, trampling of emerging crops, and increased erosion and runoff from fields where the cover crop has been grazed. Waterfowl can graze on a variety of crops, including wheat, corn, and rice (Cummings 2016). Associated costs with agricultural damage involving waterfowl include costs to replant grazed crops, implementing wildlife damage management practices, purchasing replacement food sources, and decreased yields.

1.4.2 Need to Resolve Threats that Birds Pose to Human Safety

Several bird species listed in Table 1.1 and Appendix D, such as waterfowl, swallows, starlings, sparrows, and cowbirds, can be closely associated with people and often exhibit gregarious roosting or flocking behavior (*i.e.*, found together in large numbers). The close association of those bird species with people can pose threats to human safety from pathogen transmission and increased risk of aircraft striking birds. In addition, excessive droppings can be esthetically displeasing, accumulations of nesting material can pose a fire risk in buildings and on electrical transmission structures, and aggressive behavior of certain species can pose risks to human safety.

Threat of Disease Transmission

Birds can play a role in the transmission of zoonotic diseases (*i.e.*, diseases that animals can transmit to people) (Conover 2002). However, few studies are available on the occurrence of zoonotic diseases in wild birds or the risks to people or domestic animals from transmission of those diseases (Clark and McLean 2003). Complicating the study of disease threats is the fact that people can contract some disease-causing agents associated with birds from other sources. Although many people are concerned about disease transmission from birds, the probability of contracting a disease indirectly (when no physical contact occurs) is likely to be low. However, direct contact with birds, nesting material, fecal droppings, or the inhalation of fecal particles from accumulations of droppings increases the likelihood of disease transmission.

Accumulations of fecal droppings can pose a threat to human health and safety due to the potential for pathogen transmission. Accumulations of bird droppings in public areas are not only esthetically displeasing, but are often in areas where people may come in direct contact with them. Fecal droppings in and around water resources can affect water quality and can be a source of a number of different types of pathogens and contaminants. Waterbird excrement can contain coliform bacteria, streptococcus bacteria, *Salmonella*, toxic chemicals, and nutrients, which can compromise water quality, depending on the number of birds, the amount of excrement, and the size of the water body. Elevated contaminant levels associated with breeding and/or roosting concentrations of birds and their potential effects on water supplies can be concerning.

Birds may also play a role in the transmission of encephalitis, West Nile virus, psittacosis, and histoplasmosis. Birds may play a direct and indirect role in transmission of *E. coli* and *S. enterica* to people through contact with infected livestock feces, watering troughs, and agriculture fields fertilized with manure slurries (Pedersen and Clark 2007). For example, as many as 65 different diseases transmittable to people or domestic animals have been associated with rock pigeons, European starlings, and house sparrows (Weber 1979). Public health officials and residents at such sites express concerns for human health related to the potential for disease transmission where fecal droppings accumulate. Fecal

droppings that accumulate from large communal bird roosts can facilitate the growth of disease organisms, which grow in soils enriched by bird excrement, such as the fungus *Histoplasma capsulatum*, which causes the disease histoplasmosis in people (Weeks and Stickley 1984).

In the USVI, cowbirds and starlings can form large communal roosts of the kind associated with disease organisms, such as *H. capsulatum* (Weeks and Stickley 1984). The disturbance of soil or fecal droppings under bird roosts where fecal droppings have accumulated can cause *H. capsulatum* to become airborne. Once airborne, the fungus can be inhaled by people in the area. For example, two siblings contracted pneumonia in Arkansas during 2011, and additional family members suffered from respiratory disease, after burning bamboo that was harvested from a red-winged blackbird (*Agelaius phoeniceus*) roost (Haselow et al. 2014). *H. capsulatum* remains in the soil and can be contracted several years after a roost is abandoned (Clark and McLean 2003). In most cases in which human health concerns are a major reason for requesting assistance, no actual cases of bird transmission of disease to humans have been proven to occur. Thus, it is the risk of disease transmission that is the primary reason for those persons to request assistance from WS.

Salmonella spp. may be contracted by people in many ways; however, contaminated foods are the primary source for infection (Friend and Franson 1999). Several types of the *Salmonella* bacteria are carried by wild birds with varying degrees of impact on people and livestock. Friend and Franson (1999) reported relative rates of detection of *Salmonella* spp. in free ranging birds. *Salmonella* spp. isolates were frequent in songbirds, common in doves and pigeons, and occasionally in starlings and cowbirds (Friend and Franson 1999). *Salmonella* causes gastrointestinal illness, including diarrhea in humans. When gulls feed and loaf near fast food restaurants and picnic facilities, deposit waste from landfills in urban areas and drinking water reservoirs, and contaminate industrial facility ventilation systems with feathers, nesting debris, and droppings, there are public health concerns.

As discussed in Section 1.2.1, birds can be a reservoir for a variety of AIVs (Davidson and Nettles 1997, Alexander 2000, Stallknecht 2003, Pedersen et al. 2010). While AIVs are restricted to birds, on extremely rare occasion, a few, including a highly pathogenic H5N1 strain, can be transmitted to people, and have sometimes resulted in death (Koopmans et al. 2004, Tweed et al. 2004, Gauthier-Clerc et al. 2007, Peiris et al. 2007). A pandemic outbreak of avian influenza could have impacts on human health and economies (World Health Organization 2005, Peiris et al. 2007).

While transmission of diseases or parasites from birds to people has not been well documented, the potential exists (Luechtefeld et al. 1980, Wobeser and Brand 1982, Hill and Grimes 1984, Pacha et al. 1988, Hatch 1996, Saltoun et al. 2000, Kassa et al. 2001). In some cases, infections may even be life threatening for people with suppressed or compromised immune systems (Roffe 1987, Graczyk et al. 1998). Even though many people are concerned about disease transmission from feces, the probability of contracting a disease from feces is believed to be small. However, human exposure to fecal droppings through direct or indirect contact is a possibility. Several of the bird species addressed in this EA are closely associated with the activities of people and they often exhibit gregarious roosting and nesting behavior. Accumulations of bird droppings in public areas are esthetically displeasing and are often in areas where people may come in direct contact with fecal droppings. In most cases in which human health concerns are a major reason for requesting assistance, no actual cases of bird transmission of disease to humans have been proven to occur. Thus, the risk of disease transmission would be the primary reason people request assistance. WS recognizes and defers to the authority and expertise of local and territory health officials in determining what does or does not constitute a threat to public health.

Threat to Human Safety associated with Aircraft Striking Birds at Airports and Military Bases

In addition to potentially transmitting zoonotic diseases, birds also pose a threat to human safety related to aircraft. Bird strikes can cause catastrophic failure of aircraft systems (*e.g.*, ingesting birds into engines), which can cause the plane to become uncontrollable leading to crashes. The civil and military aviation communities have acknowledged that the threat to human safety from aircraft collisions with wildlife is increasing (Dolbeer 2000, MacKinnon et al. 2004). Although wildlife-aircraft strikes do not often cause injury or loss of human life, they result in expensive repairs, flight delays, or aborted aircraft movements.

While bird strikes that result in human fatalities are rare, the consequences can be catastrophic. The worst strike on record for loss of human lives in the United States occurred in Massachusetts during 1960 when 62 people were killed in the crash of an airliner that collided with a flock of European starlings (Dolbeer and Wright 2008). In 1995, 24 individuals were killed when a military aircraft struck a flock of Canada geese at Elmendorf, Alaska and crashed (Smith et al. 1999). A recent example occurred in Oklahoma where an aircraft struck American white pelicans (*Pelecanus erythrorhynchos*) causing the plane to crash killing all five people aboard (Dove et al. 2009). Between 1990 and 2018, 32 human fatalities have occurred after aircraft struck birds in the United States (Dolbeer et al. 2019). Of those 32 fatalities, eight occurred after striking birds that were not identified, eight occurred after strikes involving red-tailed hawks, and one fatality each occurred from striking turkey vultures (*Cathartes aura*) and brown pelicans (*Pelecanus occidentalis*) (Dolbeer et al. 2019). Since 1988, wildlife strikes have killed more than 282 people and destroyed over 263 aircraft globally (Dolbeer et al. 2019).

Injuries can also occur to pilots and passengers from bird strikes. Between 1990 and 2018, 222 bird strikes involving civil aircraft have caused injuries to 288 people in the United States, including strikes with vultures, waterfowl, gulls, raptors, pigeons, doves, and eagles (Dolbeer et al. 2019). Between 1990 and 2018, 55 strikes involving waterfowl have resulted in injuries to 63 people (Dolbeer et al. 2019).

Additional Human Safety Concerns Associated with Birds

As people are increasingly living with wildlife, the lack of hazing and threatening behavior by people toward many species of wildlife, especially around urban areas, has led to a decline in the fear wildlife have toward people. When wildlife species begin to habituate to the presence of people and human activity, a loss of apprehension can occur, which can lead those species to exhibit threatening or abnormal behavior toward people. This behavior continues to increase as human populations expand and the populations of those species that adapt to human activity increase. Threatening behavior can occur in the form of aggressive posturing, a general lack of apprehension toward people, or abnormal behavior. Although birds attacking people occurs rarely, aggressive behavior by birds does occur, especially during nest building and the rearing of eggs and chicks. Some species of waterfowl aggressively defend their nests, nesting areas, and young, and may attack or threaten pets, children, and adults (*e.g.*, see Smith et al. 1999, USDA 2016). This can be a threat because feral waterfowl often nest in high densities in areas used by people for recreational purposes, such as parks, beaches, and sports fields (*e.g.*, see Figley and VanDruff 1982, VerCauteren and Marks 2004). If people unknowingly approach waterfowl or their nests at those locations, injuries could occur if waterfowl react aggressively to the presence of those people or pets. Additionally, the buildup of feces from waterfowl on docks, walkways, and other areas of foot traffic can create slipping hazards. If fecal droppings occur in areas with foot traffic, slipping could occur resulting in injuries to people. To avoid those conditions, regular cleanup is often required to alleviate threats of slipping on fecal matter, which can be economically burdensome.

Raptors can aggressively defend their nests, nesting areas, and young, and may swoop and strike at pets, children, and adults. In addition to raptors, waterfowl can aggressively defend their nests, nesting areas, and young, and may attack or threaten pets, children, and adults.

1.4.3 Need to Resolve Bird Damage Occurring to Property

As shown in Table 1.1 and Appendix D, all of the bird species addressed in this EA can cause damage to property in the USVI. Property damage can occur in a variety of ways and can result in costly repairs and clean-up. Bird damage to property can occur through direct damage to structures, through roosting behavior, and through their nesting activities. One example of direct damage to property occurs when accumulations of fecal droppings cause damage to buildings and statues. Aircraft strikes involving birds can also cause substantial damage that requires costly repairs and aircraft downtime.

Property Damage to Aircraft from Bird Strikes

Collisions between aircraft and wildlife are a concern throughout the world because wildlife strikes threaten passenger safety (Thorpe 1996), result in lost revenue, and repairs to aircraft can be costly (Linnell et al. 1996, Robinson 1996). Aircraft collisions with wildlife can also erode public confidence in the air transportation industry as a whole (Conover et al. 1995). Wildlife strikes pose increasing risks and economic losses to the aviation industry worldwide. Annual economic losses from wildlife strikes with civil aircraft are conservatively estimated to exceed $1.2 billion worldwide (Allan 2000). Direct costs include damage to aircraft, aircraft downtime, and medical expenses of injured personnel and passengers. Indirect costs can include lost revenue from the flight, cost of housing delayed passengers, rescheduling aircraft, and flight cancellations.

Dolbeer et al. (2019) estimated that the actual annual costs to the United States civil aviation industry from wildlife strikes to be over 95,950 hours of aircraft downtime and $92 million in losses. From 1990 to 2018, Federal Aviation Administration (FAA) records indicate total reported losses from bird strikes cost the civil aviation industry over $742 million in monetary losses and 758,617 hours of aircraft downtime (Dolbeer et al. 2019). Because reporting rates of aircraft strikes have been historically low, these figures likely underestimate total damage caused by bird strikes. In fact, civil wildlife strike reporting rates have been estimated to be as low as 20% (Linnell et al. 1999, Wright and Dolbeer 2005). Reporting rates are increasing, as Dolbeer et al. (2016) estimated that nearly 91% of civil wildlife strikes are currently reported. However, not all reports provide notation as to whether or not there was damage and some strike reports to the FAA that indicate there was an adverse impact on the aircraft from the strike do not include a monetary estimate of the damage caused. Additionally, most reports indicating damage to aircraft report direct damages and do not include indirect damage, such as lost revenue, cost of putting passengers in hotels, rescheduling aircraft, and flight cancellations. Thus, actual monetary losses from bird strikes are likely much higher than estimated losses.

Birds can present a safety threat to aviation when those species occur in areas on and around airports. Species of birds that occur in large flocks or flight lines entering or exiting a roost at or near airports or when present in large flocks foraging on airport property can result in aircraft strikes involving several individuals of a bird species, which can increase damage and increase the risks of catastrophic failure of the aircraft. A high percentage of bird strikes occur during peak migration periods, but dangerous situations can develop during any season. Aircraft are most vulnerable to bird strikes while at low altitudes, generally related to landing and take-off. From 1990 through 2018, approximately 71% of reported bird strikes to general aviation aircraft in the United States occurred when the aircraft was at an altitude of 500 feet above ground level or less. Additionally, approximately 92% occurred at less than 3,500 feet above ground level (Dolbeer et al. 2019).

From 2015 through 2019, the FAA (2020) had 100 reports of aircraft striking wildlife in the USVI, all of which involved birds. Of the 100 aircraft strikes involving birds, the bird species involved was unidentified in 29 strikes. Aircraft in the USVI have struck at least 18 bird species, with barn swallows,

cattle egrets, gray kingbirds, house sparrows, killdeer, laughing gulls, peregrine falcons (*Falco peregrinus*), and zenaida doves among the species most frequently struck (FAA 2020).

DeVault et al. (2011) concluded that various duck species, double-crested cormorants, brown pelicans, ospreys, great blue herons, herring gulls (*Larus argentatus*), great egrets (*Ardea alba*), and red-tailed hawks were among the top twenty most hazardous birds to aircraft. The hazards were based upon the number of strikes involving those birds, the amount of damage to aircraft, the effect on the flight after the strike, and the body mass the bird (DeVault et al. 2011). Raptors present a risk to aircraft because of their large body mass and slow-flying or soaring behavior. Of the total known birds struck in the United States from 1990 through 2018, raptors accounted for 13% of reported strikes and 22% of the damage (Dolbeer et al. 2019). Aircraft have struck numerous raptors in the USVI from 2015 through 2019, including American kestrels, merlin, peregrine falcons, and red-tailed hawks (FAA 2020).

Dolbeer et al. (2019) found the most common bird species involved in strikes reported to the FAA (when identification of the bird species occurred) from 1990 to 2018 were pigeons/doves (14%), followed by raptors (13%), gulls (10%), shorebirds (9%), and waterfowl (5%). Waterfowl and gulls accounted for 28% and 19% of the damage occurring in which the bird species was identified, respectively (Dolbeer et al. 2019). Dolbeer et al. (2015) reported that 25% of the reported gull strikes resulted in damage to the aircraft or had a negative effect on the flight while 62% of the reported waterfowl strikes resulted in damage or negative effects on the flight compared to 40% of strikes involving raptors/vultures and 9% of strikes involving pigeons and doves. Since 1990, more than $261 million in damage and economic losses to civil aircraft have been reported from strikes involving waterfowl (Dolbeer et al. 2019). Aircraft strikes involving herons, bitterns, and egrets have resulted in more than $18 million in damages to aircraft (Dolbeer et al. 2019).

Starlings, when in large flocks or flight lines entering or exiting a winter roost at or near airports, present a safety threat to aviation. Starlings are particularly dangerous birds to aircraft during take-offs and landings because of their high body density and tendency to travel in large flocks of hundreds to thousands of birds (Seamans et al. 1995). Doves also present similar risks when their late summer behaviors involve large roosting and loafing flocks. Their feeding, watering, and gritting behavior on airport turf and runways further increase the risks of bird-aircraft collisions. Gulls also present a strike risk to aircraft, especially in coastal areas where large populations are often present. Egret heronries located near airports also pose a threat of being struck by aircraft, which can cause damage to property and threaten passenger safety.

Other Property Damage Associated with Birds

Damage to property can occur from accumulations of droppings and feather debris associated with large concentrations of birds, such as gulls, pigeons, swallows, and waterfowl. Although damage and threats can occur throughout the year, damage can be highest during those periods when birds are concentrated into large flocks, such as migration periods and during winter months when food sources are limited. Birds that routinely nest, roost, and/or loaf in the same areas often leave large accumulations of droppings and feather debris, which can be esthetically displeasing and can cause damage to property. The reoccurring presence of fecal droppings under bird roosts can lead to constant cleaning costs for property owners.

Fecal droppings and the overgrazing of vegetation can be esthetically displeasing (*e.g*. see Fitzwater 1994, Gorenzel and Salmon 1994, Johnson 1994, Williams and Corrigan 1994, Homan et al. 2017). Businesses may be concerned about the negative esthetic appearance of their property caused by excessive droppings and excessive grazing, and are sensitive to comments by clients and guests. Costs associated with property damage include labor and disinfectants to clean and sanitize fecal droppings,

implementation of wildlife management methods, loss of property use, loss of esthetic value of property, and loss of customers or visitors irritated by walking in fecal droppings. The reoccurring presence of fecal droppings can lead to constant cleaning costs for property owners.

Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion damage to metal structures and painted finishes, including those on automobiles, can occur because of uric acid from bird droppings (Homan et al. 2017). Electrical utility companies may have problems with birds and bird droppings causing power outages by shorting out transformers and substations. This can result in outage time for power companies and consumers. Damage can also occur from droppings entering into food items or contaminating surfaces used to prepare food items at manufacturing facilities and can introduce undesirable components into the materials used in manufacturing processes.

Cattle egrets form gregarious nesting colonies, or heronries, generally in medium to tall upland trees found in woodlands, swamps, and wooded islands adjacent to water. However, proximity to water is not a requirement of egret nesting sites with many heronries located in or near residential areas (Telfair II 2020). The accumulation of guano under heronries can defoliate and kill vegetation (Wiese 1979, Grant and Watson 1995), which can cause herons to abandon nest sites and create heronries in other areas (Telfair II 2020). Telfair II and Bister (2004) noted that the composition of vegetation under heronries rapidly changed within two- to three-years after the establishment of a cattle egret heronry in Texas due to large concentrations of feces. Egret heronries located near airports also pose a threat from the potential for egrets being struck by aircraft, which can cause damage to property and threaten passenger safety.

In addition to damage caused by the accumulation of droppings, damage can also occur in other ways. Electrical utility companies frequently have problems with birds and bird droppings causing power outages by shorting out transformers and substations. The nesting behavior of some bird species can also cause damage to property. Nesting material can be esthetically displeasing and fecal droppings often accumulate near nests, which can also be esthetically displeasing.

When gulls, European starlings, house sparrows, raptors, rock pigeons, swallows and other birds nest on or in buildings or other structures they transport large amounts of nest material and food debris to the area. Many bird species are colonial nesters meaning they nest together in large numbers. Many of the gull, egret, and heron species addressed in this EA nest in large colonies. Swallows can also nest in large colonies. For example, rooftop colonies of nesting gulls can cause damage to urban and industrial structures. Nesting gulls peck at spray-on-foam roofing and rubber roofing material, including caulking. This creates holes that must be repaired or leaks in the roof can result. Gulls transport large amounts of nest material and food remains to the rooftops, which can obstruct roof drainage systems and lead to structural damage or roof failure if clogged drains result in rooftop flooding (Vermeer et al. 1988, Blokpoel and Scharf 1991, Belant 1993).

Pigeons, starlings, and sparrows can cause economic damage to aircraft in hangars. Accumulations of fecal droppings on planes, helicopters, maintenance equipment, and hangar floors result in unscheduled maintenance to clean planes and buildings to protect painted surfaces from acidic fecal droppings and maintain a sanitary work environment. Furthermore, birds may build nests in engines of idle aircraft, which may cause engine damage or a fire.

Nesting material and feathers can also clog ventilation systems or fall onto equipment or goods (Gorenzel and Salmon 1994, Homan et al. 2017). Electrical utility companies frequently have problems with bird nests causing power outages when they short out transformers and substations (Enck 1989, James et al. 1999). Nesting material can also create a fire hazard (Fitzwater 1994). Additionally, because the active

nests of most species are protected under the Migratory Bird Treaty Act (MBTA), problems arise when birds nest in areas where new construction or maintenance is scheduled to occur (Coates et al. 2012).

Osprey nests are often constructed of large sticks, twigs, and other building materials that can cause damage and prevent access to critical areas when those nests are built on man-made structures (*e.g.*, power lines, cell towers, boats). Disruptions in the electrical power supply can occur when nests are located on utility structures and can inhibit access to utility structures for maintenance by creating obstacles to workers.

Large numbers of gulls frequently use landfills as feeding and loafing areas throughout the year, though larger populations of gulls often utilize landfills during migration periods (Mudge and Ferns 1982, Patton 1988, Belant et al. 1995, Gabrey 1997, Belant et al. 1998, Bruleigh et al. 1998). Landfills have even been suggested as contributing to increases in gull populations (Verbeek 1977, Patton 1988, Belant and Dolbeer 1993). Gulls that visit landfills may loaf and nest on nearby rooftops, causing health concerns and structural damage to buildings and equipment. Bird conflicts associated with landfills include accumulation of feces on equipment and buildings, distraction of heavy machinery operators, and the potential for birds to transmit disease to workers on the site. The tendency for gulls to carry waste off site results in accumulation of feces and deposition of garbage in surrounding industrial and residential areas, which creates a nuisance, and is a potential mode of transmission of pathogens to neighboring residents.

Birds can also cause damage to windows, siding, vehicles, and other property when they mistake their reflection as another bird and attack the image.

1.4.4 Need to Resolve Bird Damage Occurring to Natural Resources

Birds can also negatively affect natural resources through habitat degradation, competition with other wildlife, and through direct depredation on natural resources. Habitat degradation can occur when large concentrations of birds in a localized area negatively affect characteristics of the surrounding habitat, which can adversely affect other wildlife species and can be esthetically displeasing. Competition can occur when two species compete (usually to the detriment of one species) for available resources, such as food or nesting sites. Direct depredation occurs when predatory bird species feed on other wildlife, which can negatively influence those species' populations, especially when depredation occurs on T&E species.

Shiny cowbirds are brood parasites, meaning they lay their eggs in the nests of other bird species (Mason 1986, Lowther and Post 2020). Female cowbirds have laid eggs in the nests of 232 host species (Mason 1986, Lowther and Post 2020). Cowbirds provide no parental care with the raising of cowbird young occurring by the host species. Young cowbirds often out-compete the young of the host species and typically puncture the eggs of the host species (Post and Wiley 1977*a*, Post and Wiley 1977*b*, Lowther and Post 2020). Because of this, shiny cowbirds can have adverse effects on the reproductive success of other species (Post and Wiley 1977*a*, Wiley 1985, Lowther and Post 2020) and threaten the viability of a population or the survival of a host species (Post and Wiley 1977*b*, Wiley et al. 1991, Lowther and Post 2020).

European starlings and house sparrows can be aggressive and often out-compete native species, destroying their eggs, and killing nestlings (Cabe 2020, Lowther and Cink 2020). Nest competition by European starlings can displace American kestrels (Von Jarchow 1943, Nickell 1967, Wilmer 1987, Bechard and Bechard 1996), woodpeckers (Kerpez and Smith 1990, Ingold 1994), martins (Allen and Nice 1952), and waterfowl (McGilvery and Uhler 1971, Grabill 1977, Heusmann et al. 1977). Weitzel (1988) reported nine native species of birds in Nevada had been displaced by starling nest competition, and Mason et al. (1972) reported European starlings evicted bats from nest holes.

Gulls consume a variety of food items, including the eggs and chicks of other birds (Burger 2020, Good 2020, Nisbet et al. 2020, Pollet et al. 2020, Verbeek and Caffrey 2020). Gulls are among the most frequently reported avian predator of colonial nesting waterbirds in the United States (Frederick and Collopy 1989). Predation is a naturally occurring event but can become a management concern when predation occurs on species experiencing severe population declines or during the restoration of waterbird breeding sites (Hunter et al. 2006). Fish eating birds, such as egrets, herons, and osprey, also have the potential to impact fish and amphibian populations, especially those of T&E species.

Impacts on the productivity and survivorship of rare or threatened wildlife can be severe when they become targets of avian predators. Some of the species listed as threatened or endangered under the ESA are preyed upon or otherwise could be adversely affected by certain bird species. Cattle egrets are a major source of predation to the federally endangered St. Croix ground lizard (Gassett et al. 2000). Egg and chick predation by pearly-eyed thrashers is a significant threat to white-crowned pigeons (*Patagioenas leucocephala*) (Wiley and Wiley 1979), a species listed as endangered by the territory under the Endangered and Indigenous Species Act of 1990. Cattle egrets have been implicated as contributing to the declining trends of little blue herons and snowy egrets given the aggressive behavior exhibited by cattle egrets and the use of similar nesting habitats (Burger 1978, Hunter et al. 2006, Telfair II 2020).

Degradation of vegetation due to the presence of colonial nesting birds can reduce nesting habitat for other birds (Jarvie et al. 1997, Shieldcastle and Martin 1999) and wildlife, including T&E species (Korfanty et al. 1999). In some cases, the establishment of colonial waterbird nesting colonies on islands has led to the complete denuding of vegetation within three to 10 years of areas being occupied (Lewis 1929, Lemmon et al. 1994, Weseloh and Ewins 1994, Weseloh and Collier 1995, Weseloh et al. 1995, Korfanty et al. 1999, Hebert et al. 2005).

Cattle egrets form gregarious nesting colonies, or heronries, generally in medium to tall upland trees found in woodlands, swamps, and wooded islands adjacent to water. However, proximity to water is not a requirement of egret nesting sites with many heronries located in or near residential areas (Telfair II 2020). The accumulation of guano under heronries can defoliate and kill vegetation (Wiese 1979, Grant and Watson 1995), which can cause herons to abandon nest sites and create heronries in other areas (Telfair II 2020). Telfair II and Bister (2004) noted that the composition of vegetation under a cattle egret heronry in Texas rapidly changed within two to three years due to large concentrations of feces.

Large concentrations of waterfowl may affect water quality around beaches and in wetlands by acting as nonpoint source pollution. For example, nutrient loading has been found to increase in wetlands in proportion to increases in the numbers of roosting waterfowl (Manny et al. 1994, Kitchell et al. 1999). In studying the relationship between bird density and phosphorus and nitrogen levels in Bosque Del Apache National Wildlife Refuge in New Mexico, Kitchell et al. (1999) found an increase in the concentration of both phosphorus and nitrogen correlated with an increase in bird density. Scherer et al. (1995) stated that waterfowl metabolize food very rapidly and most of the phosphorus contributed by bird feces into water bodies probably originates from sources within a lake being studied. In addition, assimilation and defecation converted the phosphorus into a more soluble form; therefore, the phosphorus from fecal droppings was considered a form of internal loading. Waterfowl can contribute substantial amounts of phosphorus and nitrogen into lakes through feces, which can cause excessive aquatic macrophyte growth and algae blooms (Scherer et al. 1995) and accelerated eutrophication through nutrient loading (Harris et al. 1981).

Waterfowl can be attracted to waste water treatment plants because of the water and available vegetation. Sewage treatment plants are often required to test water quality of effluents before release from finishing ponds into the environment. Coliform bacteria causes acidic pH levels in the water and lowers dissolved oxygen, which can kill aquatic organisms (Cagle 1998). In addition, fecal contamination increases

nitrogen levels in the pond resulting in algae blooms. Oxygen levels are depleted when the algae dies resulting in the death of aquatic invertebrates and vertebrates.

Birds can carry a wide range of bacterial, viral, fungal, and protozoan pathogens that can affect other bird species, as well as mammals. Infected wild birds may transmit pathogens to a single individual or a local population, new habitat, or to other species of wildlife including birds, mammals, reptiles, amphibians, and fish species. Birds may also act as a vector, reservoir, or intermediate host as it relates to pathogens and parasites. Diseases like avian botulism, avian cholera, and Newcastle disease can account for the death of hundreds to thousands of bird species across the natural landscape (Friend et al. 2001). For example, an estimated 514,000 birds died in 1997 on the Great Salt Lake in Utah from avian botulism (Friend and Franson 1999). Although diseases spread through populations of birds, it is often difficult to determine the potential impacts they might have on other wildlife species due to the range of variables that are involved in a disease outbreak (Friend et al. 2001).

1.4.5 Roles and Authorities of Other Territory and Federal Agencies

If WS provides assistance to meet the need for action, several territory and federal agencies would have roles and authorities that would relate to WS conducting activities. Below are brief discussions of the roles and authorities of other territory and federal agencies, as those authorities relate to conducting wildlife damage management.

United States Fish and Wildlife Service

The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitats. The USFWS shares responsibility with other federal, territory, tribal, and local entities. However, the USFWS has specific responsibilities for the protection of T&E species under the ESA, migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters that the USFWS administers for the management and protection of those resources, such as the National Wildlife Refuge System.

Department of Planning and Natural Resources

The DPNR was established in 1987, under Act 5265 of the Government Reorganization and Consolidation Act. The DPNR is the territory agency mandated to protect, maintain, and manage the natural and cultural resources of the USVI. There are several divisions within the DPNR involved in environmental resource management, including the DFW, Division of Coastal Zone Management, Division of Environmental Protection, and Division of Environmental Enforcement.

Division of Fish and Wildlife

The DFW is the division within the DPNR that is in charge of protecting, preserving, restoring, and managing the natural and ecological environments of fish and wildlife. The DFW also initiates and implements public awareness activities that help to enhance and safeguard fish and wildlife resources in the USVI. The DFW was first organized in 1969 as the Bureau of Fish and Wildlife in an effort to qualify for federal funding under the Sport Fish and Wildlife Restoration program. In 1980, the agency was renamed the DFW. Currently, the DFW is made up of three Bureaus: the Bureau of Environmental Education, the Bureau of Fisheries, and the Bureau of Wildlife.

Division of Coastal Zone Management

The Division of Coastal Zone Management manages, enhances, protects, and preserves coastal resources. The Division of Coastal Zone Management seeks to reduce conflicts between competing land and water uses, minimizing the impacts of activities on coastal resources. The Division of Coastal Zone Management is tasked with issuing permits for development projects within the Coastal Zone.

Division of Environmental Protection

The Division of Environmental Protection is the regulatory body within the DPNR and is entrusted with the responsibility for environmental protections and enforcement of USVI environmental laws and regulations and certain national environmental laws, as delegated by the United States Environmental Protection Agency. The Division of Environmental Protection is responsible for activities related to water quality management, air pollution control, groundwater, use of pesticides, and solid waste management.

Division of Environmental Enforcement

The Division of Environmental Enforcement serves as the compliance arm of DPNR tasked with enforcing all environmental, boating safety and permitting laws of the USVI. The Division of Environmental Enforcement is also responsible for the local enforcement of federal fisheries laws.

USVI Department of Agriculture

The USVI Department of Agriculture strives to grow the agri-business industry in the USVI. There are several divisions within the USVI Department of Agriculture, including Agriculture Development, Abattoir, Forestry, Horticulture, Marketing, Soil and Water Conservation, and Veterinary Services.

1.4.6 Territory and Federal Regulations that could apply to WS' Activities

In addition to the NEPA, several regulations and executive orders would be relevant to activities that WS could conduct when providing assistance. This section discusses several regulations and executive orders that are highly relevant to WS when providing assistance. All management actions conducted and/or recommended by WS would comply with appropriate federal, territory, and local laws in accordance with WS Directive 2.210.

Endangered Species Act

Under the ESA, all federal agencies will seek to conserve T&E species and will utilize their authorities in furtherance of the purposes of the ESA (Section 2(c)). Evaluation of the alternatives in regards to the ESA will occur in Section 3.2.2 of this EA.

National Historic Preservation Act

The National Historic Preservation Act and its implementing regulations (see 36 CFR 800) require federal agencies to initiate the Section 106 process if an agency determines that the agency's actions are undertakings as defined in Section 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under Section 106.

Migratory Bird Treaty Act of 1918 (16 USC 703-711; 40 Stat. 755), as amended

The MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, nests, or eggs (16 USC 703-711). A list of bird species protected under the MBTA occurs at 50 CFR 10.13. The MBTA also provides the USFWS regulatory authority to protect families of migratory birds. The law prohibits any "*take*" of migratory bird species by any entities, except as authorized by the USFWS. Under permitting guidelines in the MBTA, the USFWS may issue depredation permits to requesters experiencing damage caused by bird species protected under the MBTA. In addition, the USFWS may establish depredation/control orders for migratory birds that allow people to take bird species without the need for a depredation permit when those species cause damage. Information regarding migratory bird permits and depredation/control orders occurs at 50 CFR 13 and 50 CFR 21, respectively. The USFWS has the overall regulatory authority to manage populations of migratory bird species, while the DPNR has the authority to manage wildlife populations in the territory of the USVI.

Depredation Order for Blackbirds, Cowbirds, Grackles, Crows, and Magpies (50 CFR 21.43)

Pursuant to the MBTA under 50 CFR 21.43, a depredation permit is not required to take certain species of blackbirds, cowbirds, grackles, crows, and magpies when those species cause serious injuries to agricultural crops, horticultural crops, or livestock feed. In addition, a depredation permit is not required when those species cause a health hazard or cause structural property damage. A depredation permit is also not required to protect species designated as endangered, threatened, or a candidate species by a federal, territory, and/or tribal government. In the USVI, the shiny cowbird is the only blackbird species that WS could lethally remove pursuant to the blackbird depredation.

Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33; PL 92-583, October 27, 1972; 86 Stat. 1280)

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for federal approval, each state's plan was required to define boundaries of the coastal zone, identify uses of the area to be regulated by the state, determine the mechanism (criteria, standards or regulations) for controlling such uses, and develop broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varied depending on whether the federal action involved a permit, license, financial assistance, or a federally authorized activity. As appropriate, a consistency determination would be conducted by WS to assure management actions would be consistent with the territory's Coastal Zone Management Program.

Occupational Safety and Health Act of 1970

The Occupational Safety and Health Act of 1970 and its implementing regulations (29 CFR 1910) on sanitation standards states that, "*Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected*." This standard includes birds that may cause safety and health concerns at workplaces.

The Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

Responsibilities of Federal Agencies to Protect Migratory Birds - Executive Order 13186

Executive Order 13186 requires each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, to develop and implement a MOU with the USFWS that shall promote the conservation of migratory bird populations. The APHIS has developed a MOU with the USFWS as required by this Executive Order. WS would abide by the MOU signed by the APHIS and the USFWS.

Environmental Justice in Minority and Low Income Populations - Executive Order 12898

Executive Order 12898 promotes the fair treatment of people of all races, income levels, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority and low-income persons or populations. This EA will evaluate activities addressed in the alternative approaches for their potential impacts on the human environment and compliance with Executive Order 12898.

Protection of Children from Environmental Health and Safety Risks - Executive Order 13045

Children may suffer disproportionately for many reasons from environmental health and safety risks, including the development of their physical and mental status. Federal agencies must make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. In addition, federal agencies must ensure agency policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Invasive Species - Executive Order 13112 and Executive Order 13751

Executive Order 13112 establishes guidance to federal agencies to prevent the introduction of invasive species, provide for the control of invasive species, and to minimize the economic, ecological, and human health impacts that invasive species cause. The Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law: 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations and provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education of invasive species. Executive Order 13751 amended Executive Order 13112 by clarifying the operations of the National Invasive Species Council and by expanding its membership. In addition, Executive Order 13751 incorporated additional considerations into federal efforts to address invasive species and to strengthen coordinated, cost efficient federal actions.

Endangered and Indigenous Species Act of 1990

Under the USVI Code, the Endangered and Indigenous Species Act of 1990 establishes the legal framework to protect, conserve, and manage indigenous fish, wildlife and plants, and endangered or threatened species found in the USVI. The act outlines prohibited activities, requirements for collection permits, and violation penalties. The Endangered and Indigenous Species Act of 1990 also establishes the requirement for a permit from the DPNR to lethally take any animal or plant that is indigenous, as well as those species that are listed as threatened or endangered by the territory in the USVI.

1.4.7 Areas where WS' Activities could Occur

Damage or threats of damage caused by those bird species identified in Section 1.2 and Appendix D can occur throughout the territory wherever those species of birds occur. However, WS would only provide assistance when the appropriate property owner or manager requested such assistance and only on properties where WS and the appropriate property owner or manager has signed a MOU, work initiation document, or another similar document. Most species of birds addressed in this EA are capable of utilizing a variety of habitats and occur throughout the USVI where suitable habitat exists for foraging, loafing, roosting, and nesting. In addition, many of the bird species occur throughout the year in the USVI. Because several bird species addressed in this EA occur throughout the USVI, requests for assistance to manage damage or threats of damage could occur in areas of the territory occupied by those bird species.

Birds could occur in and around commercial, industrial, public, and private buildings, facilities, and properties where birds may roost, loaf, feed, nest, or otherwise occur. Examples of areas where birds occur include, but are not necessarily limited to, residential buildings, golf courses, athletic fields, recreational areas, swimming beaches, parks, corporate complexes, subdivisions, businesses, industrial parks, and schools. Activities could also occur in and around agricultural areas, wetlands, restoration sites, cemeteries, public parks, bridges, industrial sites, urban/suburban woodlots, water impoundment structures, reservoirs and reservoir shore lands, power plant sites, substations, transmission line rights-of-way, landfills, on ship fleets, military bases, or at any other sites where birds may roost, loaf, or nest. Target bird species could occur in and around agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, grain mills, and grain handling areas (*e.g.*, railroad yards) where birds destroy crops, feed on spilled grains, or contaminate food products for human or livestock consumption. Additionally, target bird species could occur at airports and surrounding properties where birds represent a threat to aviation safety. Therefore, the geographic scope of the actions and analyses in this EA is throughout the USVI and this EA analyzes actions that could occur on federal, territory, municipality, city, and private lands, when requested.

CHAPTER 2: ISSUES AND ALTERNATIVES

WS has identified a need for action based on requests for assistance that WS receives to manage damage caused by birds in the USVI (see Section 1.4). WS has identified several issues associated with the activities that WS could implement to meet that need for action. Issues are concerns regarding potential effects that might occur from proposed activities. Federal agencies must consider such issues during the decision-making process required by the NEPA. Section 2.1 of this EA discusses the issues that WS identified, which could occur from the implementation of alternative approaches to meet the need for action. Section 2.1.1 discusses issues carried forward for further analysis in Chapter 3. Section 2.1.2 discusses additional issues that WS identified; however, the EA does not analyze those issues further in Chapter 3 for the reasons provided in Section 2.1.2.

WS developed four alternative approaches to meet the need for action that Section 1.4 of this EA identifies and to address the identified issues discussed in Section 2.1. Section 2.2.2 discusses the four alternative approaches that WS could implement to meet the need for action. Section 2.2.3 discusses alternatives considered but not analyzed in detail and provides the rationale for not considering those alternative approaches in detail within this EA. In addition, WS' directives would provide guidance to WS' personnel conducting official activities (see WS Directive 1.101).

2.1 ISSUES ASSOCIATED WITH MEETING THE NEED FOR ACTION

Chapter 3 analyzes several issues in detail for their potential direct and indirect impacts on the human environment. WS identified those issues based on experience, previous EAs developed by WS, and public comments on those EAs. Chapter 3 discusses the issues, as those issues relate to the possible implementation of the alternative approaches to meeting the need for action discussed in Section 1.4. WS evaluated, in detail, the following issues.

2.1.1 Issues Analyzed Further in Chapter 3

This section describes the issues that WS identified during the scoping process for this EA. Section 3.2 analyzes the environmental consequences of each alternative in comparison to determine the extent of actual or potential impacts on the issues.

Issue 1 - Effects of Damage Management Activities on Target Bird Populations

A common issue when addressing damage caused by wildlife is the potential impacts of management actions on the populations of target species. Methods available to alleviate bird damage or threats of damage are either nonlethal or lethal methods. Nonlethal methods available can capture, exclude, disperse, or otherwise make an area unattractive to target species causing damage, which can reduce the presence of those species at the site and potentially the immediate area around the site where people use those nonlethal methods. Lethal methods could also be available to remove a bird or those birds responsible for causing damage or posing threats to human safety. Therefore, if WS' personnel used lethal methods, the removal of a bird or birds could result in local population reductions in the area where damage or threats were occurring. The number of individuals from a target species that WS could remove from a population using lethal methods under the alternatives would be dependent on the number of requests for assistance received, the number of individual birds involved with the associated damage or threat, and the efficacy of methods employed.

The basis for the analysis to determine the magnitude of impacts on the populations of those target bird species addressed in this EA from the use of lethal methods would be a measure of the number of individuals lethally removed in relation to that species abundance. Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations may rely on population estimates, allowable removal levels, and actual removal data. Qualitative determinations may rely on population trend data, when available. WS would monitor the annual take of target bird species by comparing the number of birds lethally removed with overall populations or trends. WS' personnel would only use lethal methods at the request of a cooperator seeking assistance. In addition, the take of those migratory bird species protected pursuant to the MBTA would only occur after the USFWS authorized the take. The take of bird species may also require authorization from the DPNR.

In addition, people can harvest some of the bird species addressed in this EA during annual hunting seasons in the USVI, such as waterfowl, common ground doves, and zenaida doves. A concern is that damage management activities conducted by WS would affect the ability of people to harvest those bird species during the regulated hunting seasons either by reducing local populations through the lethal

removal of birds or by reducing the number of birds present in an area through dispersal techniques. Therefore, any activities conducted by WS under the alternatives addressed would be occurring along with other natural processes and human-induced events, such as natural mortality, human-induced mortality from private damage management activities, mortality from regulated harvest, and human-induced alterations of wildlife habitat.

Section 3.2.1 analyzes the effects on the populations of target bird species in the USVI from implementation of the alternative approaches. Information on bird populations and population trend data can be available from several sources including the Breeding Bird Survey (BBS), the Christmas Bird Count (CBC), the Partners in Flight Landbird Population database, and available literature. Further information on those sources of information occurs below.

BREEDING BIRD SURVEY

The USGS coordinates the BBS through their Patuxent Wildlife Research Center. The BBS is a large-scale inventory of North American birds (USGS 2020*b*). People can monitor bird populations by using trend data derived from bird observations collected during the BBS. During the BBS, observers count birds at established survey points along roadways for a set duration along a pre-determined route. In the United States and Canada, survey routes are 24.5 miles long with the observer stopping every 0.5 miles along the route to conduct the survey. The observer records the number of birds observed and heard within 0.25 miles of each of the survey points during a 3-minute sampling period at each point. A survey along the route occurs once per year. Surveys first occurred in 1966 and occur in June, which is generally the period of time when those birds present at a location are likely breeding in the immediate area. The BBS occurs annually in the United States and Canada, across a large geographical area, under standardized survey guidelines. The BBS is a combined set of over 3,700 roadside survey routes primarily covering the continental United States and southern Canada. The primary objective of the BBS has been to generate an estimate of population change for all breeding birds. Populations of birds tend to fluctuate, especially locally, because of variable local habitat and climatic conditions. Hierarchical model analysis is the basis for the current population trends derived from BBS data (Link and Sauer 2002, Sauer and Link 2011) and are dependent upon a variety of assumptions (Link and Sauer 1998).

The BBS has never been conducted in the USVI, and thus, no population data exists for the USVI (K. Pardieck, National Coordination of the North American Breeding Bird Survey, personal communication 2019). However, WS used population trends derived from all routes in North America during the creation of this EA. In addition, the Partners in Flight Committee used BBS data from throughout North America to generate population estimates for landbird species, which were also used during the creation of this EA.

CHRISTMAS BIRD COUNT

Numerous volunteers conduct the CBC annually in December and early January under the guidance of the National Audubon Society. The CBC reflects the number of birds frequenting a location during the winter months. Survey data consists of the number of birds observed within a 15-mile diameter circle around a central point (177 mi^2). The CBC data does not provide a population estimate, but the data can be an indicator of trends in a population over time. Researchers have found that population trends reflected in CBC data tend to correlate well with those from censuses taken by more stringent means (National Audubon Society 2020).

ANNUAL HARVEST DATA

The populations of several migratory bird species are sufficient to allow for annual harvest seasons that typically occur during the fall migration periods of those species. The DPNR establishes hunting seasons

and harvest limits in the USVI. Although hunting is legal, hunting licenses have not been issued by the DPNR in recent years because of low demand (N. Angeli, DFW Chief of Wildlife, pers. comm. 2019). Thus, recent annual harvest data is unavailable in the USVI.

PARTNERS IN FLIGHT LANDBIRD POPULATION ESTIMATE DATABASE

The intent of the BBS is to monitor bird population trends, but it is also possible to use BBS data to develop a general estimate of the size of bird populations (Will et al. 2020). Using relative abundances derived from the BBS conducted from 2006 through 2015, the Partners in Flight (2020) extrapolated population estimates for many bird species in North America as part of the Partners in Flight Landbird Population Estimate database (see Will et al. 2020). The Partners in Flight system involves extrapolating the number of birds in the 50 quarter-mile circles (total area/route = 10 mi^2) surveyed during the BBS to an area of interest. The model used by Partners in Flight (2020) makes assumptions on the detectability of birds, which can vary for each species (Stanton et al. 2019, Will et al. 2020). Some species of birds that are more conspicuous (visual and auditory) are more likely to be detected during bird surveys when compared to bird species that are more secretive and do not vocalize often. Therefore, the Partners in Flight Landbird Population Estimate database uses information on the detectability of a species to create a detectability factor, which may be combined with relative abundance data from the BBS to yield a population estimate (Blancher et al. 2013, Will et al. 2020).

Issue 2 - Effects on the Populations of Nontarget Wildlife Species, Including T&E Species

The potential for effects on nontarget species and threatened or endangered species arises from the use of nonlethal and lethal methods identified in the alternative approaches. The use of nonlethal and lethal methods has the potential to inadvertently exclude, disperse, capture, or kill nontarget wildlife. Appendix B describes the methods available for use under the alternative approaches. As part of the scoping process for this EA, WS consulted with the USFWS pursuant to Section 7 of the ESA, which Section 3.2.2 discusses in further detail.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

An additional issue often raised is the potential risks to human health and safety associated with employing methods to manage damage caused by target species. WS' employees would use and recommend only those methods that were legally available, selective for target species, and were effective at resolving the damage associated with the target species. Still, some concerns exist regarding the safety of methods despite their legality, selectivity, and effectiveness. As a result, this EA will analyze the potential for proposed methods to pose a risk to members of the public and employees of WS. Section 3.2.3 further evaluates the risks to human safety as this issue relates to the alternative approaches.

Issue 4 - Humaneness and Animal Welfare Concerns of Methods

Several nonlethal and lethal methods would be available to alleviate damage associated with bird species. The use of nonlethal and lethal methods has the potential to disperse, exclude, capture, or kill target bird species. Section 3.2.4 will discuss concerns regarding the humaneness of available methods and animal welfare concerns.

2.1.2 Issues Considered But Not Analyzed Further in Chapter 3 for the Reasons Provided

WS identified additional issues during the scoping process of this EA. WS considered those additional issues but a detailed analysis does not occur in Chapter 3. Discussion of those additional issues and the reasons for not analyzing those issues in detail occur below.

Effects of Activities on Soils, Water, and Air Quality

The implementation of those alternative approaches discussed in Section 2.2.2 by WS would meet the requirements of applicable federal laws, regulations, and Executive Orders for the protection of the environment, including the Clean Air Act. The actions described in Section 2.2.2 do not involve major ground disturbance, construction, or habitat alteration. Activities that WS could conduct during implementation of those alternative approaches discussed in Section 2.2.2 would not cause changes in the flow, quantity, or storage of water resources. The use and storage of methods by WS' personnel would also follow WS' directives, including WS Directive 2.210, WS Directive 2.430, WS Directive 2.465, WS Directive 2.601, WS Directive 2.605, WS Directive 2.615, WS Directive 2.625, and WS Directive 2.627.

Most methods available for use to manage damage caused by birds are mechanical methods. Mechanical methods would not cause contaminants to enter water bodies or result in bioaccumulation. For example, firearms are mechanical methods that WS could use to remove a target bird lethally and to reinforce the noise associated with nonlethal methods, such as pyrotechnics. Firearms would not enter bodies of water and would be securely stored off-site after each use; therefore, the firearm itself would not contaminate water or result in the bioaccumulation of chemicals or other hazardous materials. Depredation permits issued by the USFWS require the use of nontoxic shot when using shotguns to target birds listed on the permit. Therefore, when conducting activities pursuant to a depredation permit issued by the USFWS and when using shotguns, WS' personnel would only use nontoxic shot. WS would also use nontoxic ammunition when required by depredation/control orders. Occasionally, WS' personnel could use lead ammunition in rifles, handguns, air rifles, and shotguns[4].

There is often concern about the deposition of lead into the environment from ammunition used in firearms to remove birds lethally. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996). To address lead exposure from the use of shotguns, the USFWS Migratory Bird Permit Program has implemented the requirement to use nontoxic shot (see 50 CFR 20.21(j)) as part of the standard conditions of depredation permits issued pursuant to the MBTA for the lethal take of birds under 50 CFR 21.41. The depredation order for blackbirds (see 50 CFR 21.43(b)) includes the requirement for use of nontoxic shot, as defined under 50 CFR 20.21(j), as well as, nontoxic bullets. However, this prohibition on the use of lead bullets does not apply if an entity uses an air rifle or an air pistol to remove depredating blackbirds under the depredation order.

The take of target bird species by WS in the USVI would occur primarily using shotguns. However, WS' personnel could use rifles, air rifles, and handguns to disperse or remove target bird species in some situations when WS' personnel determine their use to be safe. To reduce risks to human safety and property damage from bullets passing through a target bird, the use of rifles and air rifles would be applied in such a way (*e.g.*, caliber, bullet weight, distance) to reduce the likelihood of the bullet passing through the target bird species. Birds that were removed using a firearm would often occur within areas where retrieval of all carcasses for proper disposal would be highly likely (*e.g.*, at roost sites). WS' personnel would retrieve the carcasses of birds to the extent possible and would dispose of the carcasses in accordance with WS Directive 2.515. With risks of lead exposure occurring primarily from ingestion of bullet fragments and lead shot, the retrieval and proper disposal of bird carcasses would greatly reduce the risk of scavengers ingesting lead contained within the carcass.

[4]Occasionally, WS could use shotguns using lead shot when targeting bird species that do not require a depredation permit from the USFWS to take those species, such as pigeons, house sparrows, and starlings.

However, deposition of lead into soil could occur if, during the use of a firearm, the projectile passed through a bird, if misses occurred, or if WS' personnel were not able to retrieve the carcass. Laidlaw et al. (2005) reported that, because of the low mobility of lead in soil, all of the lead that accumulates on the surface layer of the soil generally stays within the top 20 cm (about eight inches). In addition, concerns occur that lead from bullets deposited in soil from shooting activities could lead to contamination of ground water or surface water. Stansley et al. (1992) studied lead levels in water that had high concentrations of lead shot accumulation because of intensive target shooting at several shooting ranges. Lead did not appear to "*transport*" readily in surface water when soils were neutral or slightly alkaline in pH (*i.e*., not acidic), but lead did transport more readily under slightly acidic conditions. Although Stansley et al. (1992) detected elevated lead levels in water in a stream and a marsh that were in the shot "*fall zones*" at a shooting range, the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot. Stansley et al. (1992) believed the lead contamination near the parking lot was due to runoff from the lot, and not from the shooting range areas. The study also indicated that even when lead shot was highly accumulated in areas with permanent water bodies present, the lead did not necessarily cause elevated lead levels in water further downstream. Muscle samples from two species of fish collected in water bodies with high lead shot accumulations had lead levels that were well below the accepted threshold standard of safety for human consumption (Stansley et al. 1992).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "*action level*" of 15 parts per billion as defined by the United States Environmental Protection Agency (*i.e*., requiring action to treat the water to remove lead). The study found that the dissolution (*i.e*., capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments, which reduces the transport of lead across the landscape and naturally serves to reduce the potential for ground or surface water contamination (Craig et al. 1999). Those studies suggest that, given the very low amount of lead deposited and the concentrations that would occur from WS' activities to reduce bird damage using firearms, as well as most other forms of hunting in general, lead contamination from such sources would be minimal to nonexistent.

Because the take of birds could occur by other entities when authorized by the USFWS and the DPNR, when required, WS' assistance with removing target bird species would not be additive to the environmental status quo. WS' assistance would not be additive to the environmental status quo because those birds removed by WS using firearms could be lethally removed by the entities experiencing damage using the same method in the absence of WS' involvement. WS' involvement in activities may result in lower amounts of lead being deposited into the environment due to efforts by WS to ensure projectiles do not pass through, but are contained within the bird carcass, which would limit the amount of lead potentially deposited into soil from projectiles passing through the carcass. The proficiency training received by WS' employees in firearm use and accuracy increases the likelihood that WS' personnel lethally remove a target bird humanely in situations that ensure accuracy and that misses occur infrequently, which would further reduce the potential for WS' activities to deposit lead in the soil.

In addition, WS' involvement in activities would ensure WS' personnel made efforts to retrieve bird carcasses lethally removed using firearms to prevent the ingestion of lead in carcasses by scavengers. WS' involvement would also ensure carcasses were disposed of properly to limit the availability of lead. Based on current information, the risks associated with lead ammunition that WS' activities could deposit into the environment due to misses, the bullet passing through the carcass, or from bird carcasses that may be irretrievable would be below any level that would pose any risk from exposure or significant contamination. WS would not use lead ammunition at a magnitude that activities would deposit a large amount of spent bullets or shot in such a limited area that would result in large accumulations of lead in the soil. As stated previously, when using shotguns to target those migratory bird species addressed in a

depredation permit issued by the USFWS and when targeting shiny cowbirds pursuant to the blackbird depredation order, only nontoxic shot would be used by WS pursuant to 50 CFR 20.21(j). Additionally, WS may utilize nontoxic ammunition in rifles, air rifles, and handguns as the technology improves and ammunition becomes more effective and available.

When conducting activities using lethal methods, WS' personnel would retrieve carcasses to the extent possible for disposal. WS' personnel would dispose of retrieved carcasses in accordance with WS Directive 2.510 and WS Directive 2.515. When applicable, WS' personnel would also dispose of carcasses pursuant to requirements in authorizations issued by the USFWS and authorizations provided by the DPNR.

Consequently, WS does not expect that implementing any of the alternative approaches discussed in Section 2.2.2 would significantly change the environmental status quo with respect to soils, geology, minerals, water quality, water quantity, floodplains, wetlands, other aquatic resources, air quality, prime and unique farmlands, timber, and range. WS has received no reports or documented any effects associated with soil, water, or air quality from previous activities associated with managing damage caused by birds in the USVI that WS conducted. Therefore, the EA will not analyze those elements further.

Greenhouse Gas Emissions by the WS Program

Under the alternative approaches intended to meet the need for action discussed in Section 2.2.2, WS could potentially produce criteria pollutants (*i.e.*, pollutants for which maximum allowable emission levels and concentrations are enforced by state agencies). Those activities could include working in the office, travel from office to field locations, travel at field locations (vehicles or all-terrain vehicles), and from other work-related travel (*e.g.*, attending meetings). During evaluations of the national program to manage feral swine (*Sus scrofa*), the WS program reviewed greenhouse gas emissions for the entire national WS program (see pages 266 and 267 in USDA 2015*a*). The analysis estimated effects of vehicle, aircraft, office, and all-terrain vehicle use by WS for federal fiscal year (FY) 2013 and included the potential new vehicle purchases that could be associated with a national program to manage damaged caused by feral swine. The review concluded that the range of Carbon Dioxide Equivalents (includes CO_2, NO_x CO, and SO_x) for the entire national WS program would be below the reference point of 25,000 metric tons per year recommended by CEQ for actions requiring detailed review of impacts on greenhouse gas emissions. The activities that WS could conduct under the alternative approaches discussed in Section 2.2.2 would have negligible cumulative effects on atmospheric conditions, including the global climate.

WS' Actions Would Result in Irreversible and Irretrievable Commitments of Resources

Other than relatively minor uses of fuels for vehicles, electricity for office operations, carbon dioxide for euthanasia, and some components associated with ammunition (*e.g.*, black powder, shot) and pyrotechnics (*e.g.*, black powder, cardboard), no irreversible or irretrievable commitments of resources result from WS.

Impacts on Cultural, Archaeological, Historic, and Tribal Resources and Unique Characteristics of Geographic Areas

A number of different types of public lands occur within the analysis area, such as national wildlife refuges, national monuments, and national parks. WS recognizes that some persons interested in those areas may feel that any activities that could occur in those areas would adversely affect the esthetic value and natural qualities of the area. Similarly, WS' activities could occur within areas with cultural,

archaeological, historic, and/or tribal resources. WS would only provide direct operational assistance if WS implements Alternative 1 or Alternative 2 (see Section 2.2.2). WS would provide no assistance with managing damage caused by birds if WS implements Alternative 4 and WS would only provide technical assistance if WS implements Alternative 3.

If WS implements Alternative 1 or Alternative 2, the methods that WS could employ would not cause major ground disturbance and would not cause any physical destruction or damage to property. In addition, the methods available would not cause any alterations of property, wildlife habitat, or landscapes, and would not involve the sale, lease, or transfer of ownership of any property. In general, implementation of Alternative 1 or Alternative 2 would not have the potential to introduce visual, atmospheric, or audible elements to areas that could result in effects on the character or use of properties. Therefore, if WS implemented Alternative 1 or Alternative 2, the methods would not have the potential to affect the unique characteristics of geographic areas or any cultural, archeological, historic, and tribal resources. If WS implements Alternative 1 or Alternative 2 and WS planned an individual activity with the potential to affect historic resources, WS and/or the entity requesting assistance would conduct the site-specific consultation, as required by Section 106 of the National Historic Preservation Act, as necessary.

Conducting activities at or in close proximity to historic or cultural sites for the purposes of alleviating damage caused by birds would have the potential for audible effects on the use and enjoyment of the historic property. For example, WS could use pyrotechnics to disperse birds. However, WS would only use such methods at a historic site after the property owner or manager signed a MOU, work initiation document, work plan, or a similar document allowing WS to conduct activities on their property. A built-in minimization factor for this issue is that nearly all the methods involved would only have temporary effects on the audible nature of a site and could be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects.

In addition, WS would only conduct activities on tribal lands at the request of the Tribe and only after signing appropriate authorizing documents. Therefore, the Tribe would determine what activities they would allow and when WS' assistance was required. Because Tribal officials would be responsible for requesting assistance and determining what methods would be available to alleviate damage, no conflict with traditional cultural properties or beliefs would likely occur. WS would also adhere to the Native American Graves Protection and Repatriation Act. If WS' personnel located Native American cultural items while conducting activities on federal or tribal lands, WS would notify the land manager and would discontinue work at the site until authorized by the managing entity.

WS would abide by federal and territory laws, regulations, work plans, MOUs, and policies to minimize any effects and would abide by any restrictions imposed by the land management agency on activities conducted by WS. The implementation of those alternative approaches discussed in Section 2.2.2 by WS would meet the requirements of applicable federal laws, regulations, and Executive Orders for the protection of the unique characteristics of geographic areas or any cultural, archeological, historic, and tribal resources.

Impacts of Dispersing a Bird Roost on People in Urban/Suburban Areas

Another issue often raised is that the dispersal of birds from a roost location to alleviate damage or conflicts at one site could result in new damage or conflicts at a new roost site. While the original complainant may see resolution to the bird problem when the roost is dispersed, the recipient of the bird roost may see the bird problem as imposed on them. Thus, overall, there is no resolution to the original bird problem (Mott and Timbrook 1988). Bird roosts usually are dispersed using a combination of hazing methods including pyrotechnics, propane cannons, effigies, and electronic distress calls (Avery et al.

2008, Chipman et al. 2008, Seamans and Gosser 2016). A similar conflict could develop when making minor habitat alterations (*e.g.*, trimming tree branches) to disperse a bird roost. This concern would be heightened in large metropolitan areas where the likelihood of birds dispersed from a roost, finding a new roost location, and not coming into conflict would be very low. WS has developed alternatives to minimize the potential of dispersing bird roosts in urban/suburban areas by evaluating a management option to depopulate a bird roost.

In urban areas, WS would often work with the community or municipal leaders to address bird damage involving large bird roosts that would likely be affecting several people; therefore, WS often consults not only with the property owner where roosts are located but also with community leaders to allow for community-based decision-making on the best management approach. In addition, funding would often be provided by the municipality where the roost was located, which would allow activities to occur within city limits where bird roosts occurred. This would allow roosts that relocated to other areas to be addressed effectively and often times, before roosts become well established. Section 2.2.1 further discusses a community-based decision-making approach to bird damage management in urban areas. Therefore, WS did not consider this issue further.

2.2 DESCRIPTION OF THE ALTERNATIVES

Section 2.2 discusses those alternative approaches that WS identified during the initial scoping process for this EA. WS developed the alternative approaches based on the need for action. The need for action identified by WS is associated with requests for assistance that WS receives to manage damage and threats of damage caused by birds in the USVI (see Section 1.4). WS also developed the alternative approaches to address those issues identified in Section 2.1.

Section 2.2.1 addresses actions that would be common to the alternatives. Section 2.2.2 discusses those alternative approaches WS considered in detail within Chapter 3 of this EA. Chapter 3 analyzes the environmental consequences of each alternative as each alternative relates to the identified issues. Section 2.2.3 discusses additional alternative approaches that WS identified. However, this EA will not analyze those alternative approaches in detail within Chapter 3 for the reasons provided in the description of each alternative.

2.2.1 Actions Common to the Alternatives

The following subsections discuss those actions WS identified that would continue to occur if WS implemented any of the alternative approaches identified in Section 2.2.2.

WS' Co-managerial Approach to Making Decisions

Those entities experiencing damage associated with birds could conduct activities on their own, they could contact a private business for assistance, they could seek assistance from another governmental agency, they could seek assistance from WS, if available, or they could take no action. However, in all cases, the person and/or entity experiencing damage or threats of damage would determine the appropriate involvement of other people and/or entities and to what degree those people or other entities were involved in the decision-making process.

If a person and/or entity requested assistance from WS and WS was able to provide assistance, WS would follow the "*co-managerial approach*" to alleviate damage or threats of damage as described by Decker and Chase (1997). Within this management model, WS could provide technical assistance regarding the biology and ecology of target bird species and effective, practical, and reasonable methods available to a local decision-maker(s) to reduce damage or threats. Generally, a decision-maker seeking assistance

would be part of a community, municipality, business, governmental agency, and/or a private property owner.

Under a community based decision-making process, WS would provide information, demonstration, and discussion on all available methods to the appropriate representatives of the community for which services were requested to ensure a community-based decision was made. By involving decision-makers in the process, WS could present damage management recommendations to the appropriate decision-maker(s) to allow decisions on damage management to involve those individuals that the decision maker(s) represents. As addressed in this EA, WS would provide technical assistance to the appropriate decision-maker(s) to allow the decision-maker(s) to present information on damage management activities to those persons represented by the decision-maker(s), including demonstrations and presentations by WS at public meetings to allow for involvement of the community. Requests for assistance to manage damage caused by birds often originate from the decision-maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives, the decision-maker(s) would be able to provide the information to local interests either through technical assistance provided by WS or through demonstrations and presentations by WS on activities to manage damage. This process would allow WS to recommend and implement activities based on local input.

The decision-maker for the local community would be officials or representatives of the communities that residents of a community have elected to represent them. The elected officials or representatives would be people who oversee the interests and business of the local community. This person or persons would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision-making. In the case of private property owners, the decision-maker would be the individual that owns or manages the affected property. The decision-maker for local, territory, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. If WS implemented Alternative 4, WS would not provide any assistance with managing the damage that birds can cause in the USVI; therefore, the co-managerial approach would not be applicable.

Availability of Methods to Manage Damage Caused by Birds

Appendix B discusses several methods available to alleviate damage or threats of damage associated with birds. All of the methods discussed in Appendix B would be available to any entity for use when managing damage or threats of damage caused by birds in the USVI. Therefore, despite the level of involvement by WS, all methods discussed in Appendix B would be available to other entities to manage damage or threats of damage associated with birds, including the public, private businesses, and other territory or federal agencies.

Effectiveness of Methods to Address Damage and Threats of Damage

Defining the effectiveness of any damage management activities often occurs in terms of losses or risks potentially reduced or prevented. Effectiveness can be dependent upon how accurately practitioners diagnose the problem, the species responsible for the damage, and how people implement actions to correct or mitigate risks or damages. To determine that effectiveness, WS must be able to complete management actions expeditiously to minimize harm to nontarget animals and the environment, while at the same time, using methods as humanely as possible. Efficacy is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of people using the method and, for WS' personnel, the guidance provided by WS' directives and policies. For any management methods employed, the proper timing is essential in effectively dispersing those birds causing damage. Employing methods soon after damage begins or soon after identifying damage threats increases the likelihood that those damage management activities would achieve success in addressing

damage. Therefore, coordination and timing of methods is necessary to be effective in achieving expedient resolution of bird damage.

WS is considering several methods (see Appendix B) that WS' personnel could incorporate into alternative approaches (see Section 2.2.2) to meet the need for action. If WS provides assistance and depending on the alternative approach selected to meet the need for action (see Section 2.2.2), WS could consider the use of an individual method or consider the use of several methods in combination to address damage and threats of damage. When WS provides assistance, WS' personnel would use the WS Decision Model (see Appendix E) to identify methods (see WS Directive 2.101) appropriate to reducing damage and reducing the threat of damage. In general, when providing assistance, WS' personnel would consider an adaptive approach that would integrate a combination of methods to resolve damage and reduce threats of damage (see WS Directive 2.105).

The use of nonlethal methods in an integrated approach may effectively disperse birds. For example, Avery et al. (2002) and Seamans (2004) found that the use of vulture effigies were an effective nonlethal method to disperse roosting vultures. Nonlethal methods have been effective in dispersing crow roosts (Gorenzel et al. 2000, Chipman et al. 2008), including the use of crow effigies (Avery et al. 2008), lasers (Gorenzel et al. 2002), and electronic distress calls (Gorenzel and Salmon 1993). Chipman et al. (2008) found the use of only nonlethal methods to disperse urban crow roosts often requires a long-term commitment of affected parties, including financial commitments, to achieve and maintain the desired result of reducing damage.

The continued use of nonlethal methods often leads to the habituation of birds to those methods, which can decrease the effectiveness of those methods (Conover 2002, Avery et al. 2008, Chipman et al. 2008, Seamans and Gosser 2016). The intent of lethal methods is to reduce the number of birds present at a location. A reduction in the number of birds at a location leads to a reduction in damage, which is applicable whether using lethal or nonlethal methods. The use of lethal methods can be successful in reducing bird damage (Gorenzel et al. 2000). The intent of nonlethal methods is to haze, exclude, or otherwise make an area unattractive to birds, which disperses those birds to other areas and leads to a reduction in damage. Similarly, the intent of using lethal methods is to reduce the number of birds in the area where damage is occurring, which can lead to a reduction in the damage occurring at that location.

Therefore, reducing the number of birds at a location where damage or threats are occurring either using nonlethal methods or lethal methods can lead to a reduction in damage. The dispersal of birds using nonlethal methods can reduce the number of birds using a location, which can correlate to a reduction in damage at a location (Avery et al. 2008, Chipman et al. 2008). Similarly, the use of lethal methods reduces the number of birds at a location by removing those birds identified as causing damage or posing a threat of damage.

Often of concern with the use of lethal methods is that birds that are lethally taken would only be replaced by other birds either during the application of those methods (from other birds that immigrate into the area) or by birds the following year (increase in reproduction that could result from less competition). WS does not use lethal methods to manage a species population. The intent of lethal methods is to reduce the number of birds present at a location where damage is occurring by targeting those birds causing damage or posing threats. Because the intent of lethal methods is to manage those birds causing damage and not to manage entire bird populations, WS considers those methods effective even if birds return the following year.

Chipman et al. (2008) found that crows returned to roosts previously dispersed using nonlethal methods within two to eight weeks. In addition, Chipman et al. (2008) had to re-use nonlethal methods every year during a six-year project evaluating the use of only nonlethal methods. At some roost locations, Chipman

et al. (2008) found the number of crows that returned each year to roosts over a six-year period actually increased despite the use of nonlethal methods each year. Despite the need to re-apply nonlethal methods yearly, the return of birds to roost locations previously dispersed, and the number of crows using roost locations increasing annually at some roost locations, Chipman et al. (2008) determined the use of nonlethal methods could be effective at dispersing urban crow roosts in New York. Avery et al. (2008) found similar results during the use of crow effigies and other nonlethal methods to disperse urban crow roosts in Pennsylvania. Crows returned to roost locations in Pennsylvania annually despite the use of nonlethal methods and effigies (Avery et al. 2008). Gorenzel et al. (2002) found that crows returned to roost locations after the use of lasers. This suggests the use of both lethal and nonlethal methods may require repeated use of those methods. The return of birds to areas where damage management methods were previously employed does not indicate previous use of those methods were ineffective because the intent of those methods is to reduce the number of birds present at a site where damage is occurring at the time those methods are employed.

If WS provides assistance, WS' personnel would evaluate the request for assistance and would consider the effectiveness of the methods available for that request based on how effective a method or methods were during previous requests for assistance and/or how effective methods were when used by those entities experiencing damage or threats of damage. When using methods, WS' personnel would continue to evaluate method effectiveness during the use of those methods. Therefore, WS' personnel would consider method effectiveness as part of the decision making-process during their use of the WS Decision Model for each damage management request based on continual evaluation of methods and results.

In meeting the need for action, the objective would be to reduce damage, risks, and conflicts with birds as requested and not to reduce/eliminate a species population. If WS excludes, removes, and/or disperses birds from an area where they were causing damage or posing a threat of damage, those birds would no longer be present at that location to cause damage or pose a threat. The removal and/or dispersal of birds could be short-term because new individuals may immigrate to an area, especially during the migration periods. Therefore, the return of birds to an area after removal and/or dispersal activities does not mean individual management actions or methods were unsuccessful, but that periodic management may be necessary.

Similar to the effectiveness of methods to reduce damage or reduce threats of damage is the cost effectiveness of methods. The cost of methods and/or the cost of implementing methods may sometimes be a secondary consideration because of overriding environmental, legal, human health and safety, humaneness, animal welfare, or other concerns. Therefore, the cost effectiveness of methods and/or a cost benefit analysis is not essential to making a reasoned choice among the alternative approaches that WS is considering. In addition, the CEQ does not require a formal, monetized cost benefit analysis to comply with the NEPA.

Research Methods and Information on the Life History of Birds

Under any of the alternatives, the national WS program would continue to research and develop methods to address bird damage through the National Wildlife Research Center (NWRC). The NWRC functions as the research unit of WS by providing scientific information and developing methods to address damage caused by animals. Research biologists with the NWRC work closely with WS' personnel, wildlife managers, researchers, and others to develop and evaluate methods and techniques. For example, one research area that is a focus of the NWRC is aviation safety and reducing risks of aircraft striking birds at airports and military facilities. In addition, the NWRC could conduct research to understand the life history of bird species, such as migration routes and feeding habits.

Authorization of Migratory Bird Take by the USFWS

As noted in Section 1.4.6, the MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, nests, or eggs (16 USC 703-711). Most target bird species addressed in this EA are a migratory bird species protected by the MBTA (see 50 CFR 10.13), except nonnative species (*e.g.*, rock pigeons, house sparrows). Pursuant to 50 CFR 21.41, "…*a depredation permit is required before any person may take, possess, or transport migratory birds for depredation control purposes. No permit is required merely to scare or herd depredating migratory birds other than endangered or threatened species or bald or golden eagles*". Therefore, prior to the use of lethal methods to alleviate damage or threats of damage associated with a migratory bird species, any entity, including WS, must apply for and receive a depredation permit from the USFWS. In general, the dispersal (*i.e.*, scaring) of birds from an area using nonlethal methods would not require an entity to apply for and receive a depredation permit. A depredation permit is also not required to destroy inactive nests (*i.e.*, nests without eggs or nestlings). Under the permitting application process for a depredation permit, the USFWS requires applicants to describe prior nonlethal damage management techniques that they have used.

The USFWS can also authorize the take of migratory birds by establishing depredation orders, control orders, and other permitting processes. The USFWS has created depredation and control orders that allow the take of specific species of migratory birds for specific purposes without the need for a depredation permit. For example, the USFWS has established a depredation order that allows take of specific species of blackbirds, cowbirds, grackles, and crows for specific purposes without the need for a depredation permit from the USFWS (see 50 CFR 21.43). Section 1.4.6 discusses the depredation and control orders that could apply to WS' activities.

Authorization from the DPNR

In addition to authorization from the USFWS, the DPNR may also require a permit to take migratory and non-migratory bird species. When the USFWS issues a depredation permit for a migratory bird species protected by the MBTA, the DPNR could issue permits to take the same number of birds authorized by the USFWS or the DPNR could issue a permit authorizing the lethal removal of less than the number permitted by the USFWS. However, the take authorized by the DPNR cannot exceed the take level authorized by the USFWS.

Influence of Global Climate Change on Bird Populations

The State of the Climate in 2012 report indicates that every year has been warmer than the long-term average since 1976 (Blunden and Arndt 2013). Impacts of this change will vary throughout the United States, but some areas could experience air and water temperature increases, alterations in precipitation, and increased severe weather events. Temperature and precipitation often influence the distribution and abundance of a plant or animal species. As temperatures continue to increase, the ranges of many species will likely expand into northern latitudes and higher altitudes (Trautmann 2018). Species adapted to cold climates may struggle to adjust to changing climate conditions (*e.g.*, less snowfall, range expansions of other species). Sheikh et al. (2007) stated, "*Wildlife species can be affected by several climatic variables such as increasing temperatures, changes in precipitation, and extreme weather events*". Sheikh et al. (2007) further stated that changes in climate could benefit some species of wildlife.

The impact of climate change on wildlife and their habitats is of increasing concern to land managers, biologists, and members of the public. Climate change may alter the frequency and severity of habitat-altering events, such as wildfires, weather extremes, such as drought, presence of invasive species, and wildlife diseases. WS recognizes that climate change is an ongoing concern and may result in changes in

species range and abundance. Climate change may also affect other factors, such as agricultural practices and the timing of water freeze up, which can influence the timing and movement pattern of bird migrations. Over time, climate change would likely lead to changes in the scope and nature of human-wildlife conflicts in the territory. Because these types of changes are an ongoing process, WS has developed adaptive management strategies that allow WS and other agencies to monitor for and adjust to impacts of ongoing changes in the affected environment.

If WS selected an alternative approach to meeting the need for action that allows WS to provide assistance (see Section 2.2.2), WS would monitor activities, in context of the issues analyzed in detail, to determine if the need for action and the associated impacts remain within the parameters established and analyzed in this EA. If WS determines that a new need for action, changed conditions, new issues, or new alternatives having different environmental impacts warrant a new or additional analysis, WS would supplement this analysis or conduct a separate evaluation pursuant to the NEPA. Through monitoring, WS can evaluate and adjust activities as changes occur over time.

In addition, most target bird species addressed in this EA are a migratory bird species protected by the MBTA (see 50 CFR 10.13), except nonnative species (*e.g.*, house sparrows, rock pigeons). Activities that involve the take of migratory bird species protected by the MBTA require authorization (*e.g.*, depredation permit, depredation order, control order) from the USFWS. The take of bird species may also require authorization from the DPNR. Therefore, WS' activities would only occur when authorized by the USFWS and the DPNR, when required, and take would not exceed the levels authorized. WS would submit activity reports to the USFWS and the DPNR, when required, so the USFWS and the DPNR had the opportunity to evaluate WS' activities and the cumulative take occurring for bird species. Conducting activities only when authorized and providing activities reports would ensure the USFWS and the DPNR have the opportunity to incorporate any activities WS' conducts into population objectives established for wildlife populations in the USVI.

WS' monitoring would also include reviewing the list of species the USFWS and the National Marine Fisheries Service consider as threatened or endangered within the USVI pursuant to the ESA. As appropriate, WS would consult with the USFWS and/or the National Marine Fisheries Service pursuant to Section 7 of the ESA to ensure the activities conducted by WS would not jeopardize the continued existence of threatened or endangered species or result in adverse modification to areas designated as critical habitat for a species within the USVI. Through the review of species listed as threatened or endangered and the consultation process with the USFWS and/or the National Marine Fisheries Service, WS can evaluate and adjust activities conducted to meet the need for action. Accordingly, WS could supplement this analysis or conduct a separate evaluation pursuant to the NEPA based on the review and consultation process. Should this monitoring and analysis determine it to be necessary, WS could adjust activities to assure that its actions do not significantly contribute to changes in the environmental status quo that occur because of climate change.

2.2.2 Alternatives Carried Forward for Further Analysis in Chapter 3

As discussed in Section 1.2 and Section 1.4, people experiencing damage or threats of damage associated with wildlife often seek assistance from other entities to alleviate that damage or to prevent damage from occurring. WS is the lead federal agency responsible for managing conflicts between people and wildlife (see Section 1.2); therefore, people could request assistance from WS. WS identified four alternative approaches to meeting the need for action that also address the issues identified in Section 2.1. Section 2.2.2 describes those alternative approaches identified by WS and provides a description of how WS would implement those approaches.

Alternative 1 – WS would continue the current integrated methods approach to managing damage caused by birds in the USVI (Proposed Action/No Action)

If WS implements Alternative 1, WS would be available to provide assistance when people experience damage or threats of damage associated with those target bird species addressed in this EA and, consequently, request assistance from WS. When responding to a request for assistance, WS' personnel would use the WS Decision Model to formulate a management strategy to address each request for assistance. Appendix E shows the general thought process and procedures of the WS Decision Model, which generally involve receiving a request for assistance, assessing the problem, evaluating management methods, formulating a management strategy, providing assistance, and evaluating the results. Slate et al. (1992) provides further discussion and detail on the use of the WS Decision Model by WS' employees.

Therefore, if WS implements Alternative 1, WS could respond to requests for assistance by: 1) taking no action, if warranted, 2) providing only technical assistance to property owners or managers on actions they could take to reduce damage caused by birds, or 3) providing technical assistance and direct operational assistance to a property owner or manager experiencing damage. WS would provide technical assistance to those entities requesting assistance as described for Alternative 3. Direct operational damage management assistance would include damage management activities that WS' personnel would conduct directly or supervise. WS' employees may initiate operational damage management assistance when technical assistance alone could not effectively alleviate the damage or the threat of damage and when WS and the entity requesting assistance have signed a MOU, work initiation document, or another comparable document. Funding for WS' activities could occur from federal appropriations and/or from cooperative service agreements with an entity requesting WS' assistance.

Appendix B discusses those methods that WS' employees would consider when evaluating management methods to alleviate damage or threats of damage associated with birds. Nonlethal methods from Section I in Appendix B that WS could use and/or recommend include exclusion methods (*e.g.*, fencing, netting, overhead wires), auditory deterrents (*e.g.*, propane cannons, pyrotechnics, electronic distress calls), visual deterrents (*e.g.*, scarecrows, lasers, lights), trained dogs, nest destruction, translocation, live traps (*e.g.*, cage traps, modified padded foothold traps), and nets (*e.g.*, cannon nets, mist nets). In addition, WS could recommend minor habitat modifications (*e.g.*, pruning trees to discourage roosting) and changes in cultural practices (*e.g.*, changes in flight patterns at an air facility or using bird proof livestock feeders). Lethal methods would include the use of a firearm, euthanasia after live-capture, and egg destruction (*i.e.*, puncturing, breaking, oiling, or shaking an egg). Section II in Appendix B describes those lethal methods that would be available to manage damage and threats of damage associated with birds. The initial investigation would define the nature, history, and extent of the problem; species responsible for the damage; and methods available to alleviate the problem. When evaluating management methods and formulating a management strategy, WS' personnel would give preference to nonlethal methods when they determine those methods to be practical and effective (see WS Directive 2.101).

For those migratory bird species protected by the MBTA, WS would only use lethal methods, including egg destruction, after the USFWS authorized the lethal removal of the target migratory bird species and would only use those methods allowed in an authorization. The use of methods that live-capture migratory birds protected by the MBTA also require authorization from the USFWS; therefore, WS would only use live-capture methods after the USFWS had issued the appropriate permit or authorization allowing the capture of the target bird species. Similarly, the DPNR may also require authorization before conducting activities that lethally remove or captures a target bird species. Many nonnative species, such as rock pigeons and house sparrows, do not require authorization from the USFWS or the DPNR to use lethal methods or live-capture methods. WS' activities to manage damage associated with birds in the USVI would comply with WS Directive 2.301.

In general, the most effective approach to resolving damage would be to integrate the use of several methods simultaneously or sequentially while continuing to evaluate the effectiveness of the method or methods. Alternative 1 would be an adaptive approach to managing damage that would integrate the use of the most practical and effective methods as determined by a site-specific evaluation for each request after applying the WS Decision Model. The philosophy behind an adaptive approach would be to integrate the best combination of methods while minimizing the potentially harmful effects on people, target and nontarget species, and the environment. WS' personnel would not necessarily use every method from Appendix B to address every request for assistance but would use the WS' Decision Model to determine the most appropriate approach to address each request for assistance, which could include using additional methods from Appendix B if initial efforts were unsuccessful at reducing damage or threats of damage adequately.

Alternative 2 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI using only nonlethal methods

Under this alternative, WS would implement an adaptive integrated methods approach as described under Alternative 1, including the use of the WS' Decision Model; however, WS would only consider nonlethal methods when formulating approaches to resolve damage associated with bird species. WS could provide technical assistance and/or direct operational assistance similar to Alternative 1. WS would provide technical assistance to those entities requesting assistance as described for Alternative 3. The only methods that WS could recommend and/or use would be nonlethal methods. Nonlethal methods that WS could use and/or recommend include exclusion methods (*e.g.*, netting, overhead wires, fencing, surface coverings), auditory deterrents (*e.g.*, propane cannons, pyrotechnics, electronic distress calls), and visual deterrents (*e.g.*, scarecrows, lasers, lights). In addition, WS could use and/or recommend inactive nest destruction, live-capture (*e.g.*, nets, live traps), limited habitat alteration/modification (*e.g.*, pruning trees), supplemental feeding, and lure crops. Section I of Appendix B describes those nonlethal methods in more detail.

WS would refer requests for information regarding lethal methods to the USFWS, the DPNR, and/or private entities. Although WS would not recommend or use lethal methods under this alternative, other entities, including private entities, could use the lethal methods discussed in Section II of Appendix B to resolve damage or threats of damage. The USFWS could continue to authorize the lethal take of migratory birds protected by the MBTA. In addition, the DPNR could authorize the lethal take of bird species in the USVI.

Alternative 3 – WS would recommend an integrated methods approach to managing bird damage in the USVI through technical assistance only

If WS implements Alternative 3, WS would continue to use the WS' Decision Model to respond to requests for assistance; however, WS would only provide those cooperators requesting assistance with technical assistance. Technical assistance would provide those cooperators experiencing damage or threats of damage associated with birds with information, demonstrations, and recommendations on available and appropriate methods available. The implementation of methods and techniques to alleviate or prevent damage would be the responsibility of the requester with no direct involvement by WS. In some cases, WS may provide supplies or materials that were of limited availability for use by private entities (*e.g.*, loaning of propane cannons). Similar to Alternative 1 and Alternative 2, a key component of assistance provided by WS would be providing information to the requester about birds and how to manage damage associated with target bird species.

Education would be an important component of technical assistance because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife.

This is extremely challenging as nature has no balance, but rather is in continual flux. When responding to a request for assistance, WS would provide those entities with information regarding the use of appropriate methods. WS would provide property owners or managers requesting assistance with information regarding the use of effective and practical techniques and methods. In addition to the routine dissemination of recommendations and information to individuals or organizations experiencing damage, WS could provide lectures, courses, and demonstrations to agricultural producers, homeowners, governmental entities, colleges and universities, and other interested groups. WS frequently cooperates with other entities in education and public information efforts. Additionally, WS' personnel may present technical papers at professional meetings and conferences so that other wildlife professionals and the public receive updates on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Technical assistance would include collecting information, such as the number of birds involved, the extent of the damage, and previous methods that the cooperator had used to alleviate the problem. WS' personnel would then provide information on appropriate methods that the cooperator could consider to alleviate the damage themselves. Types of technical assistance projects may include a site visit to the affected property, written communication, telephone conversations, or presentations to groups such as homeowner associations or civic leagues.

Generally, WS' personnel would describe several management strategies to the requester for short and long-term solutions to managing damage based on the level of risk, need, and the practicality of their application. WS' personnel would recommend and loan only those methods legally available for use by the appropriate individual. Those methods described in Appendix B would be available to those people experiencing damage or threats associated with birds in the USVI.

Those entities seeking assistance with reducing damage could seek direct operational assistance from other governmental agencies, private entities, or conduct activities on their own. In situations where nonlethal methods were ineffective or impractical, WS could advise the property owner or manager of appropriate lethal methods to supplement nonlethal methods. In addition, WS' personnel would also advise the property owner or manager of the potential need to seek authorization from the USFWS and the DPNR to take target bird species, such as the need to apply for a depredation permit from the USFWS to take migratory birds.

When conducting technical assistance, WS' personnel could assist people experiencing damage caused by birds with the process for applying for their own depredation permit from the USFWS. In accordance with WS Directive 2.301, WS' personnel will assist people seeking assistance with applying for a depredation permit from the USFWS by completing a USFWS Migratory Bird Permit Application or Review form (WS Form 37). The USFWS Migratory Bird Permit Application or Review form provides the USFWS with the basic information required as part of the application process for a depredation permit, which includes information on the extent of the damages or risks, the number of birds involved, and recommended methods to alleviate damage (see 50 CFR 21.41 for required information). Following review by the USFWS of a complete application for a depredation permit from a property owner or manager and the USFWS Migratory Bird Permit Application or Review form, the USFWS could issue a depredation permit authorizing the lethal take of a specified number of birds and bird species.

Alternative 4 – WS would not provide any assistance with managing damage caused by birds in the USVI

This alternative would preclude any activities by WS to alleviate damage or threats of damage associated with those bird species addressed in the EA. WS would refer all requests for assistance associated with target bird species to the USFWS, to the DPNR, and/or to private entities. This alternative would not

prevent other governmental agencies and/or private entities from conducting damage management activities directed at alleviating damage and threats associated with birds in the territory. Therefore, under this alternative, entities seeking assistance with addressing damage caused by those bird species addressed in this EA could contact WS but WS would immediately refer the requester to other entities. The requester could then contact other entities for information and assistance, could take actions to alleviate damage without contacting any entity, or could take no further action. All of the methods listed in Appendix B would be available for use by other governmental agencies and private entities to manage damage and threats associated with birds.

2.2.3 Alternatives Considered But Not Analyzed Further In Chapter 3 for the Reasons Provided

In addition to those alternatives discussed in Section 2.2.2, WS identified several additional alternative approaches to meeting the need for action. However, those alternatives will not receive detailed analysis in Chapter 3 for the reasons provided for each alternative. Those alternatives considered but not analyzed in detail include the following.

Implementation of Alternative 1 but WS must use all of the nonlethal methods identified in Appendix B before using lethal methods

Implementation of this alternative would be an adaptive integrated methods approach similar to Alternative 1. However, this alternative would require that WS apply nonlethal methods or techniques described in Appendix B to all requests for assistance to reduce damage and threats to safety associated with target bird species in the territory. If the use of nonlethal methods failed to alleviate the damage situation or reduce threats to human safety at each damage situation, WS' personnel would use lethal methods to alleviate the damage or threat occurring. WS' personnel would apply nonlethal methods to every request for assistance regardless of severity or intensity of the damage or threat until the employee deemed those nonlethal methods inadequate to resolve the damage or threat. This alternative would not prevent the use of lethal methods by other entities to alleviate damage or threats of damage.

WS did not carry this alternative forward for further analysis in Chapter 3 because people experiencing damage often employ nonlethal methods to reduce damage or threats prior to contacting WS. For example, Stickley and Andrews (1989) conducted a survey of catfish farms in Mississippi during 1988 to determine the methods and costs associated with dispersing fish-eating birds from ponds where the farms were raising catfish. Of the 281 catfish farms that replied to the survey, 87% of the farmers felt the economic losses associated with fish-eating birds was sufficient to warrant hazing fish-eating birds from the ponds (Stickley and Andrews 1989). Stickley and Andrews (1989) found that catfish farms in Mississippi spent an average of 2.6 hours per day hazing waterbirds from aquaculture ponds. Of those aquaculture facilities that used propane cannons, 9% indicated their use was "*very effective*", 51% indicated they were "*somewhat effective*" and 40% indicated they were "*not effective*" (Stickley and Andrews 1989). Similarly, of the aquaculture facilities using pyrotechnics, 24% considered their use to be "*very effective*", 57% considered them to be "*somewhat effective*" and 19% determined the use of pyrotechnics was "*not effective*" (Stickley and Andrews 1989). For example, during 1988, aquaculture producers in Mississippi reported spending an average of $7,400 per farmer, or a total of more than $2.1 million, to haze birds from their ponds (Stickley and Andrews 1989). In addition, the USFWS requires the use of nonlethal methods prior to authorizing the take of those bird species protected from take by the MBTA. Therefore, people often use nonlethal methods prior to contacting WS for assistance.

If WS implemented this alternative, WS would be required to implement nonlethal methods the entity requesting assistance had already used or would have to establish criteria to measure the efforts of the requesting entity to determine if the requesting entity applied nonlethal methods appropriately. For example, Price and Nickum (1995) concluded that the aquaculture industry has small profit margins so

that even a small percentage reduction in the farm gate value due to predation is an economic issue. Therefore, continuing to use methods already proven ineffective at alleviating the damage could prolong the amount of time damage occurs, which could increase the economic losses. Because many people that request assistance use nonlethal methods but continue to experience damage or threats of damage and because there is no standard that exists for the use of nonlethal methods, WS did not carry this alternative forward for further analysis in Chapter 3. In addition, implementation of Alternative 1 would be similar to a nonlethal before lethal alternative because WS' personnel would consider the use of nonlethal methods before considering the use of lethal methods (see WS Directive 2.101). Adding a nonlethal before lethal alternative and the associated analysis would not add additional information to the analyses in this EA.

WS would implement Alternative 1 but would only use lethal methods

This alternative would be similar to Alternative 1 but WS would use only those methods that lethally remove birds. Under WS Directive 2.101, WS must consider the use of nonlethal methods before lethal methods. The USFWS also requires the use of nonlethal methods prior to issuing a depredation permit to take migratory birds. Nonlethal methods have been effective in alleviating some bird damage. For example, the use of nonlethal methods has been effective in dispersing urban crow roosts and vulture roosts (Avery et al. 2002, Seamans 2004, Avery et al. 2008, Chipman et al. 2008). In those situations where damage could be alleviated using nonlethal methods, WS' personnel could use those methods and/or recommend those methods as determined by the WS Decision Model. Therefore, WS did not consider this alternative in detail.

WS would develop a program that compensates people for damage

This alternative would require WS to establish a system to reimburse persons impacted by bird damage. Under such an alternative, WS would continue to provide technical assistance to those persons seeking assistance with managing damage. In addition, WS would conduct site visits to verify damage. Compensation would require large expenditures of money and labor to investigate and validate damage claims and to determine and administer appropriate compensation. Compensation would most likely be below full market value. Compensation for damages would give little incentive to resource owners to limit damage through improved cultural or other practices and management strategies and would not be practical for reducing threats to human health and safety. For the above listed reasons, WS did not carry this alternative forward for further analysis in Chapter 3.

WS would implement Alternative 1 but would establish a loss threshold before allowing lethal methods

There is also a concern that damage caused by animals should be a cost of doing business and/or that there should be a threshold of damage before allowing the use of lethal methods to manage damage. In some cases, cooperators likely tolerate some damage and economic loss until the damage reaches a threshold where the damage becomes an economic burden. The appropriate level of allowed tolerance or threshold before employing lethal methods would differ among cooperators and damage situations. In some cases, any loss in value of a resource caused by birds could be financially burdensome to some people. In addition, establishing a threshold would be difficult or inappropriate to apply to human health and safety situations. For example, aircraft striking birds could lead to property damage and could threaten passenger safety if a catastrophic failure of the aircraft occurred because of the strike. Therefore, addressing the threats of aircraft strikes prior to an actual strike occurring would be appropriate. For those reasons, WS did not carry this alternative forward for further analysis in Chapter 3.

WS would require cooperators completely fund activities (no taxpayer money)

This alternative would be similar to Alternative 1 or Alternative 2 except WS would require the entity requesting assistance to pay for any activities conducted by WS. Therefore, no activities conducted by WS would occur through federal appropriations or territory funding (*i.e*., no taxpayer money). Funding for WS' activities could occur from federal appropriations, through territory funding, and/or through money received from the entity requesting assistance. In those cases where WS receives federal and/or territory funding to conduct activities, federal, territory, and/or local officials have made the decision to provide funding for damage management activities and have allocated funds for such activities. Additionally, damage management activities are an appropriate sphere of activity for government programs because managing wildlife is a government responsibility. Treves and Naughton-Treves (2005) and the International Association of Fish and Wildlife Agencies (2005) discuss the need for wildlife damage management and that an accountable government agency is best suited to take the lead in such activities because it increases the tolerance for wildlife by those people being impacted by their damage and has the least impacts on wildlife overall. Therefore, WS did not carry this alternative forward for further analysis in Chapter 3.

WS would implement Alternative 1 but would require cooperators fund the use of lethal methods

This alternative would be identical to Alternative 1 except WS would require people requesting assistance to pay for all the costs associated with using lethal methods to resolve their request for assistance. If WS used lethal methods to alleviate or prevent damage, the person requesting assistance would be responsible for paying for the costs associated with those activities. WS could then use existing federal and/or territory funding to pay for the costs associated with using nonlethal methods to manage bird damage. WS did not carry this alternative forward for further analysis because the environmental consequences associated with the use of this method would be identical to Alternative 1.

WS would refer requests for assistance to Private Nuisance Wildlife Control Agents

People experiencing damage or threats of damage associated with birds could contact private wildlife control agents and/or other private entities to reduce damage when they deem appropriate. In addition, WS could refer persons requesting assistance to private wildlife control agents and/or other private entities if WS implemented any of the alternative approaches. WS Directive 3.101 provides guidance on establishing cooperative projects and interfacing with private businesses. WS only responds after receiving a request for assistance. If WS implemented Alternative 1 or Alternative 2, WS would inform requesters that other service providers, including private entities, might be available to provide assistance. Therefore, WS did not carry this alternative forward for further analysis.

Trap and translocate birds only by WS

Under this alternative, WS would address all requests for assistance using live-capture methods or the recommendation of live-capture methods. Birds could be live-captured using live-traps, cannon nets, rocket nets, bow nets, net guns, mist nets, or hand-capture. All birds live-captured through direct operational assistance by WS would be translocated. Prior to live-capture, WS' personnel would identify a release site or sites and obtain approval from the appropriate property owner and/or manager to release birds on their property or properties. In addition, the translocation of most bird species requires prior authorization from the USFWS and the DPNR. For example, WS would need prior approval from the USFWS to live-capture and translocate red-tailed hawks. WS could translocate birds if WS implemented Alternative 1 or Alternative 2. Other entities could translocate birds to alleviate damage if WS implemented Alternative 3 or Alternative 4.

Translocation may not be appropriate for all bird species. For example, it may be inappropriate to translocate and release nonnative bird species. In addition, the translocation of birds causing damage or posing a threat of damage to other areas following live-capture generally would not be effective or cost-effective. Translocation is generally ineffective because problem bird species are highly mobile and can easily return to damage sites from long distances, habitats in other areas are generally already occupied, and translocation would most likely result in bird damage problems at the new location. In addition, hundreds or thousands of birds would need to be captured and translocated to solve some damage problems (*e.g.*, urban crow roosts); therefore, translocation would be unrealistic in those circumstances. Translocation of wildlife is also discouraged by WS policy (see WS Directive 2.501) because of the stress to the translocated animal, poor survival rates, the potential for disease transmission, and the difficulties that translocated wildlife have with adapting to new locations or habitats (Nielsen 1988, Craven et al. 1998, Massei et al. 2010). Therefore, WS did not consider this alternative in detail.

Reducing damage by managing bird populations through the use of reproductive inhibitors

Under this alternative, the only method available to alleviate requests for assistance would be the recommendation and the use of reproductive inhibitors to reduce or prevent reproduction in birds responsible for causing damage. Reproductive inhibitors are often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1997). Use and effectiveness of reproductive control as a population management tool is limited by population dynamic characteristics (*e.g.*, longevity, age at onset of reproduction, population size, and biological/cultural carrying capacity), habitat and environmental factors (*e.g.*, isolation of target population, cover types, and access to target individuals), socioeconomic factors, and other factors.

Reproductive control for wildlife could be accomplished through sterilization (permanent) or contraception (reversible). Sterilization could be accomplished through surgical sterilization (vasectomy, castration, and tubal ligation), chemosterilization, or gene therapy. Contraception could be accomplished through hormone implantation (synthetic steroids such as progestins), immunocontraception (contraceptive vaccines), or oral contraception (progestin administered daily).

Population modeling indicates that reproductive control is more effective than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproductive control technologies as a wildlife management tool for some species. Currently, no reproductive inhibitors are available for use to manage most bird populations. Given the costs associated with live-capturing and performing sterilization procedures on birds and the lack of availability of chemical reproductive inhibitors for the management of most bird populations, WS did not evaluate this alternative in detail.

If a reproductive inhibitor becomes available to manage a large number of bird populations and is proven effective in reducing localized bird populations, WS could evaluate the use of the inhibitor as a method available under the alternatives. WS would review and supplement this EA to the degree necessary to evaluate the use of the reproductive inhibitor.

CHAPTER 3: ENVIRONMENTAL EFFECTS

Chapter 3 provides information needed for making informed decisions by comparing the environmental consequences of the four alternatives. Section 3.1 provides further discussion on how WS will evaluate significance as it relates to the NEPA. To determine if the real or potential effects are greater, lesser, or

the same as the environmental baseline, Section 3.2 compares the environmental consequences associated with each of the four alternatives. A discussion occurs on the cumulative and unavoidable impacts, including direct and indirect effects, in relation to the issues for each of the alternatives. Impacts caused by implementation of an alternative approach and occur at the same time and place are direct effects. In contrast, impacts caused by implementing an alternative approach that occur later in time or further removed in distance, and are still reasonably foreseeable, are indirect effects. The analyses discuss the cumulative effects in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from similar activities, and include summary analyses of potential cumulative impacts to target and nontarget species, including threatened or endangered species, threats to human health and safety, and the humaneness of methods.

3.1 EVALUATION OF SIGNIFICANCE

Section 3.2 evaluates the direct, indirect, and cumulative impacts associated with implementation of the four alternatives under each of the issues. The NEPA describe the elements that determine whether an impact is "*significant*". Significance is dependent upon the context and intensity of the action. When reviewing the context and intensity of the four alternatives, WS considered the magnitude of the impact, the duration/frequency of the action, the likelihood of the impact, the geographic extent, the legal status, and conforming to statutes, regulations, and policies.

3.1.1 Magnitude of the Impact

The basis for determining the magnitude of an impact is the size, number, or relative amount of the impact (intensity). For example, the analysis that occurs in Section 3.2 measures the number of birds that WS could lethally remove annually in relation to the abundance of those bird species to determine the magnitude of impact to those species' populations from the lethal removal of those birds. Magnitude may be determined either quantitatively or qualitatively. Determinations based on population estimates would be quantitative. Determinations based on population trends and harvest trend data would be qualitative.

3.1.2 Duration and Frequency of the Action

The duration and frequency of the impact relates to factors, such as, is the impact temporary, seasonal, or ongoing throughout the year (intensity). The duration and frequency of activities associated with the alternatives would be highly variable. Abiotic and biotic factors affecting bird behavior would affect the duration and frequency of activities conducted by WS if WS implemented any of the alternative approaches. Although activities may involve programs of long duration, the frequency of individual activities within the program may be highly variable depending upon spatial, temporal, and biotic factors affecting the behavior of target bird species that are causing damage. For instance, some requests for assistance are associated with birds that nest further north but spend the winter in the USVI or pass through the USVI to wintering areas before they migrate back northward in the spring to nest. Therefore, some activities that could occur if WS implemented Alternative 1, Alternative 2, or Alternative 3 would occur in the fall, winter, and early spring when the number of birds present in the territory increases. Projects involving damage management activities at individual sites are generally of short duration but may happen frequently at different sites.

3.1.3 Likelihood of the Impact

This factor can relate to the likelihood that there would be a need for a particular damage management action, and to the likelihood that an impact may occur because of a damage management action. For example, most requests for assistance that WS receives in the USVI involve risks of aircraft striking birds at air facilities; therefore, the likelihood that WS could address a bird species to alleviate aircraft strike

risks may be relatively high. WS receives very few requests for assistance involving accumulations of fecal droppings causing damage to property in the USVI; therefore, the need to address birds to alleviate property damage caused by fecal accumulations may be much lower.

3.1.4 Geographic Extent

If WS implemented Alternative 1, Alternative 2, or Alternative 3, WS would continue to provide assistance in areas of the USVI where people request assistance and, when applicable, agreements for activities are in place. Because most requests for assistance are associated with aircraft strike risks at air facilities, most activities would occur at airports in the territory. The USVI encompasses over 136 square miles of land area (Platenberg and Valiulis 2018*a*), which equates to 87,040 acres. However, agreements to conduct activities to manage damage associated with birds comprise a small portion of the land area in the USVI and not all properties where people request assistance may need assistance with birds in any given year.

3.1.5 Legal Status

The legal status of an affected resource would be a contextual consideration. Legal status may range from protected by federal law or territory law to no protection. In addition to the NEPA, several territory and federal regulations would be relevant to activities that WS could conduct when providing assistance (see Section 1.4.6). For example, the MBTA protects migratory birds from take. In another example, federal law protects species of wildlife and plants listed as threatened or endangered pursuant to the ESA.

3.1.6 Complying with Statutes, Regulations, and Policies

Statutes, regulations, and policies provide contextual information in the analysis. Compliance with applicable statutes, regulations, and policies can also serve as mitigation to ensure that certain types of adverse effects on the environment do not occur.

3.2 ENVIRONMENTAL CONSEQUENCES BY ISSUE ANALYZED IN DETAIL

WS developed the alternative approaches (see Section 2.2.2) to meet the need for action identified in Section 1.4 and to address the issues identified in Section 2.1. This section analyzes the environmental consequences of each alternative approach in comparison to determine the extent of actual or potential impacts on each of the issues. Therefore, Alternative 1 serves as the baseline for the analysis and the comparison of expected impacts among the alternative approaches. The analysis also takes into consideration mandates, directives, and the procedures of WS, the USFWS, and the DPNR.

3.2.1 Issue 1 - Effects of Damage Management Activities on Target Bird Populations

Maintaining viable populations of native species is a concern of the public, the DPNR, and federal agencies, including WS. If WS implemented Alternative 1, Alternative 2, or Alternative 3, WS could conduct and/or recommend that others conduct activities that could disperse, exclude, capture, or lethally remove birds depending on the alternative approach WS selected and implemented. Appendix B identifies and discusses the methods that WS could consider when formulating strategies to resolve damage caused by birds in the USVI when someone requests such assistance. If WS implemented Alternative 4, WS would not conduct any activities in the USVI involving those target bird species addressed in this EA. This section evaluates the magnitude of cumulative effects on the populations of target bird species that could occur if WS implemented one of the four alternative approaches.

- ***Impacts of Avian Influenza on Bird Populations***

A virus in the Orthomyxovirus group causes avian influenza. Viruses in this group vary in the intensity of illness (*i.e.*, virulence) they may cause. Wild birds, in particular waterfowl and shorebirds, can be natural reservoirs for the AIV (Davidson and Nettles 1997, Alexander 2000, Stallknecht 2003, Pedersen et al. 2012). Most strains of the AIV rarely cause severe illness or death in birds, although some strains tend to be highly virulent and very contagious. However, even the strains that do not cause severe illness in birds are a concern for human and animal health officials because the viruses have the potential to become virulent and transmissible to other species through mutation and reassortment (Clark and Hall 2006).

There are two types of AIVs, low pathogenic and high pathogenic AIV (USGS 2013). The low and high refer to the potential of the viruses to kill domestic poultry (USGS 2013). In wild birds, low pathogenic AIV rarely causes signs of illness and it is not an important mortality factor for wild birds (Davidson and Nettles 1997, Clark and Hall 2006). In contrast, high pathogenic AIV has sickened and killed large numbers of wild birds (USGS 2013). Prior to 2014, high pathogenic strains were not known to occur in wild waterfowl species in North America (Brown et al. 2006, Keawcharoen et al. 2008, USGS 2015).

In December 2014, highly pathogenic AIV was isolated from a northern pintail (*Anas acuta*) in Washington State making it the first detection of highly pathogenic AIV in wild birds in North America (USGS 2015). The detection in North America coincided with the detection of the virus in poultry across the western and central United States (USDA 2015*b*). WS has been one of several agencies and organizations conducting surveillance and monitoring of avian influenza in migratory birds. Between December 20, 2014 and February 1, 2015, Bevins et al. (2016) reported 63 cases of highly pathogenic AIV in wild birds across the United States. All 63 cases were detected in waterfowl sampled from hunter-harvested birds during the annual hunting season (Bevins et al. 2016). Although mortality events involving the highly pathogenic AIV have occurred in waterfowl, there have been no reports of major waterfowl die-offs from the virus. In addition, no reports of major die-offs of other bird species have occurred. Therefore, there is no evidence to suggest that the AIV is or will have an effect on bird populations. As stated previously, most strains of avian influenza do not cause severe illnesses or death in wild bird populations.

- **Population Impact Analyses of the Alternatives - Direct, Indirect, and Cumulative Effects**

Direct effects are impacts the action causes and occur at the same time and place. Indirect effects occur because of the action but are later in time or farther removed in distance. Indirect effects may include impacts related to actions that induced changes in population density, ecosystems, and land use changes. Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time. The potential cumulative impacts analyzed below would occur from either WS' damage management program activities over time or from the aggregate effects of those activities combined with the activities of other agencies and private entities.

As discussed in Section 1.4.5, the USFWS and the DPNR are the federal and territory entities responsible for managing those native bird species addressed in this EA. Through ongoing communication with the USFWS and the DPNR, WS can consider the activities of other agencies and private entities to the extent that those agencies know those activities occur. WS does not typically conduct direct damage management activities concurrently with other governmental or private entities at a location, but may conduct damage management activities at adjacent sites within the same period.

WS' actions would be occurring simultaneously over time with other natural processes and human generated changes that are currently taking place. These activities include, but are not limited to

- Natural mortality of birds
- Human-induced mortality through vehicle strikes, aircraft strikes, and illegal take
- Human-induced mortality of birds through private damage management activities
- Human-induced mortality through regulated harvest
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in wildlife population densities

All those factors play a role in the dynamics of bird populations. WS' employees use the WS Decision Model to evaluate damage occurring (including other affected elements and the dynamics of the damaging species) and to determine appropriate strategies to minimize effects on environmental elements. After WS' personnel apply damage management actions, they subsequently monitor and adjust/cease damage management actions (Slate et al. 1992). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

With management authority over bird populations, the USFWS and the DPNR could adjust take levels, including the take by WS, to achieve population objectives for bird species. Consultation and reporting of take by WS would ensure the USFWS and the DPNR had the opportunity to consider the activities conducted by WS. As stated previously, WS would not use or recommend those lethal methods available as population management tools over broad areas. WS would use and recommend lethal methods to reduce the number of birds present at a location where damage was occurring by targeting those birds causing damage or posing threats; therefore, the intent of lethal methods would be to manage those birds causing damage and not to manage entire bird populations.

Because take of most bird species can only legally occur when authorized by the USFWS and the DPNR, the USFWS and the DPNR can consider take when determining population objectives for those bird species. Therefore, the USFWS and the DPNR could adjust the number of birds that people harvest during the regulated hunting season and the number of birds that people can take for damage management purposes to achieve the population objectives. For most species, take by WS and the authorized take allowed would occur at the discretion of the USFWS and the DPNR. Any bird population declines or increases induced through the regulation of take would be the collective objective for bird populations established by the USFWS and the DPNR.

As discussed previously, the analysis for magnitude of impact from lethal take can be determined either quantitatively or qualitatively. Quantitative determinations may rely on population estimates, allowable removal levels, and actual removal data. Qualitative determinations may rely on population trend data, when available. Information on bird populations and trends are often derived from several sources including the BBS, the CBC, the Partners in Flight Landbird Population database, and available literature. The potential impacts of conducting the alternatives on the populations of target bird species occurs below for each alternative.

Alternative 1 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI (Proposed Action/No Action)

If WS implements Alternative 1, WS would be available to provide both technical assistance and direct operational assistance to those persons requesting assistance with managing damage and threats caused by

birds in the USVI. The effects on the populations of target bird species associated with WS providing technical assistance during the implementation of Alternative 1 would be similar to those effects discussed for Alternative 3. Therefore, to reduce redundancy, the effects associated with WS providing technical assistance that would occur if WS implements Alternative 1 occur in the discussion for Alternative 3.

When providing direct operational assistance, WS could employ those methods described in Appendix B in an adaptive approach that would integrate methods to reduce damage and threats associated with birds effectively. WS' personnel would use the WS Decision Model (see Appendix E) to identify the most appropriate damage management strategies and their impacts. If WS implemented Alternative 1, WS' personnel could choose to use any of the methods discussed in Appendix B when using the WS Decision Model to formulate strategies. Therefore, implementation of Alternative 1 would allow WS' personnel to consider the widest range of methods available when formulating strategies to resolve requests for assistance associated with birds. WS' personnel would employ methods in an adaptive approach that would integrate methods to reduce damage and threats of damage associated with birds in the USVI. WS would only use methods after WS and the appropriate entity requesting assistance signed a MOU, work initiation document, or a similar document allowing WS to use those methods on property they own or manage. When practical and effective, WS' personnel would give preference to nonlethal methods pursuant to WS Directive 2.101.

A common concern is whether damage management actions would adversely affect the population of a target bird species, especially when WS and other entities use lethal methods. If WS implemented Alternative 1, the potential effects on the populations of target bird species associated with WS' use of nonlethal methods would be similar to those potential effects discussed for Alternative 2 because the same nonlethal methods would be available for use by WS' personnel. To limit redundancy, a discussion on the potential effects associated with the use of nonlethal methods does not occur for Alternative 1 because those potential effects would be similar to those discussed for Alternative 2 but those potential effects could possibly occur if WS' implemented Alternative 1. In general, the use of nonlethal methods to disperse, exclude, or capture birds from areas where they are causing damage or posing a threat of damage would have minimal effects on the overall population of a target bird species because those methods generally do not harm birds (see discussion for Alternative 2).

Therefore, the evaluation of potential effects on the populations of target bird species for Alternative 1 will primarily focus on WS' use of lethal methods because WS' personnel could use lethal methods to remove an individual bird or a group of birds to alleviate damage. WS would only target an individual bird or a group of birds identified as causing damage or posing a threat to human safety. Therefore, if WS implemented Alternative 1, WS could lethally remove birds, which could potentially have direct, indirect, and cumulative effects on the populations of target bird species. WS would only take migratory bird species protected by the MBTA when authorized by the USFWS and only at authorized levels. Similarly, WS would only take bird species when authorized by the DPNR, when required, and only at authorized levels.

A lethal method that WS could employ would be the destruction of active and inactive nests of target bird species. For those species protected from take by the MBTA, the destruction of active nests (those nests containing eggs or nestlings) can only occur when the USFWS permits those activities and only at the levels they permit. People can destroy inactive nests (those nests that do not contain eggs or nestlings) without the need for a depredation permit from the USFWS. People often use nest destruction to alleviate damage associated with the nesting activities and/or to discourage nesting in an area where damages occur or could occur. Many bird species have the ability to identify areas with regular human disturbance and low reproductive success and they will relocate to nest elsewhere when confronted with repeated nest failure. After the initial removal of active or inactive nests, WS' personnel or the cooperating entity

would attempt to monitor the site for additional nesting activity. If new nesting activity occurred, WS' personnel would continue to destroy the inactive nests by hand. After repeated nesting failures, birds often seek other nesting locations. Monitoring a site for nesting activity by WS' personnel would reduce or alleviate the need to destroy eggs and euthanize any nestlings.

Although there may be reduced fecundity for the individuals affected by nest destruction, this activity would not have long-term effects on breeding adult birds because of the limited number of nests removed and the ability of many bird species to re-nest after a nest failure. WS does not use nest destruction as a population management method. WS uses nest destruction to inhibit nesting in an area experiencing damage due to or associated with the nesting activity and those activities only occur at a localized level. If WS' personnel encounter eggs and/or nestlings in an active nest, WS could destroy the eggs by puncturing the eggs, oiling the eggs, shaking the eggs, or by breaking the eggs open. If WS' personnel encountered nestlings in an active nest, WS' personnel would euthanize those nestlings in accordance with WS Directive 2.505. For the purposes of the analysis, WS will consider nestlings euthanized as part of the cumulative take of a target bird species.

The use of lethal methods could result in local population reductions in the area where damage or threats were occurring because those methods would remove birds from a population. WS often uses lethal methods to reinforce nonlethal methods and to remove birds that WS' personnel identify as causing damage or posing a threat of damage. The analysis includes WS' anticipated annual take level for each species, which WS based on previous requests for assistance associated with the species and in anticipation of future requests for assistance. WS' anticipated annual take level for each species is not a prescribed take level but is a maximum take level that WS anticipates could occur annually to alleviate damage. The number of birds removed annually by WS using lethal methods would be dependent on the number of requests for assistance received, the number of birds involved with the associated damage or threat, the efficacy of methods employed, and the take permitted by the USFWS and the DPNR. WS' personnel would only target the bird or birds that they identify as responsible for causing damage or posing a threat of damage. The potential impacts on the populations of target bird species from the implementation of Alternative 1 occurs below.

COMMON GROUND DOVE POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

The common ground dove is among the smallest doves in North America (Bowman 2020). The species occurs throughout the southernmost portion of the United States from Florida to California, the West Indies, Mexico, much of Central America, and the northern third of South America. Common ground doves prefer arid, early-successional open woodlands and shrub or scrub habitats (Bowman 2020). Common ground doves often occur in residential areas and in irrigated agricultural fields (Bowman 2020). Common ground doves breed year round, though breeding typically peaks in response to resource availability. Common ground doves can have up to four clutches per year with two eggs per clutch. Common ground doves feed predominantly on tiny seeds of grasses and weeds (Bowman 2020).

There are an estimated 36 million common ground doves globally, including two million ground doves in the United States (Partners in Flight 2020). BirdLife International (2018*a*) classified common ground doves as a species of least concern with a slightly decreasing population trend. The number of common ground doves observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -0.8% annually from 1966 through 2017 (USGS 2020*b*). From 2007 through 2017, the number of common ground doves observed across all routes surveyed in the United States and Canada during the BBS has shown an increasing trend estimated at 0.1% annually (USGS 2020*b*).

Although the population of common ground doves is currently unknown in the USVI, common ground doves were not listed as a species of concern in the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands (Nytch et al. 2015). Furthermore, the USVI Wildlife Action Plan listed common ground doves as a species of least concern, a classification for species that are widespread and abundant in the USVI (Platenberg and Valiulis 2018*b*). Since the early 1970s, the number of common ground doves observed in areas of the USVI surveyed during the CBC has shown a general stable trend (National Audubon Society 2020). Common ground doves can be harvested in the USVI during a regulated hunting season. However, because the DPNR has not issued hunting licenses in recent years due to low demand, relevant harvest data is not available.

Table 3.1 shows the number of common ground doves that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed common ground doves using vehicle activity, pyrotechnics, and the noise associated with the discharge of a firearm. WS used firearms to remove common ground doves that WS' personnel identify as causing damage or posing a risk of damage. Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 50 common ground doves per year in the USVI. However, WS anticipates continuing to address most damage caused by common ground doves using nonlethal methods.

Although information on the common ground dove population in the USVI is limited, WS does not anticipate the take of up to 50 common ground doves per year in the USVI to affect the population adversely because WS' take would only occur when authorized by the USFWS and the DPNR and only at the take levels authorized. The USFWS and the DPNR are the agencies responsible for managing most bird populations in the USVI, including common ground doves (see Section 1.4.5, Section 2.2.1). Therefore, the authorization of take by the USFWS and the DPNR indicates the take by WS and other entities occurs within allowable take levels.

Table 3.1 – Number of common ground doves addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	36	0
2016	8	2
2017	20	0
2018	0	1
2019	116	18

In addition, WS' take would not adversely affect the common ground dove population in the USVI because the take of up to 50 common ground doves is likely to be of low magnitude to the actual population in the USVI. Similar to other migratory birds addressed in this EA, the take of common ground doves by WS would only occur at the discretion of the USFWS and the DPNR and only at levels permitted by the USFWS and the DPNR. Therefore, all take by WS to alleviate damage or threats associated with common ground doves would be evaluated pursuant to the objectives of the MBTA and the Endangered and Indigenous Species Act of 1990.

ROCK PIGEON POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Rock pigeons are a nonnative species that people first introduced to North America for sport, carrying messages, and as a source of food (Schorger 1952, Lowther and Johnston 2020). Many of those birds escaped and eventually formed the feral pigeon populations that now occur throughout the United States, southern Canada, and Mexico, including the USVI (Lowther and Johnston 2020). Pigeons are non-migratory and they are closely associated with people, where human structures and activities provide them with food and sites for roosting, loafing, and nesting (Williams and Corrigan 1994, Lowther and

Johnston 2020). Thus, pigeons commonly occur around city buildings, bridges, parks, farmyards, grain elevators, feed mills, and other structures (Williams and Corrigan 1994, Lowther and Johnston 2020). Additionally, although pigeons are primarily grain and seed eaters, they will readily feed on garbage, spilled grains, insects, and any other available bits of food (Williams and Corrigan 1994, Lowther and Johnston 2020).

There are an estimated 12 million rock pigeons in the United States and 140 million rock pigeons globally (Partners in Flight 2020). The number of rock pigeons observed across all routes surveyed in the United States and Canada during the BBS has shown a declining trend estimated at -1.2% annually from 1966 through 2017 (USGS 2020*b*). From 2007 through 2017, the number of rock pigeons observed across all routes surveyed in the United States and Canada during the BBS has shown a declining trend estimated at -0.3% annually (USGS 2020*b*). Since the early 1970s, the number of rock pigeons observed in areas of the USVI surveyed during the CBC has shown an overall increasing trend, though the number observed has shown a decreasing trend since the mid-2000s (National Audubon Society 2020). However, population estimates of rock pigeons are not available in the USVI.

Rock pigeons are not native to the United States, including the USVI. Thus, rock pigeons are afforded no protections under the MBTA or the Endangered and Indigenous Species Act of 1990. The take of rock pigeons to alleviate damage or to reduce threats can occur without the need for a depredation permit from the USFWS or the DPNR. Therefore, take by other entities in the USVI is unknown. WS has addressed previous requests for assistance associated with rock pigeons using both nonlethal dispersal methods and lethal removal. Table 3.2 shows the number of rock pigeons that WS addressed in the USVI from FY 2015 through FY 2019. WS used pyrotechnics, the presence of vehicles, and the noise associated with the discharge of a firearm to disperse rock pigeons in the USVI. In addition, WS used firearms to remove rock pigeons that WS' personnel identify as causing damage or posing a risk of damage. During FY 2019, WS addressed more rock pigeons compared to previous years because WS received more requests for assistance and available funding allowed WS to hire additional employees to address those requests.

Table 3.2 – Number of rock pigeons addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	0	0
2016	0	0
2017	0	0
2018	0	1
2019	227	52

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 500 rock pigeons annually in the USVI to alleviate damage. In addition, WS could destroy up to 50 nests annually to discourage pigeons from nesting in areas where damage or threats of damage are occurring. Because rock pigeons are a non-native species in North America, the MBTA does not afford rock pigeons protection from take. Similarly, the Endangered and Indigenous Species Act of 1990 does not protect rock pigeons from take. Therefore, a depredation permit from the USFWS and the DPNR is not required for people to take rock pigeons and there are no requirements to report the take of rock pigeons to the USFWS; therefore, the number of rock pigeons that other entities lethally remove is unknown. Activities associated with rock pigeons would occur pursuant to Executive Order 13112 and Executive Order 13751, which states that each federal agency whose actions may affect the status of invasive species shall reduce invasions of exotic species and the associated damages.

ZENAIDA DOVE POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

The zenaida dove occurs throughout the West Indies, preferring clearings and forest edge habitats, such as gardens and hotel grounds (Baptista et al. 2020). Zenaida doves feed both in trees and on the ground (Baptista et al. 2020). Zenaida doves feed primarily on grains and seeds but also eat insects and fruits (Baptista et al. 2020). Zenaida doves also consume fine gravel to aid in digestion and salt from mineral rich soil to aid in egg formation and pigeon-milk production (Wiley 1991). The peak nesting period in the USVI occurs from May through August, though eggs can be found throughout the year (Nellis et al. 1984). Although generally solitary, zenaida doves will form flocks in the fall and at sites where seasonal food is concentrated (Wiley 1991).

BirdLife International (2016*a*) classified zenaida doves as a species of least concern with an increasing population trend. Because both migratory and resident zenaida doves are found in the USVI, the number of zenaida dove present can fluctuate drastically from month to month (Nellis et al. 1984). Nellis et al. (1984) estimated monthly populations of zenaida doves in the USVI from 1974 through 1979. During this five-year period, population estimates ranged from a high of 14,492 individuals in May to a low of 4,271 individuals in November (Nellis et al. 1984).

Although Nellis et al. (1984) reported population estimates during the late 1970s, recent information on the population status of zenaida doves in the USVI is lacking. However, the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized zenaida doves in the USVI as a Tier IV species, the second lowest conservation priority score (Nytch et al. 2015). Furthermore, the USVI Wildlife Action Plan listed zenaida doves as a species of least concern, a classification for species that are widespread and abundant in the USVI (Platenberg and Valiulis 2018*b*). Since the early 1970s, the number of zenaida doves observed in areas of the USVI surveyed during the CBC has shown an overall increasing trend (National Audubon Society 2020). Zenaida doves can be harvested in the USVI during a regulated hunting season. However, because the DPNR has not issued hunting licenses in recent years due to low demand, relevant harvest data is not available.

WS has addressed previous requests for assistance associated with zenaida doves using both nonlethal dispersal methods and lethal removal. Table 3.3 shows the number of zenaida doves that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed zenaida doves using the presence of vehicles, pyrotechnics, and the noise associated with the discharge of a firearm. WS used firearms to remove zenaida doves that WS' personnel identify as causing damage or posing a risk of damage. During FY 2019, WS addressed more zenaida doves compared to previous years because WS received increasing requests for assistance and available funding allowed WS to hire additional employees to address those requests.

Table 3.3 – Number of zenaida doves addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	7	0
2016	6	0
2017	8	0
2018	0	2
2019	606	113

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 250 zenaida doves annually in the USVI to alleviate damage. If the population fluctuated from 4,271 to 14,492 zenaida doves, the take of 250 zenaida doves would range from 1.7% to 5.9% of the population.

Like other migratory bird species, the take of zenaida doves by WS to alleviate damage would only occur when permitted by the USFWS pursuant to the MBTA through the issuance of depredation permits. Similarly, the take of zenaida doves by WS would only occur when permitted by the DPNR. The take of zenaida doves by WS would only occur at levels authorized by the USFWS and the DPNR, which ensures the USFWS and the DPNR have the opportunity to consider take by WS and other entities, including hunter harvest, to achieve the desired population management levels of zenaida doves in the USVI.

CATTLE EGRET POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

The cattle egret is native to Africa, Europe, India, Australia, and the tropics of Asia (Telfair II 2020). The species is a relatively new arrival to the North American continent with the first record for the Caribbean basin occurring on the island of Old Providence in 1933 (Arendt 1988). Today, cattle egrets occur throughout the Caribbean and much of the United States, from New England to south Texas (Arendt 1988, Telfair II 2020). As their name implies, cattle egrets are closely associated with cattle where they forage on invertebrates disturbed by foraging livestock, primarily grasshoppers, crickets, and flies (Telfair II 2020). Cattle egrets also consume fish, frogs, and birds, including eggs and nestlings (Telfair II 2020).

The total population of cattle egrets in North America has been estimated to range from 750,000 to 1.5 million cattle egrets (Hunter et al. 2006). The NAWCP estimated 1.16 million cattle egrets breed in Texas alone (Kushlan et al. 2002). Given the species large distribution and high population estimates, the 2016 State of North America's Birds report listed cattle egrets as a species of low conservation concern (North American Bird Conservation Initiative 2016). Although the BBS indicates cattle egrets have a declining trend estimated at -1.5% annually from 1966 through 2017 in the United States and Canada (USGS 2020*b*), the NAWCP lists the species as "*not currently at risk*" for conservation concern in North America. Large population sizes and range expansion of cattle egrets have been attributed to the species' broad use of terrestrial habitats relative to other waterbirds (Hunter et al. 2006, Telfair II 2020).

Historically, cattle egrets did not occur in the USVI. The first records of the cattle egret occurring in the USVI began in the 1950s (Seaman 1955). Although the population of cattle egrets in the USVI is currently unknown, the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized cattle egrets in the USVI as a Tier V species, the lowest conservation priority score (Nytch et al. 2015). Furthermore, the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands recommended cattle egrets as a species that possibly needed local population reductions to alleviate documented economic, environmental, or human health and safety conflicts (Nytch et al. 2015). Since the early 1970s, the number of cattle egrets observed in areas of the USVI surveyed during the CBC has shown a slightly declining trend; however, from the late 2000s, the number observed has shown a general stable trend (National Audubon Society 2020).

WS has addressed previous requests for assistance associated with cattle egrets using both nonlethal dispersal methods and lethal removal. Table 3.4 shows the number of cattle egrets that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed cattle egrets using pyrotechnics, lasers, propane cannons, presence of vehicles, human activity, and the noise associated with the discharge of a firearm. WS used firearms to remove cattle egrets that WS' personnel identify as causing damage or posing a risk of damage. During FY 2019, WS addressed more cattle egrets compared to previous years because WS received increasing requests for assistance and available funding allowed WS to hire additional employees to address those requests.

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 1,000 cattle egrets per year in the USVI. However, WS anticipates continuing to address most damage caused by cattle egrets using nonlethal methods. In the

southeastern United States, Hunter et al. (2006) estimated the breeding population to be 350,000 breeding pairs of cattle egrets, which equates to 700,000 breeding cattle egrets. Hunter et al. (2006) recommended reducing the breeding population in the southeastern United States to less than 200,000 breeding pairs as part of efforts to reduce competition with other waterbirds. If WS lethally removed 1,000 cattle egrets to alleviate damage and threats of damage in the USVI, WS' take would represent 0.1% of the estimated 700,000 breeding cattle egrets in the southeastern United States. As noted previously, the number of cattle egrets in the USVI is unknown.

Table 3.4 – Number of cattle egrets addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	542	5
2016	793	17
2017	83	1
2018	204	2
2019	8,867	515

The take of cattle egrets by WS to alleviate damage would only occur when permitted by the USFWS pursuant to the MBTA through the issuance of depredation permits. In addition, the take of cattle egrets by WS would only occur when permitted by the DPNR. The take of cattle egrets by WS would only occur at levels authorized by the USFWS and the DPNR, which ensures the USFWS and the DPNR have the opportunity to consider take by WS and other entities to achieve the desired population management levels of cattle egrets in the USVI. Therefore, all take by WS to alleviate damage or threats associated with cattle egrets would be evaluated pursuant to the objectives of the MBTA and the Endangered and Indigenous Species Act of 1990.

KILLDEER POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Killdeer occur over much of North America from the Gulf of Alaska southward throughout the United States with their range extending from the Atlantic coast to the Pacific coast (Hayman et. al. 1986, Jackson and Jackson 2020). Although killdeer are technically in the family of shorebirds, they are unusual shorebirds in that they often nest and live far from water. Killdeer commonly occur in a variety of open areas, even concrete or asphalt parking lots at shopping malls, as well as fields and beaches, ponds, lakes, roadside ditches, mudflats, airports, pastures, and gravel roads and levees but are seldom seen in large flocks (Jackson and Jackson 2020).

The number of killdeer observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -1.1% annually from 1966 through 2017 (USGS 2020*b*). From 2007 through 2017, the number of killdeer observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -0.6% annually (USGS 2020*b*). BirdLife International (2016*b*) classified killdeer as a species of least concern with a decreasing population trend. Based on broad-scale surveys, the United States Shorebird Conservation Plan estimated the population of killdeer in the United States to be approximately 2 million birds in 2001 (Brown et al. 2001). BirdLife International (2016*b*) estimated the killdeer population at 1 million killdeer. Andres et al. (2012) indicated a population estimated at 1 million killdeer in 2006 with a population estimated at 2 million killdeer in 2012.

Although the population of killdeer is currently unknown in the USVI, killdeer were not listed as a species of concern in the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands (Nytch et al. 2015). However, the number of killdeer observed in areas of the USVI surveyed during the CBC has shown an overall decreasing trend since the 1970s (National Audubon

Society 2020). Furthermore, the USVI Wildlife Action Plan listed killdeer as a data deficient species that is possibly at risk, a classification for which insufficient information is available toward assessing population abundances or distributions, but whose populations are experiencing ongoing threats (Platenberg and Valiulis 2018*b*).

WS has addressed previous requests for assistance associated with killdeer using both nonlethal dispersal methods and lethal removal. Table 3.5 shows the number of killdeer that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed killdeer using pyrotechnics, presence of vehicles, human activity, and the noise associated with the discharge of a firearm. WS used firearms to remove killdeer that WS' personnel identify as causing damage or posing a risk of damage. In addition, WS destroyed 16 eggs in six killdeer nests from FY 2015 through FY 2019. Requests for assistance associated with killdeer occur primarily at airports in the USVI.

Table 3.5 – Number of killdeer addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	6	0
2016	13	4
2017	1	0
2018	0	1
2019	177	2

In anticipation of additional efforts to address requests associated with killdeer, WS could take up to 100 killdeer each year and destroy up to 50 nests annually to alleviate damage or threats throughout the USVI, including any eggs in those nests. The removal of nests and eggs would occur in an attempt to cause the killdeer to abandon the nest site and to disperse the killdeer from the area. The MBTA prohibits the take of active killdeer nests, including the removal of killdeer eggs, unless the USFWS authorizes the take through the issuance of a depredation permit.

With a population estimated at one to two million killdeer in the United States, the take of up to 100 killdeer by WS in the USVI would represent 0.005% to 0.01% of the population. The International Union for Conservation of Nature and Natural Resources ranks the killdeer as a species of "*least concern*" based on the "*species…extremely large range…*", "*…the population size is extremely large…*", and "*the decline is not believed to be sufficiently rapid*" (BirdLife International 2016*b*). The United States Shorebird Conservation Plan Partnership (2016) indicated the killdeer was a species of "*moderate concern*".

Given the limited take proposed by WS to alleviate damage and threats, WS' proposed take would not have an adverse effect on killdeer populations. The take of killdeer could only occur when authorized through the issuance of depredation permits by the USFWS and the DPNR. The permitting of take by the USFWS pursuant to the MBTA and the DPNR pursuant to the Endangered and Indigenous Species Act of 1990 would ensure take by WS and other entities occurred within allowable take levels to achieve desired population objectives for killdeer. The destruction of a limited number of nests generally has no adverse effects on bird populations. WS would continue to assist airport personnel in identifying habitat and other attractants to killdeer on airport property. Killdeer would continue to be addressed using primarily nonlethal hazing and dispersal methods. All take of killdeer would occur within the levels permitted by the USFWS and the DPNR.

BARN SWALLOW POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Barn swallows are one of the most abundant and widespread of the swallow species (Brown and Brown

2020). Breeding populations occur throughout North America, Europe, and Asia with wintering populations occurring in Central and South America, southern Spain, Morocco, Egypt, Africa, the Middle East, India, Indochina, Malaysia, and Australia (Brown and Brown 2020). Barn swallows nest in large colonies predominately using human-made structures, such as under the eaves of buildings, bridges, and culverts (Brown and Brown 2020). Barn swallows feed on flying insects often in open areas such as farm pastures or airfields (Brown and Brown 2020).

There are an estimated 190 million barn swallows globally, including 40 million swallows in the United States (Partners in Flight 2020). The number of barn swallows observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -1.2% annually from 1966 through 2017 (USGS 2020*b*). From 2007 through 2017, the number of barn swallows observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -1.0% annually (USGS 2020*b*). BirdLife International (2019*a*) classified barn swallows as a species of least concern with a decreasing population trend.

Although the population of barn swallows is currently unknown in the USVI, barn swallows were not listed as a species of concern in the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands (Nytch et al. 2015). Furthermore, the USVI Wildlife Action Plan listed barn swallows as a species of least concern, a classification for species that are widespread and abundant in the USVI (Platenberg and Valiulis 2018*b*). Since the early 1970s, the number of barn swallows observed in areas of the USVI surveyed during the CBC has shown an overall declining trend; however, from the late 2000s, the number observed has shown a slightly increasing trend (National Audubon Society 2020).

WS has addressed previous requests for assistance associated with barn swallows using both nonlethal dispersal methods and lethal removal. Table 3.6 shows the number of barn swallows that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed barn swallows using pyrotechnics, presence of vehicles, and the noise associated with the discharge of a firearm. WS used firearms to remove barn swallows that WS' personnel identified as causing damage or posing a risk of damage. During FY 2019, WS addressed more barn swallows compared to previous years because WS received increasing requests for assistance and available funding allowed WS to hire additional employees to address those requests.

Table 3.6 – Number of barn swallows addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Take
2015	8	0
2016	50	0
2017	0	0
2018	0	0
2019	1,365	27

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 500 barn swallows each year and destroy up to 200 nests annually in the USVI. The removal of nests and eggs would occur in an attempt to cause barn swallows to abandon the nest site and to disperse the barn swallows from the area. The MBTA prohibits the take of active barn swallow nests, including the removal of barn swallow eggs, unless the USFWS authorizes the take through the issuance of a depredation permit.

Given the limited take proposed by WS to alleviate damage and threats, WS' proposed take would not have an adverse effect on barn swallow populations. The take of barn swallows could only occur when authorized through the issuance of depredation permits by the USFWS and the DPNR. The permitting of take by the USFWS pursuant to the MBTA and the DPNR pursuant to the Endangered and Indigenous

Species Act of 1990 would ensure take by WS and other entities occurred within allowable take levels to achieve desired population objectives for barn swallows. The destruction of a limited number of nests generally has no adverse effects on bird populations. WS would continue to assist airport personnel in identifying habitat and other attractants to barn swallows on airport property. Barn swallows would continue to be addressed using primarily nonlethal hazing and dispersal methods. All take of barn swallows would occur within the levels permitted by the USFWS and the DPNR.

LAUGHING GULL POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

The laughing gull is a common gull species found year-round in the southeastern United States with breeding colonies occurring along the coastal areas of the Atlantic Ocean, Gulf of Mexico, and the coastal areas of the Caribbean Islands (Burger 2020). Localized breeding colonies can also occur along the Gulf of California and the Pacific Coast of Mexico (Burger 2020). Characterized by a black hood, laughing gulls are often associated with human activities near coastal areas where food sources are readily available (Burger 2020). Burger (2020) cites several sources that indicate laughing gulls are opportunistic foragers feeding on a wide-range of aquatic and terrestrial invertebrates, small vertebrates, human garbage, and plant material, such as berries. Laughing gulls will also prey on the eggs and young of terns, including the federally threatened roseate tern (Platenberg et al. 2005).

Belant and Dolbeer (1993) estimated the population of breeding laughing gulls in the United States at 258,851 pairs based on state population records; however, they did not consider nonbreeding and sub-adult gulls as part of the breeding population in the United States. BirdLife International (2018*b*) classified laughing gulls as a species of least concern with an increasing population trend. The number of laughing gulls observed across all routes surveyed in the United States and Canada during the BBS has shown an increasing trend estimated at 1.9% annually from 1966 through 2017 (USGS 2020*b*).

Laughing gulls are the only gull species that breeds in the USVI, with an estimated breeding population of 2,000 to 3,000 pairs (Nytch et al. 2015). Laughing gulls are migratory and begin appearing in the USVI in March, with nests found from May through August (Platenberg et al. 2005). The species is widely distributed throughout the USVI (Platenberg et al. 2005). The USVI Wildlife Action Plan listed laughing gulls as a species of least concern (Platenberg and Valiulis 2018*b*), and the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized laughing gulls in the USVI as a Tier V species, the lowest conservation priority score (Nytch et al. 2015). Furthermore, the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized laughing gulls as a species that possibly needed local population reductions to minimize depredation of colonial seabirds (Nytch et al. 2015).

WS has addressed previous requests for assistance associated with laughing gulls using both nonlethal dispersal methods and lethal removal. Table 3.7 shows the number of laughing gulls that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed laughing gulls using pyrotechnics, presence of vehicles, human activities, and the noise associated with the discharge of a firearm. WS used firearms to remove laughing gulls that WS' personnel identified as causing damage or posing a risk of damage. In addition, WS removed and destroyed 74 eggs in 39 active laughing gull nests from FY 2015 through FY 2019. During FY 2019, WS addressed more laughing gulls compared to previous years because WS received increasing requests for assistance and available funding allowed WS to hire additional employees to address those requests.

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 600 laughing gulls per year and destroy up to 100 nests annually to alleviate damage or threats throughout the USVI, including any eggs in those nests. Based on a population of 2,000 breeding pairs (4,000 individuals), the lethal removal of 600 laughing gulls would

represent 15% of the estimated breeding population in the USVI. However, the take of laughing gulls by WS could also occur during the migration periods when the number of laughing gulls likely increases in the USVI. Therefore, cumulative take is likely to be a lower percentage of the breeding population in the USVI.

Table 3.7 – Number of laughing gulls addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	0	0
2016	0	0
2017	0	0
2018	166	90
2019	2,254	85

Similar to other migratory birds addressed in this EA, the take of laughing gulls by WS would only occur at the discretion of the USFWS and the DPNR and only at levels permitted by the USFWS and the DPNR. Therefore, all take by WS to alleviate damage or threats associated with laughing gulls would be evaluated pursuant to the objectives of the MBTA and the Endangered and Indigenous Species Act of 1990.

HOUSE SPARROW POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

People introduced house sparrows to North America from England in 1850 and sparrows have since spread throughout the continent (Fitzwater 1994, Lowther and Cink 2020). House sparrows occur in nearly every habitat, except dense forest, alpine, and desert environments. They prefer human-altered habitats and are abundant on farms and in cities and suburbs. House sparrows are not migratory in North America and are year-round residents wherever they occur (Lowther and Cink 2020). Nesting locations often occur in areas of human activities and they are considered "*...fairly gregarious at all times of year*" with nesting occurring in small colonies or clumped distribution (Lowther and Cink 2020). Large flocks of sparrows can occur in the winter as birds forage and roost together (Lowther and Cink 2020). House sparrows feed primarily on grains and seeds, but will eat insects during the breeding season (Lowther and Cink 2020). House sparrows often compete with native birds, primarily through competition for nesting sites.

There are an estimated 740 million house sparrows globally, including 80 million sparrows in the United States (Partners in Flight 2020). The number of house sparrows observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -3.6% annually from 1966 through 2017 (USGS 2020*b*). From 2007 through 2017, the number of house sparrows observed across all routes surveyed in the United States and Canada during the BBS has shown a decreasing trend estimated at -3.2% annually (USGS 2020*b*). BirdLife International (2019*b*) classified house sparrows as a species of least concern with a decreasing population trend.

House sparrows are an introduced species in the USVI (Platenberg and Valiulis 2018*b*). Although the CBC in the USVI began during the early 1970s, observations of house sparrows did not occur until 1995 (National Audubon Society 2020). From the mid-1990s, the number of house sparrows observed in areas of the USVI surveyed during the CBC showed an increasing trend until the early 2010s; however, since the early 2010s, the number observed has shown a decreasing trend (National Audubon Society 2020).

From FY 2015 through FY 2019, WS dispersed 20 house sparrow in the USVI using pyrotechnics and the presence of vehicles (see Table 3.8). Because the MBTA does not protect house sparrows from take, the take of sparrows to alleviate damage or to reduce threats can occur without the need for a depredation

permit from the USFWS. Similarly, the Endangered and Indigenous Species Act of 1990 does not protect house sparrows from take; therefore, authorization from the DPNR is not required to take house sparrows. However, WS did not lethally take any house sparrows from FY 2015 through FY 2019.

Table 3.8 – Number of house sparrows addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	20	0

In the future, WS could remove up to 300 house sparrows per year to address damages and threats caused by sparrows. In addition, WS could destroy up to 100 house sparrow nests in the USVI per year. Given the invasive status of house sparrows, any reduction in populations could be beneficial to the environment. House sparrows are not native to the USVI and any removal of house sparrows could improve conditions and reduce competition for food and habitat with native species. Activities associated with house sparrows would occur pursuant to Executive Order 13112 and Executive Order 13751, which states that each federal agency whose actions may affect the status of invasive species shall reduce invasions of exotic species and the associated damages.

PEARLY-EYED THRASHER POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Pearly-eyed thrashers occur throughout much of the West Indies, from the Bahamas in the north to the Grenadines in the south (Arendt 2020). Pearly-eyed thrashers are a generalist species that thrives in species-poor habitats (Arendt 2020). Pearly-eyed thrashers are an aggressive, opportunistic omnivore that feed primarily on large insects, but also feed on fruits, berries, lizards, frogs, small crabs and other bird's eggs and nestlings (Arendt 2020). Thrashers are prolific breeders capable of having two to six broods per breeding season, which can last eight to 11 months (Arendt 2020). Pearly-eyed thrashers compete with other birds for nest cavities and food resources (Arendt 2000). Pearly-eyed thrashers will also opportunistically prey on the eggs and chicks of several bird species (Lindsey 1992, Latta et al. 1995, Arendt 2020), and can be a major predator of Columbid nests (Wiley and Wiley 1979, Wiley 1991).

BirdLife International (2018*c*) classified pearly-eyed thrashers as a species of least concern with a stable population trend. Although the population of pearly-eyed thrashers in the USVI is currently unknown, the USVI Wildlife Action Plan listed pearly-eyed thrashers as a species of least concern (Platenberg and Valiulis 2018*b*), and the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized pearly-eyed thrashers in the USVI as a Tier V species, the lowest conservation priority score (Nytch et al. 2015). Furthermore, the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands categorized pearly-eyed thrashers as a species that possibly needed local population reductions to minimize egg depredation of many other bird species (Nytch et al. 2015). Since the early 1970s, the number of pearly-eyed thrashers observed in areas of the USVI surveyed during the CBC has shown an overall declining trend; however, from the early 2000s, the number observed has shown an increasing trend (National Audubon Society 2020).

WS has addressed previous requests for assistance associated with pearly-eyed thrashers using both nonlethal dispersal methods and lethal removal. Table 3.9 shows the number of pearly-eyed thrashers that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed pearly-eyed thrashers using pyrotechnics. In addition, WS used firearms to remove pearly-eyed thrashers that WS' personnel

identified as causing damage or posing a risk of damage. Most requests for assistance would likely be associated with the protection of natural resources or human health and safety at airports.

Table 3.9 – Number of pearly-eyed thrashers addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	6	4

In the future, WS could remove up to 100 pearly-eyed thrashers per year to address damages and threats caused by pearly-eyed thrashers. WS' take would have no adverse effects on pearly-eyed thrasher populations in the USVI. WS based this determination on the limited take that could occur by WS and the permitting of the take by the USFWS and the DPNR. Similar to other migratory birds addressed in this EA, the take of pearly-eyed thrashers by WS would only occur at the discretion of the USFWS and the DPNR and only at levels permitted by the USFWS and the DPNR. Therefore, all take by WS to alleviate damage or threats associated with pearly-eyed thrashers would be evaluated pursuant to the objectives of the MBTA and the Endangered and Indigenous Species Act of 1990.

GRAY KINGBIRD POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Gray kingbirds are common throughout the Caribbean (Smith and Jackson 2020). The species also occurs in coastal areas along the Gulf of Mexico and the Atlantic Ocean in the United States, as well as the northern portion of South America (Smith and Jackson 2020). Gray kingbirds prefer open, dry habitats, often near water (Smith and Jackson 2020). Gray kingbirds predominately feed on large flying insects, though kingbirds will also consume some berries and lizards (Smith and Jackson 2020). In the USVI, gray kingbirds are both resident and an "*interisland-migrant*", meaning some individuals migrate between islands (Arendt 1992). Wintering populations of gray kingbirds in the USVI can also fluctuate and may be linked to rainfall (Faaborg et al. 1984, Steadman et al. 2009).

There are an estimated 670,000 gray kingbirds globally, including 23,000 gray kingbirds in the United States (Partners in Flight 2020). BirdLife International (2016*c*) classified gray kingbirds as a species of least concern with a stable population trend. Although the population of gray kingbirds is currently unknown in the USVI, gray kingbirds were not listed as a species of concern in the Avian Conservation Planning Priorities for Puerto Rico and the United States Virgin Islands (Nytch et al. 2015). Furthermore, the USVI Wildlife Action Plan listed gray kingbirds as a species of least concern, a classification for species that are widespread and abundant in the USVI (Platenberg and Valiulis 2018*b*). Since the early 1970s, the number of gray kingbirds observed in areas of the USVI surveyed during the CBC has shown an increasing trend (National Audubon Society 2020).

WS has addressed previous requests for assistance associated with gray kingbirds using both nonlethal dispersal methods and lethal removal. Table 3.10 shows the number of gray kingbirds that WS addressed in the USVI from FY 2015 through FY 2019. WS dispersed gray kingbirds using pyrotechnics, presence of vehicles, and the noise associated with the discharge of a firearm. WS also used firearms to remove gray kingbirds that WS' personnel identified as causing damage or posing a risk of damage. In addition, WS destroyed two eggs in three active nests from FY 2015 through FY 2019. Requests for assistance associated with gray kingbirds occur primarily at airports in the USVI.

Table 3.10 – Number of gray kingbirds addressed by WS in the USVI, FY 2015 – FY 2019

Fiscal Year	Dispersed	Lethal Take
2015	2	0
2016	10	1
2017	1	0
2018	0	0
2019	20	10

Based on previous requests for assistance and in anticipation of the number of requests received by WS to increase, WS could lethally remove up to 250 gray kingbirds per year and 20 nests annually to alleviate damage or threats throughout the USVI, including any eggs in those nests. However, WS anticipates continuing to address most damage caused by gray kingbirds using nonlethal methods. WS take would have no adverse effects on gray kingbird populations in the USVI. WS based this determination on the limited take that could occur by WS and the permitting of the take by the USFWS and the DPNR. Similar to other migratory birds addressed in this EA, the take of gray kingbirds by WS would only occur at the discretion of the USFWS and the DPNR and only at levels permitted by the USFWS and the DPNR. Therefore, all take by WS to alleviate damage or threats associated with gray kingbirds would be evaluated pursuant to the objectives of the MBTA and the Endangered and Indigenous Species Act of 1990.

RED JUNGLEFOWL POPULATION - DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Red junglefowl is a name used for both the ancestral stock of the domestic chicken and for feral populations derived from introduced domestic chickens (McGowan and Kirwan 2020). Red junglefowl are generally smaller and slimmer than most chicken breeds (McGowan and Kirwan 2020). Red junglefowl usually have buffy or bronze neck feathers extending down over the back and a metallic blue to green arching tail (McGowan and Kirwan 2020). Red junglefowl are native to southeast Asia, India, China, and Indonesia (McGowan and Kirwan 2020). There are many feral populations in the Caribbean, including in the USVI.

BirdLife International (2016*d*) classified red junglefowl as a species of least concern with a decreasing population trend. However, the population of red junglefowl is currently unknown in the USVI. Red junglefowl are not native to the United States, including the USVI. Thus, red junglefowl are afforded no protections under the MBTA or the Endangered and Indigenous Species Act of 1990. Because the species is not native to the USVI, red junglefowl can negatively affect the native ecosystem, including changing forest structure by removing seeds and seedlings (Platenberg and Valiulis 2018*a*). Red junglefowl are among the 20 most invasive species found in the USVI (Platenburg 2016), and any reduction in red junglefowl populations could be considered as providing some benefit to the native ecosystem.

The take of red junglefowl to alleviate damage or to reduce threats can occur without the need for a depredation permit from the USFWS or the DPNR. Therefore, take by other entities in the USVI is unknown. WS lethally removed one red junglefowl using a firearm from FY 2015 through FY 2019. Given the invasive status of red junglefowl in the USVI, it is reasonable to expect requests for assistance in the future. Most requests for assistance would likely be associated with the protection of natural resources or human health and safety at airports.

In the future, WS could remove up to 100 red junglefowl per year to address damages and threats caused by junglefowl. Given the invasive status of red junglefowl, any reduction in populations could be considered beneficial to the environment. Additionally, Executive Order 13112 and Executive Order

13751 directs federal agencies to use their programs and authorities to prevent the spread of and control populations of invasive species that cause economic or environmental harm, or harm to human health.

ADDITIONAL TARGET BIRD SPECIES

WS has addressed limited numbers of additional target bird species previously or WS anticipates addressing a limited number of additional bird species if WS implements Alternative 1. WS would primarily address those species to alleviate aircraft strike risks at airports in the territory. Requests for assistance associated with those species would often occur infrequently or would involve only a few individuals. WS anticipates addressing those requests for assistance using primarily nonlethal dispersal methods. If WS implements Alternative 1, WS could receive requests for assistance to use lethal methods to remove some of those bird species when nonlethal methods were ineffective or were determined to be inappropriate using the WS Decision model. An example could include birds that pose an immediate strike threat at an airport where attempts to disperse the birds were ineffective. The target bird species that WS could address in limited numbers, after receiving a request for assistance associated with those species, would include those bird species identified in Appendix D[5].

Based on previous requests for assistance and the take levels necessary to alleviate those requests for assistance, WS would not lethally remove more than 25 individuals annually of any of those species identified in Appendix D. WS does not expect the annual take of those species to occur at any level that would adversely affect populations of those species. Take would be limited to those individuals deemed causing damage or posing a threat. The MBTA protects most of those bird species from take unless the USFWS permits the take pursuant to the MBTA. If the USFWS did not issue a permit, no take would occur by WS. In addition, take could only occur at those levels stipulated in the permit. In addition, the DPNR may also require a permit to take those species. As stated previously, when the USFWS issues a depredation permit for a migratory bird species protected by the MBTA, the DPNR could issue permits to take the same number of birds authorized by the USFWS or the DPNR could issue a permit authorizing the lethal removal of less than the number permitted by the USFWS. However, the take authorized by the DPNR cannot exceed the take level authorized by the USFWS.

Therefore, the take of those bird species would occur in accordance with applicable territory and federal laws and regulations authorizing take of migratory birds and their nests and eggs, including the USFWS and the DPNR permitting processes. The USFWS and the DPNR, as the agencies with management responsibility for migratory birds, could impose restrictions on depredation take as needed to assure cumulative take does not adversely affect the continued viability of populations. This would assure that cumulative effects on those bird populations would not have a significant adverse impact on the quality of the human environment. In addition, WS would report annually to the USFWS and the DPNR any take of the bird species listed in Appendix D in accordance with a federal and territory permit.

As part of an integrated approach to managing damage, WS could also annually destroy up to 10 active nests and the associated eggs and nestlings of those species that nest in the territory. Many bird species have the ability to identify areas with regular human disturbance and low reproductive success and they will relocate to nest elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by active nest destruction, this activity has no long-term effect on breeding adult birds. WS would not use active nest and egg removal as a population management method. WS would use nest and egg destruction to inhibit nesting in an area experiencing damage due to the nesting activity and WS would only employ active nest and egg destruction at a localized level. As with the lethal removal of birds, the destruction of active nests could only occur when authorized by the USFWS and the DPNR.

[5]Appendix D contains a list of the common and scientific names of those bird species that WS could address infrequently and/or in low numbers.

Inactive nests (those nests that do not contain eggs or nestlings) can be destroyed by individuals without the need for a depredation permit from the USFWS or the DPNR. Nest destruction is often used to alleviate damage associated with the nesting activities and/or to discourage nesting in an area where damage occur or could occur. Many bird species have the ability to identify areas with regular human disturbance and low reproductive success and they will relocate to nest elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by nest destruction, this activity has no long-term effect on breeding adult birds. WS does not use nest destruction as a population management method. WS uses nest destruction to inhibit nesting in an area experiencing damage due to or associated with the nesting activity and those activities only occur at a localized level. If WS personnel encounter eggs and/or nestlings in an active nest, WS could destroy the eggs by puncturing the eggs, oiling the eggs, shaking the eggs, or by breaking the eggs open. If WS personnel encountered nestlings in an active nest, WS' personnel would euthanize those nestlings in accordance with WS Directive 2.505. For the purposes of the analysis for those target bird species addressed in Appendix D, WS will consider nestlings euthanized as part of the cumulative take of a target bird species.

Under the Endangered and Indigenous Species Act of 1990, the territory of the USVI has designated several wildlife species as endangered, which includes several bird species addressed in this EA. Appendix C identifies the complete list of species designated as threatened or endangered by the territory of the USVI. Table D-2 in Appendix D identifies those species that WS could address infrequently or in limited numbers that the USVI has designated as threatened or endangered. The lethal take of wildlife species listed as endangered by the territory is prohibited the Endangered and Indigenous Species Act of 1990 unless allowed by a specific federal or territory permit or authorization. WS would only lethally take those bird species listed in Table D-2 under extreme situations that necessitate lethal removal in order to protect human health and safety, such as preventing a bird strike with an aircraft. WS would inform the DPNR of the take of any endangered species within 24 hours.

AVIAN DISEASE SURVEILLANCE AND MONITORING

As part of disease monitoring and surveillance, WS could collect samples from birds. Examples of strategies for collecting samples in birds that WS could implement include investigating sick/dead birds, conducting surveillance in live wild birds, conducting surveillance of hunter-harvested birds, and/or conducting environmental sampling. Implementation of those sampling strategies to detect or monitor avian diseases would not adversely affect avian populations in the state. For example, the sampling (*e.g.*, drawing blood, feather sample, fecal sample) and the subsequent release of live-captured birds would not result in adverse effects because WS' personnel would release those birds unharmed on site. In addition, collecting samples from birds that were sick, dying, or harvested by hunters would not result in the additive lethal take of birds that would not have already occurred in the absence of sampling. Therefore, sampling birds for pathogens would not adversely affect the populations of any of the birds addressed in this EA nor would sampling result in any take of birds that would not have already occurred in the absence of sampling (*e.g.*, hunter harvest).

EFFECTS ON THE PUBLIC'S ESTHETIC ENJOYMENT OF BIRDS

Public opinion about the best ways to reduce conflicts between people and animals is highly variable, making the implementation and conduct of damage management programs extremely complex. Some people express concerns that proposed activities could interfere with their enjoyment of recreational activities and their esthetic enjoyment of birds. Another concern is WS' activities would result in the loss of esthetic benefits of birds to the public.

People generally regard animals as providing economic, recreational, and esthetic benefits (Decker and Goff 1987), and the mere knowledge that animals exists is a positive benefit to many people. Esthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, esthetics is truly subjective in nature, dependent on what an observer regards as beautiful. The human attraction to animals likely started when animals were first domesticated. The public today share a similar bond with animals and/or wildlife in general and in modern societies, a large percentage of households have indoor or outdoor pets. However, some people may consider individual wild animals as "*pets*" or exhibit affection toward those animals, especially people who enjoy viewing animals. Therefore, the public reaction can be variable and mixed to animal damage management because there are numerous philosophical, esthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between people and animals.

Animal populations provide a wide range of social and economic benefits (Decker and Goff 1987). Those benefits include direct benefits related to consumptive and non-consumptive uses, indirect benefits derived from vicarious wildlife related experiences, and the personal enjoyment of knowing animals exist and contribute to the stability of natural ecosystems (Bishop 1987). Direct benefits are derived from a personal relationship with animals and may take the form of direct consumptive use (*e.g.,* using parts of or the entire animal) or non-consumptive use (*e.g.*, viewing the animal in nature or in a zoo, photographing) (Decker and Goff 1987). Birds may provide similar benefits to people that enjoy viewing certain bird species and knowing they are part of natural ecosystems.

Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and originate from experiences, such as looking at photographs and films of animals, reading about animals, or benefiting from activities or contributions of animals (*e.g*., their use in research) (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Public attitudes toward animals vary considerably. Some people believe that WS should capture and translocate all animals to another area to alleviate damage or threats those animals pose. In some cases, people directly affected by animals strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of animals from specific locations or sites. Some people totally opposed to animal damage management want WS to teach tolerance for damage and threats caused by animals, and that people should never kill animals. Some of the people who oppose removal of animals do so because of human-affectionate bonds with individual animals. Those human-affectionate bonds are similar to attitudes of a pet owner and result in esthetic enjoyment.

In some cases, the presence of overabundant bird species offends people, such as starlings or pigeons. To such people, those species represent pests that are nuisances, which upset the natural order in ecosystems, and are carriers of diseases transmissible to people or other animals. In those situations, the presence of overabundant species can diminish their overall enjoyment of other animals by what they view as a destructive presence of such species. They are offended because they feel that those species proliferate in such numbers and appear to remain unbalanced.

Mortality is high among wildlife populations and specific individuals among a species may experience death early in life. Mortality in wildlife populations is a natural occurrence and people who form affectionate bonds with animals experience loss of those animals over time. A number of professionals in the field of psychology have studied human behavior in response to attachment to pet animals (Gerwolls and Labott 1994, Marks et al. 1994, Zasloff 1996, Ross and Baron-Sorensen 1998, Archer 1999). Similar observations are probably applicable to close bonds that could exist between people and wild animals. As

observed by researchers in human behavior, normal human responses to loss of loved ones proceed through phases of shock or emotional numbness, sense of loss, grief, acceptance of the loss or what cannot be changed, healing, and acceptance and rebuilding, which leads to resumption of normal lives (Lefrancois 1999). Those people who lose companion animals, or animals for which they may have developed a bond and affection, can proceed through the same phases as with the loss of human companions (Gerwolls and Labott 1994, Boyce 1998). However, they usually establish a bond with other individual animals after such losses. Although they may lose the sense of enjoyment and meaning from the association with those animals that die or are no longer accessible, they usually find a similar meaningfulness by establishing an association with new individual animals or through other relational activities (Weisman 1991). Through this process of coping with the loss and establishing new affectionate bonds, people may avoid compounding emotional effects resulting from such losses (Lefrancois 1999).

WS only conducts activities on properties where the landowner or property manager signs a MOU, work plan, work initiation document, or a similar document allowing WS' personnel to conduct activities and personnel would only target those birds identified as causing damage or posing a threat of damage. In addition, other individuals of the same species would likely continue to be present in the affected area and people would tend to establish new bonds with those remaining birds. In addition, human behavior processes usually result in individuals ultimately returning to normalcy after experiencing the loss of association with a wild animal that an entity removed from a specific location.

Even in the absence of any involvement by WS, other entities could conduct activities to alleviate damage or threats of damage. Because other entities could remove birds causing damage or posing a threat of damage, the involvement of WS in removing those birds would not likely be additive to the number of birds that could be removed in the absence of involvement by WS. In addition, activities that could occur under the alternatives by WS would occur on a relatively limited portion of the total area in the USVI, and the portion of various bird species' populations removed would typically be low (see preceding discussion). In localized areas where WS removes a bird or birds, dispersal of birds from adjacent areas typically contributes to repopulation of the area. The amount of time required to repopulate an area would vary and would depend on the level of removal and bird population levels in nearby areas. Those target species addressed in this EA are relatively abundant. As discussed previously, the effects on target bird populations from damage management activities would be relatively low if WS implemented Alternative 1, and opportunities to view, hear, or see evidence of birds would still be available over the majority of land area of the territory.

Alternative 2 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI using only nonlethal methods

If WS implements Alternative 2, WS would only use nonlethal methods to resolve damage or threats of damage associated with target bird species in the USVI. No intentional lethal removal of target bird species would occur by WS. Nonlethal methods generally disperse, exclude, or live-capture birds. Methods intended to disperse birds from areas where they are causing damage or posing a threat of damage are generally visual or auditory deterrents, such as lights, lasers, pyrotechnics, propane cannons, or air horns. Exclusion methods would prevent target bird species from accessing a resource and could disperse those birds to other areas where resources are unprotected. Exclusion methods could include overhead wires, fencing, and netting. WS could also live-capture target bird species and then translocate those birds to appropriate habitat for release.

DIRECT EFFECTS ON BIRD POPULATIONS ASSOCIATED WITH IMPLEMENTING ALTERNATIVE 2

As discussed for Alternative 1, WS has used nonlethal methods to disperse target bird species. For example, from FY 2015 through FY 2019, WS used nonlethal methods to disperse 10,489 cattle egrets in the territory to alleviate damage or threats of damage (see Table 3.4). The intent associated with the use of auditory and visual deterrents is to elicit a flight response by scaring birds from an area where damage is occurring or where damage could occur. Of concern are the possible negative physiological and/or behavioral effects that negative stimuli could cause, which could reduce the fitness of individual birds or the ability of a bird to survive, especially if the exposure to the stressor was chronic. If stress occurs to a bird from the scaring associated with hazing, the negative effects associated with causing a flight response could be exacerbated by other deleterious stressors already occurring (*e.g.*, disease, food availability). The stress from hazing could negatively affect the health of a bird, interfere with the raising of young, and/or increase energy needs. A similar concern would occur when using exclusion methods, which could prevent birds from accessing a resource (*e.g.*, food source, nesting locations). When using methods to live-capture a bird or birds, injuries or death could occur during the process of capturing a bird. Constantly monitoring and addressing captured birds immediately after capture can reduce the likelihood of injuries and death. In addition, making appropriate modification to live-capture methods can reduce injuries.

However, the use of nonlethal methods to capture, disperse, or exclude birds would generally have minimal effects on the overall population of a bird species because those methods would not harm individual birds. WS' personnel would not employ nonlethal methods over large geographical areas or apply those methods at such an intensity that birds would be unable to access essential resources (*e.g.*, food sources, habitat) for extended durations.

WS could also live-capture a limited number of birds and then attach leg bands or other identifying markers (*e.g.*, patagial tags) for identification purposes. Live-capturing and attaching identifying markers would only occur after WS or another entity received the appropriate permits from the USFWS and the USGS to attach those identifying markers on birds. When using leg bands, WS would use those band sizes indicated in the North American Bird Banding Manual developed by the USGS. Because the intent of using identifying markers is to monitor natural movement patterns and to identify individual birds, researchers have designed those methods to allow for natural movements and limit adverse effects on the bird species. Fair et al. (2010) stated "[w]*hen appropriate* [leg] *band sizes are used, the occurrence and rate of adverse effects on the subjects is ordinarily very low*".

WS anticipates using leg bands and other identifying markers on a very limited basis because of the time and cost required to live-capture birds. WS would primarily use leg bands in conjunction with the use of translocation. Attaching a leg band to a bird that WS translocated would aid in identifying the bird if it returned to the area where damage was occurring. WS anticipates attaching identifying markers on a limited number of birds.

Overall, the use of nonlethal methods by WS in the USVI to exclude, capture, or haze birds would have no effect on the population of a bird species. WS would not employ nonlethal methods over large geographical areas at such intensity levels that resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope. Therefore, direct effects that relate to a bird population would not occur by WS from implementation of Alternative 2. WS does not anticipate any cumulative effects to occur associated with WS' use of nonlethal methods even when considered with the use of nonlethal by other entities. Although nonlethal methods can elicit a flight response or exclude birds, the cumulative use of nonlethal methods by all entities is not likely to rise to a level that would have any effect on the populations of target bird species.

INDIRECT EFFECTS ON BIRD POPULATIONS ASSOCIATED WITH IMPLEMENTING ALTERNATIVE 2

As discussed previously, the use of nonlethal methods by WS to exclude, capture, or haze target bird species would have no effect on the populations of target bird species. WS would not employ nonlethal methods over large geographical areas at such intensity levels that resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope. Therefore, indirect effects that relate to the population of a target bird species would not occur by WS from implementation of Alternative 2.

Implementation of Alternative 2 by WS would not prevent other entities from using the lethal methods identified in Appendix B to take birds in the USVI. WS anticipates the lethal take of birds would occur by other entities if WS implements Alternative 2 and would likely occur at levels similar to the take that would occur if WS implemented Alternative 1. Therefore, WS anticipates the indirect effects associated with implementing Alternative 2 would be similar to those indirect effects discussed for Alternative 1 because the lethal take of birds could occur by other entities.

CUMULATIVE EFFECTS ON BIRD POPULATIONS FROM IMPLEMENTING ALTERNATIVE 2

WS does not anticipate any cumulative effects to occur associated with WS' use of nonlethal methods even when other entities utilize nonlethal methods. Although nonlethal methods would likely elicit a flight response, the cumulative use of nonlethal methods by all entities is not likely to rise to a level that would have an effect on the population of a bird species.

Although implementation of this alternative would limit WS to using only nonlethal methods, entities other than WS could use lethal methods. Implementation of Alternative 2 by WS would not prevent the USFWS and the DPNR from continuing to issue depredation permits or other authorizations for the take of birds in the USVI and would not limit the ability to take nonnative bird species. The continued use of many nonlethal methods can often lead to the habituation of birds to those methods (*i.e.*, showing no response or limited movements), which can decrease the effectiveness of those methods (Conover 2002, Seamans and Gosser 2016). For example, the USFWS could issue a depredation permit that allows the recipient to use lethal methods when nonlethal methods become less effective at excluding and/or dispersing birds. In addition, people could lethally take some bird species without the need for a depredation permit from the USFWS when the MBTA does not protect those species, such as house sparrows, rock pigeons, and European starlings. Similarly, people can lethally take certain species pursuant to depredation/control orders without the need for a depredation permit from the USFWS, such as shiny cowbirds. People could continue to take waterfowl and other harvestable species (*e.g.*, doves) during annual hunting seasons in the USVI.

The lethal take of birds could occur by other entities if WS implements Alternative 2 and would likely occur at levels similar to the take that would occur if WS implemented Alternative 1. Therefore, WS anticipates the cumulative effects associated with implementing Alternative 2 would be similar to those cumulative effects discussed for Alternative 1 because the lethal take of birds in the USVI could occur by other entities.

Alternative 3 - WS would recommend an integrated methods approach to managing bird damage in the USVI through technical assistance only

Under a technical assistance only alternative, WS would recommend an integrated methods approach similar to Alternative 1 and Alternative 2; however, WS would not provide direct operational assistance

under this alternative. Using information that a requester provides or from a site visit by an employee, WS' personnel would recommend methods and techniques based on their use of the WS Decision Model. In some instances, information provided to the requester by WS could result in tolerance/acceptance of the situation. In other instances, WS would discuss and recommend damage management options. In addition, WS' personnel could assist people with the process for applying for their own depredation permit from the USFWS. In accordance with WS Directive 2.301, WS' personnel could assist people with applying for a depredation permit from the USFWS by completing a USFWS Migratory Bird Permit Application or Review form (WS Form 37).

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS ON BIRD POPULATIONS ASSOCIATED WITH IMPLEMENTING ALTERNATIVE 3

When discussing damage management options with the person requesting assistance, WS' personnel could recommend and demonstrate the use of both nonlethal and lethal methods that were legally available for use to alleviate damage. Those people receiving technical assistance from WS could implement those methods recommended by WS, could employ other methods not recommended by WS, could seek assistance from other entities, or take no further action. If WS implements Alternative 3, WS would have no direct effect on bird populations because WS' personnel would not provide direct operational assistance.

Despite WS not providing direct operational assistance to resolve damage and threats associated with birds, those people experiencing damage caused by birds could alleviate damage by employing those methods legally available or by seeking assistance from other entities. Implementation of Alternative 3 by WS would not prevent other entities from using lethal and nonlethal methods and would not prevent the USFWS and the DPNR from authorizing the lethal take of birds. The take of shiny cowbirds could occur pursuant to the blackbird depredation order without the need for a depredation permit. The take of nonnative bird species (*e.g.*, rock pigeons, house sparrow, red junglefowl) could occur without the need for a depredation permit or authorization from the USFWS or the DPNR. Take of certain harvestable bird species could occur during the hunting season for those species (*e.g.*, zenaida dove, common ground dove, waterfowl).

The lethal take of birds could occur by other entities if WS implements Alternative 3 and would likely occur at levels similar to the take that would occur if WS implemented Alternative 1 or Alternative 2. Therefore, WS anticipates the indirect and cumulative effects associated with implementing Alternative 3 would be similar to those indirect and cumulative effects discussed for Alternative 1 and Alternative 2 because the exclusion, dispersal, and lethal take of birds in the USVI could occur by other entities.

With the oversight of the USFWS and the DPNR, it is unlikely that implementation of Alternative 3 by WS would adversely affect bird populations. However, if direct operational assistance is not available from WS or other entities, it is possible that frustration caused by the inability to reduce damage and associated losses could lead to an increase in the illegal use of methods and take. People have resorted to the illegal use of chemicals and methods to resolve wildlife damage issues (*e.g.*, see White et al. 1989, USFWS 2001, United States Food and Drug Administration 2003).

Alternative 4 - WS would not provide any assistance with managing damage caused by birds in the USVI

If WS implements Alternative 4, WS would have no direct involvement with any aspect of addressing damage caused by those bird species addressed in this EA and would provide no technical assistance. When contacted about damage or the threat of damage associated with those bird species addressed in this EA, WS would refer those people to other entities, such as the USFWS, DPNR, and/or private entities.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS ON BIRD POPULATIONS ASSOCIATED WITH IMPLEMENTING ALTERNATIVE 4

If WS implemented Alternative 4, WS would not have direct effects on target bird populations because WS would not provide any assistance involving those bird species addressed in this EA. However, like the other alternatives, other entities could continue to use nonlethal and lethal methods to address damage caused by birds. Implementation of Alternative 4 by WS would not prevent the USFWS and the DPNR from continuing to authorize the take of birds in the USVI. The take of shiny cowbirds could occur under the blackbird depredation order without the need for a depredation permit. The take of nonnative bird species could occur without the need for a depredation permit or authorization from the USFWS. Take of certain harvestable bird species could occur during the hunting season for those species. Therefore, WS anticipates the indirect and cumulative effects associated with implementing Alternative 4 would be similar to those indirect and cumulative effects discussed for the other alternatives because other entities could use nonlethal and lethal methods to alleviate bird damage.

3.2.2 Issue 2 - Effects on the Populations of Nontarget Wildlife Species, Including T&E Species

As discussed previously, a concern would be the potential impacts to nontarget species, including T&E species, from the use of methods to resolve damage caused by birds. When using methods, WS could unintentionally live-capture, disperse, or kill nontarget animals. Discussion on the potential direct, indirect, and cumulative effects of the alternative approaches on the populations of nontarget animal species, including T&E species, occurs below for each of the alternative approaches identified in Section 2.2.2.

Alternative 1 – WS would continue the current integrated methods approach to managing damage caused by birds in the USVI (Proposed Action/No Action)

If WS implements Alternative 1, WS could provide both technical assistance and direct operational assistance to those persons requesting assistance. When providing direct operational assistance, WS' employees could use lethal and/or nonlethal methods in an integrated methods approach to reduce damage and alleviate risks of damage associated with those target bird species addressed in this EA.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS ANALYSIS ON NONTARGET POPULATIONS

WS' personnel have experience and receive training in wildlife identification, which allows them to identify individual species and to identify damage or recognize damage threats associated with birds. In addition, employees of WS have knowledge in the use patterns of methods available to resolve animal damage, which allows them to select the most appropriate method(s) to address animal damage and minimize impacts on nontarget species.

WS' personnel use a decision making process for evaluating and responding to requests for assistance detailed in the WS Decision Model (see Appendix E), which Slate et al. (1992) describes in more detail. Using the WS Decision Model, WS' personnel would formulate a management strategy, which would include the method or methods the employee determines to be practical for use to alleviate damage or reduce risks caused by the target bird species. When determining the appropriate method or methods, WS' personnel would consider risks to nontarget animals from the use of a method or methods. Despite WS' efforts to reduce risks to nontarget animals, the use of a method or methods could exclude, disperse, capture, or kill nontarget animals unintentionally. A discussion of the risks to nontarget animals and the potential effects on the populations of nontarget animals if WS implements Alternative 1 occurs below.

Risks to nontarget animals associated with available methods

The risks to nontarget animals associated with WS providing technical assistance during the implementation of Alternative 1 would be similar to those risks to nontarget animals discussed for Alternative 3. Therefore, to reduce redundancy, the effects associated with WS providing technical assistance that would occur if WS implements Alternative 1 occur in the discussion for Alternative 3. Similarly, the risks to nontarget animals from the use of nonlethal methods during the implementation of Alternative 1 would be similar to those risks to nontarget animals discussed for Alternative 2. To reduce redundancy, the risks to nontarget animals from the use of nonlethal methods if WS implements Alternative 1 occur in the discussion for Alternative 2.

In regards to risks to nontarget animals, the primary risk would be associated with lethal methods because the use of lethal methods could result in the death of a nontarget animal. Lethal methods that WS' employees could use and/or recommend would include the use of a firearm, egg destruction (*i.e.*, puncturing, breaking, oiling, or shaking an egg), and euthanasia after live-capture.

- *Firearms*

The use of firearms is essentially selective for target species because WS' personnel would identify target bird species prior to application. There is a slight risk of misidentifying bird species, especially when target and nontarget species have a similar appearance. There is also a slight risk of unintentional take of nontarget animals if a projectile strikes a nontarget animal after passing through a target bird, if misses occur, or if a nontarget animal is near a target bird when using a shotgun. WS' personnel can minimize risks by using appropriate firearms, by being aware of what is near or beyond the target bird, and by training to be proficient with the use of a firearm.

Although the use of firearms can reduce the number of birds using a location (similar to dispersing birds), the use of a firearm is most often used to supplement and reinforce the noise associated with nonlethal methods. The noise produced when discharging a firearm could disperse nontarget animals from an area. In those cases, nontarget species nearby could temporarily leave the immediate vicinity, but would most likely return after conclusion of the action. Additionally, when appropriate, WS would use suppressed firearms to minimize noise and the associated dispersal effect that could occur from the discharge of a firearm. WS' personnel would not employ firearms over large geographical areas or use firearms at such an intensity level that WS would cause harm to a nontarget animal by dispersing and preventing them from accessing essential resources (*e.g.*, food sources, habitat).

- *Egg Destruction*

WS' personnel could make eggs of certain target bird species unviable by puncturing, breaking, shaking, or oiling the egg. The destruction of eggs would essentially be selective for target species because WS' personnel would identify the eggs of target bird species prior to application. The United States Environmental Protection Agency has ruled that use of corn oil to oil eggs is exempt from registration requirements under the Federal Insecticide, Fungicide, and Rodenticide Act. Therefore, WS does not anticipate direct or indirect effects to occur from destroying eggs of target bird species.

- *Euthanasia after Live-capture*

Because live-capture of birds using other methods would occur prior to using euthanasia methods, WS' personnel would identify target bird species prior to using euthanasia methods. WS could euthanize target bird species using carbon dioxide or cervical dislocation. WS' personnel would use euthanasia

methods in accordance with WS Directive 2.505. Therefore, WS does not anticipate effects to occur from the use of euthanasia methods following live-capture.

Effects on nontarget animal populations from unintentional take

As discussed previously, the potential effects on nontarget animal populations associated with the use of nonlethal methods would be similar to those potential effects discussed for Alternative 2. Similarly, the potential effects associated with WS providing technical assistance would be similar to those potential effects discussed for Alternative 3. Of primary concern would be WS' use of lethal methods because those methods could result in the unintentional death of a nontarget animal, which could potentially affect the populations of nontarget animals.

However, WS does not anticipate the unintentional lethal removal of nontarget animals to occur at such a frequency or intensity that would affect the population of a nontarget species. No lethal removal of nontarget animals has occurred by WS during prior activities to manage bird damage in the USVI. If WS' implements Alternative 1, WS' anticipates the unintentional lethal removal of nontarget animals during activities to reduce damage or threats to human safety associated with birds in the USVI to be extremely low to nonexistent. WS would continue to monitor the activities conducted to ensure activities or methodologies used in bird damage management do not adversely affect the populations of nontarget animals. Methods available to resolve and prevent bird damage or threats when employed by trained, knowledgeable personnel can be selective for target species. WS would annually report to the USFWS and the DPNR any nontarget take to ensure those agencies have the opportunity to consider take by WS as part of management objectives.

WS' impact on biodiversity

WS does not attempt to eradicate any species of native wildlife in the USVI. WS operates in accordance with applicable federal and territory laws and regulations enacted to ensure species viability. WS' personnel would use or recommend the use of methods that target individual birds or groups of birds identified as causing damage or posing a threat of damage. Any reduction of a local population is frequently temporary because immigration from adjacent areas or natural reproduction replaces those birds that an entity removes. WS operates on a small percentage of the land area in the USVI and would only target those birds identified as causing damage or posing a threat. Therefore, bird damage management activities conducted pursuant to any of the alternatives would not adversely affect biodiversity in the USVI.

Implementation of Alternative 1 would also provide WS with the widest range of methods to address requests for assistance associated with reducing risks of certain target bird species feeding on other wildlife or competing with other wildlife for resources. For example, cattle egrets are a major predator to the federally endangered St. Croix ground lizard (Gassett et al. 2000). Thus, WS could receive requests for assistance to manage predation risks on threatened or endangered species associated with pearly-eyed thrashers or other predatory bird species.

Analysis of risks to threatened and endangered species

WS would make special efforts to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures through consultation with the USFWS and/or the National Marine Fisheries Service. The ESA states that all federal agencies *"...shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act"* [Sec. 7(a)(1)]. WS conducts consultations with the USFWS and/or the National Marine Fisheries Services pursuant to Section 7 of the ESA to ensure compliance.

WS also conducts consultations to ensure that *"any action authorized, funded or carried out by such an agency...is not likely to jeopardize the continued existence of any endangered or threatened species…Each agency shall use the best scientific and commercial data available"* [Sec. 7(a)(2)].

Some of the bird species addressed in this EA occur throughout the USVI and are present throughout the year. If WS implements Alternative 1, WS could conduct activities to manage damage caused by those bird species when an entity requests such assistance. Therefore, WS could conduct activities to manage damage in areas where threatened or endangered species occur. However, no take of threatened or endangered species by WS has occurred previously in the USVI during the implementation of activities and the use of methods to manage the damage that birds cause.

During the development of this EA, WS reviewed the current list of species designated as threatened or endangered in the USVI as determined by the USFWS and the National Marine Fisheries Service. WS conducted a review of potential impacts of implementing Alternative 1 on each of those species designated as threatened or endangered in the USVI by the USFWS and the National Marine Fisheries Service. The evaluation took into consideration the direct and indirect effects of implementing Alternative 1 to alleviate damage caused by birds. WS reviewed the status, critical habitats designations, and current known locations of those species. As part of the review process, WS prepared and submitted a biological evaluation to the USFWS as part of the consultation process pursuant to Section 7 of the ESA.

Based on the use pattern of the methods and the locations where WS could implement damage management activities, the implementation of Alternative 1 would have no effect on those threatened or endangered species in the USVI under the jurisdiction of the National Marine Fisheries Service, including any designated critical habitat. In addition, based on the use patterns of methods currently available and based on current life history information for those species under the jurisdiction of the USFWS, WS has made a no effect determination for several species currently listed in the USVI (see Table C-1 in Appendix C). For several species listed within the USVI, WS has determined that the proposed activities "*may affect*" those species but those effects would be solely beneficial, insignificant, or discountable, which would warrant a "*not likely to adversely affect*" determination. Based on those determinations, WS initiated informal consultation with the USFWS for those species that a "*may affect, not likely to adversely affect*" determination was made (see Table C-1 in Appendix C). The USFWS concurred with WS' determination that activities conducted pursuant to the proposed action would not likely adversely affect those species (E. Muñiz, USFWS, pers. comm. 2020).

The USFWS has also designated critical habitat in the USVI for some of the species listed as threatened or endangered. Table C-1 in Appendix C provides a list of those species with critical habitat designated in the USVI along with WS' effects determination. WS' based the effects determinations on a review of the activities that WS could conduct if WS implemented Alternative 1. The USFWS concurred with WS' effects determination for critical habitats designated in the USVI (E. Muñiz, USFWS pers. comm. 2020). WS would continue to review the species listed as threatened or endangered by the USFWS and the National Marine Fisheries Service and would continue to consult with the USFWS and/or the National Marine Fisheries Service as appropriate.

Table C-2 in Appendix C shows those species designated by the DPNR as threatened or endangered within the USVI. WS has also reviewed the list of species the DPNR has designated as threatened or endangered. Based on the review of species listed in the USVI by the DPNR, WS has determined that the proposed activities would have no effect on those species currently listed as threatened or endangered by the DPNR. In extreme cases, WS could address certain bird species designated by the DPNR as threatened or endangered when human safety was at risk (see Table D-2 in Appendix D). WS would only address those bird species under extreme situations that necessitate a need to protect human health and

safety, such as preventing a bird strike with an aircraft. The USFWS has not designated any of the species listed in Appendix D as federally threatened or endangered in the USVI. WS would continue to review the species listed as threatened or endangered by the DPNR. As appropriate, WS would consult with the DPNR when WS determines activities may affect a threatened or endangered species designated by the DPNR.

Alternative 2 – WS would continue the current integrated methods approach to managing damage caused by birds in the USVI using only nonlethal methods

Implementation of Alternative 2 would require WS to only recommend and use nonlethal methods to manage and prevent damage associated with target bird species. WS would provide technical assistance and direct operational assistance by recommending and/or using only nonlethal methods. Using the WS Decision Model, WS' personnel would consider the potential effects to nontarget animals from the potential use of nonlethal methods when formulating a management strategy for each request for assistance. Nonlethal methods have the potential to cause adverse effects to nontarget animals primarily through live-capture, exclusion, and dispersal.

If WS implemented Alternative 2, of concern are the possible negative physiological and/or behavioral effects that negative stimuli could cause, which could reduce the fitness of a nontarget animal, or the ability of a nontarget animal to survive, especially if the exposure to the stressor were chronic. The stress caused during the use of nonlethal methods could negatively affect the health of an animal, interfere with the raising of young, and/or increase energy needs.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS ON NONTARGET ANIMAL POPULATIONS ASSOCIATED WITH IMPLEMENTING ALTERNATIVE 2

In general, the use of nonlethal methods to disperse, exclude, or capture target birds from areas would have no effect on the populations of nontarget animals because those methods generally would not occur with such frequency and would not occur at an intensity level that would cause adverse effects. Therefore, WS does not anticipate direct or indirect effects to occur to any nontarget species. Based on the use pattern of methods and the activities that WS could conduct to manage damage or threats of damage caused by target bird species, WS does not anticipate cumulative effects to occur to any nontarget species. Activities conducted by WS would not occur with such frequency and would not occur at an intensity level that would cause cumulative adverse effects. WS has received no reports or documented any cumulative effects associated with the use of nonlethal methods from previous activities associated with managing damage caused by target bird species in the territory that WS conducted.

Risks to nontarget animals associated with available methods

Section I in Appendix B describes the nonlethal methods that would be available for WS' personnel to use if WS implemented Alternative 2. The potential effects associated with specific methods or a category of methods occurs below.

- *Human Presence*

For the effects analysis, human presence will include physical actions that WS could use to haze target bird species and consideration of WS' employees conducting activities to manage bird damage in the USVI. Like the intent of many nonlethal methods, the presence of people and the physical actions of clapping, waving, or yelling can disperse birds from an area through auditory and visual cues. With many visual and auditory methods intended to disperse animals from a location, the primary concern would be the possible negative physiological and/or behavioral effects that negative stimuli could cause, which

could reduce the fitness of a nontarget animal or the ability of a nontarget animal to survive, especially if the exposure to the stressor was chronic. Activities conducted by WS can involve repeated visits to the same area until WS and/or another entity reduces damage or threats of damage. In some cases, such as airports, WS' employees may be present in areas multiple times a day and on a regular basis. However, like other visual and auditory stimuli, nontarget animals often habituate to the presence of people, especially in areas where nontarget animals frequently encounter people, such as urban areas. In addition, nontarget animals are likely to return to the area once WS' personnel are no longer present. The presence of WS' personnel would not occur at a magnitude or intensity level that would cause harm to a nontarget animal by preventing them from accessing essential resources (*e.g.*, food sources, habitat).

- *Modifying Cultural Practices*

When providing technical assistance, WS could recommend that people requesting assistance modify behaviors that may be contributing to bird damage or threats of damage. However, in those cases, the entity experiencing damage or the threat of damage would be responsible for implementing the recommendations made by WS' personnel.

- *Limited Habitat Modification*

WS could also recommend limited modification of habitat in some situations, such as pruning trees to make them less attractive to roosting blackbird species. In those cases, the entity experiencing damage or the threat of damage would be responsible for implementing the recommendations made by WS' personnel. WS' employees would recommend habitat modifications in limited circumstances where modifications could result in the dispersal of target bird species from an area or make an area less attractive to those species. WS' employees would not recommend habitat modifications over large areas and would not recommend modifications to the extent that would result in the removal or modification of large areas of habitat. The use of habitat modifications would generally be restricted to urban areas, airports, industrial parks, office complexes, and other areas where human activities are high. WS' personnel would not recommend habitat modification at a magnitude or intensity level that would cause harm to nontarget animals by reducing available habitat.

- *Supplemental Feeding and Lure Crops*

Providing a supplemental food source and/or planting and maintaining lure crops could be methods that WS recommends to entities experiencing damage or the threat of damage associated with birds. Similar to other recommendations that WS could make when providing technical assistance, the entity requesting assistance would be primarily responsible for providing a supplemental food source and/or planting and maintaining lure crops. WS' employees would not recommend the use of supplemental feeding or the use of lure crops over large areas and would not recommend modifying habitat to plant lure crops to the extent that would result in the removal or modification of large areas of habitat. The use of lure crops is likely to occur in areas already modified for agriculture production.

- *Exclusion Devices*

Exclusionary devices can be effective in preventing access to resources in certain circumstances. The primary exclusionary methods are netting and overhead lines but could include surface coverings and fencing. The use of exclusionary methods may include floating plastic balls or wire grids across water retention ponds to prevent birds from using the ponds because they pose a threat to aircraft from a bird strike. Exclusion methods could include using overhead wires in outdoor eating areas at a restaurant to discourage birds from attempting to take food from customers. The use of exclusionary methods is primarily associated with areas modified by people because birds are posing a threat the human health and

safety or causing damage to a resource valued by people, such as buildings, infrastructure, turf, and agricultural commodities. Given the expense of excluding birds from large areas, exclusion methods are often restricted to small areas around high value resources (*e.g.*, netting over a small grain research plot). Therefore, purchase and installation of exclusion devices would primarily occur by the entity experiencing damage or threats of damage. In addition, exclusion methods may also have limited application because their use could restrict people's access to the resource. For example, netting erected to prevent birds from nesting on buildings could prevent access to people that inspect the safety of the building. Any exclusionary device erected to prevent access of target species also potentially excludes other nontarget species. However, WS' personnel and other entities would not employ exclusionary devices over large geographical areas or use those devices at such an intensity level that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to a species' population.

- *Visual Scaring Techniques*

Several visual scaring methods would be available for WS' personnel to recommend and/or use to manage damage. The intent associated with the use of visual dispersal methods would be to elicit a flight response by scaring target birds from an area where damage was occurring or where damage could occur. Of concern are the possible negative physiological and/or behavioral effects that negative stimuli could cause, which could reduce the fitness of nontarget animals, or the ability of nontarget animals to survive, especially if the exposure to the stressor was chronic. The stress from dispersal methods could negatively affect the health of an animal, interfere with the raising of young, and/or increase energy needs. However, for effects to occur a nontarget animal would have to encounter a visual dispersal method and the resulting visual stimuli would have to elicit a negative response. Like other nonlethal methods, WS' personnel would not employ visual dispersal methods over large geographical areas or use those devices at such an intensity level that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to a species' population.

- *Trained Dogs*

WS could use and/or recommend the use of trained dogs to disperse waterfowl in areas where they are causing damage or posing a threat of damage. Only authorized WS' personnel can use trained dogs and personnel can only use trained dogs to conduct specific functions. Pursuant to WS Directive 2.445, "*WS personnel shall control and monitor their trained dogs at all times. A trained dog is considered controlled when the dog responds to the command(s) of WS personnel by exhibiting the desired or intended behavior as directed*." Therefore, WS' personnel would use dogs that are proficient in the skills necessary to disperse waterfowl in a manner that was responsive to its handler's commands. To ensure proper monitoring and control, WS' personnel use various methods and equipment, such as muzzles, electronic training collars, harnesses, leashes, voice commands, global positioning system collars, and telemetry collars. Because WS' personnel would only use trained dogs that are responsive to commands, WS' personnel can call back dogs if WS' personnel determine the dogs begin approaching a nontarget species. Therefore, the use of trained dogs would not have adverse effects on the populations of nontarget species.

- *Electronic Hazing Devices, Pyrotechnics, Propane Cannons*

Like the use of visual dispersal methods, the intent with the use of auditory dispersal methods, such as electronic hazing devices, pyrotechnics, and propane cannons, is to illicit a flight response in target bird species by mimicking distress calls, producing a novel noise, or producing an adverse noise. Of concern

are the possible negative physiological and/or behavioral effects that negative stimuli could cause, which could reduce the fitness of nontarget animals, or the ability of nontarget animals to survive, especially if the exposure to the stressor was chronic. The stress from dispersal methods could negatively affect the health of an animal, interfere with the raising of young, and/or increase energy needs. However, for effects to occur, nontarget animals would have to be within hearing distance at the time WS' personnel used an auditory method and the resulting noise stimuli would have to elicit a negative response. Like other nonlethal methods, WS' personnel would not use those methods over large geographical areas or use those methods at such an intensity level that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to a species' population.

- *Paintballs*

As described on product labeling and Material Safety Data Sheets, paintballs are nontoxic to people and do not pose an environmental hazard. However, consumption may cause toxicosis in dogs, which is potentially fatal without supportive veterinary treatment (Donaldson 2003). Although unknown, Donaldson (2003) speculated the there is an osmotic diuretic effect resulting in an abnormal electrolyte and fluid balance in dogs that consume paintballs, though most affected dogs recover within 24 hours (Donaldson 2003).

- *High-pressure Water Spray*

WS would primarily use high-pressure water spray to remove inactive nests on buildings and other structures. WS could occasionally use high-pressure water spray to disperse roosts of birds in urban settings. WS would use high-pressure water spray in situations where other methods were ineffective or where the noise produced by other methods was prohibited or of concern. Requests for assistance associated with roosting birds often occurs in areas where the fecal droppings of the roosting birds are posing a threat to human health and safety, causing property damage, and are esthetically displeasing. Those roosting areas are often associated with residential and commercial areas. Some concern could arise from water runoff during activities. During activities, water would soak into the soil, runoff into nearby streams, enter a municipal sewer system, and/or enter into a municipal storm water system.

WS does not anticipate effects to nontarget animals would occur from removing inactive nests because nests or parts of nests are likely to fall after birds abandon the nests at the end of the nesting season as nests deteriorate from weather and other natural processes. In addition, WS often attempts to remove nests as a bird is constructing the nest, which would also limit the amount of debris falling under the location of the nest or nests. WS does not anticipate removing nests using high-pressure water spray with any frequency or intensity that would result in effects. WS does not anticipate effects to nontarget animals would occur because WS would not introduce anything other than water and nesting materials into the soil, streams, sewer systems, and/or storm water systems, which is a process that occurs normally during rain events and from the natural deterioration of nests.

- *Live traps*

Live traps (*e.g.*, cage traps, pigeon traps, decoy traps) generally allow a target bird species to enter inside the trap but prevent the bird from exiting the trap. When using live-traps, WS' personnel generally use bait and/or a lure to attract target bird species and to encourage a target bird or birds to enter the trap. Live traps have the potential to capture nontarget species if those nontarget species enter inside the trap. The placement of live-traps in areas where target species are active and the use of target-specific attractants would likely minimize the capture of nontarget animals. WS' personnel would attend live-traps appropriately, which would allow them to release any nontarget animals captured unharmed. For

example, under the blackbird depredation order, when using a live-trap to capture blackbirds, WS' personnel would check live-traps at least once every day (see 50 CFR 21.43(f)). Therefore, WS' personnel could release any nontarget animals captured in live-traps.

- *Nets*

Nets (*e.g.*, cannon nets, mist nets, bow nets, dipping nets) restrain birds once captured and are live-capture methods. Nets have the potential to capture nontarget species. Net placement in areas where target species are active and the use of target-specific attractants would likely minimize the capture of nontarget animals. WS' personnel would attend nets appropriately, which would allow them to release any nontarget animals captured unharmed.

Nets could include the use of net guns, net launchers, cannon/rocket nets, drop nets, hand nets, bow nets, and mist nets. Nets are virtually selective for target individuals because application would occur by attending personnel or WS' personnel would check nets frequently to address any live-captured animals. Therefore, WS' personnel could release any nontarget animals captured using nets on site. WS' personnel would handle any nontarget animals captured using in such a manner as to ensure the survivability of the animal if released. Even though live-capture does occur from those methods, the potential for death of a target or nontarget animal while being restrained or released does exist, primarily from being struck by cannon or rocket assemblies during deployment. The likelihood of cannon or rocket assemblies striking a nontarget animal is extremely low. The risk is likely extremely low because a nontarget animal must be present when WS' personnel activate the net and the nontarget animal must be in a position where the assemblies strike the animal. WS' personnel would position nets so the net envelops target birds upon deployment, which would minimize the risk of assemblies striking a nontarget animal. When using nets, WS' personnel would often use a bait to attract target species and to concentrate target species in a specific area to ensure the net completely envelopes target birds. Therefore, WS' personnel could abandon sites if nontarget use of the area was high or could refrain from firing the net at a time when nontarget animals were present.

- *Modified Padded Foothold Trap*

As discussed in Appendix B, WS would primarily use modified padded foothold traps on top of poles at airport and military facilities to live-capture raptors that were posing an aircraft strike risk. Elevating modified padded foothold traps on poles to live-capture raptors at airports would limit risk of exposure for many nontarget animals. WS could occasionally place modified padded foothold traps on the ground or submerge the trap in shallow water to live-capture larger bird species. WS would place modified padded foothold traps in areas frequently used by the target bird species. When using modified padded foothold traps, WS' personnel would monitor the traps frequently. WS' personnel would remove the modified padded foothold trap or disengage the trap to prevent capture when not in use. Elevating a trap on a pole, placing traps in areas frequently used by a target bird species, and monitoring the trap would minimize risks of nontarget animals encountering and triggering a trap.

- *Nest Destruction*

WS' personnel would remove nests by hand, hand tools, or by high-power water spray, which would allow WS' personnel to identify the nest to bird species prior to removal. WS' personnel have experience and receive training in wildlife identification, which allows them to identify individual species. WS' personnel would be familiar with the nests of a target species before destroying a nest; therefore, it is highly unlikely WS' personnel would inadvertently destroy the nest of a nontarget species.

- *Translocation*

WS often uses translocation when damage or threats of damage occur during the migratory periods when many bird species do not have well defined territories as birds migrate to and/or through the USVI. WS would primarily translocate raptor species and primarily when those species present an aircraft strike risk at airports. WS does not anticipate live capturing and releasing target species to have any effect on nontarget species. Although raptor species translocated to other areas could feed on prey species, Schafer et al. (2002) found that the majority of translocated red-tailed hawks dispersed from the release site within five days of translocation indicating that inundation of discharged species in a release area is not a likely consequence.

- *Unmanned Aerial Vehicles*

WS could use Unmanned Aerial Vehicles (UAVs) to locate and haze target bird species. WS could use UAVs to elicit a flight response by scaring target birds from an area where damage was occurring or where damage could occur. WS could also use UAVs with the intent of locating or monitoring individuals or groups of birds and their associated nests or eggs. Of concern are the possible negative physiological and/or behavioral effects that negative stimuli could cause, which could reduce the fitness of nontarget animals, or the ability of nontarget animals to survive, especially if the exposure to the stressor was chronic. The stress from dispersal methods could negatively affect the health of an animal, interfere with the raising of young, and/or increase energy needs. However, for effects to occur nontarget animals would have to visually encounter UAVs and/or be within hearing distance at the time WS' personnel used UAVs and the resulting visual and/or auditory stimuli would have to elicit a negative response. Like other nonlethal methods, WS' personnel would not employ UAVs over large geographical areas or use UAVs at such an intensity level that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to a species' population.

Alternative 3 - WS would recommend an integrated methods approach to managing bird damage in the USVI through technical assistance only

Under a technical assistance alternative, WS would have no direct impact on nontarget species, including T&E species. Those persons requesting assistance could employ methods that WS' personnel recommend or provide through loaning of equipment. Using the WS Decision Model, WS' personnel would base recommendations from information provided by the person requesting assistance or through site visits. Recommendations would include methods or techniques to minimize impacts on nontarget animals associated with the methods that personnel recommend or loan. Methods recommended could include nonlethal and lethal methods as deemed appropriate by the WS Decision Model and as permitted by laws and regulations.

The potential impacts to nontarget animals under this alternative would be variable and based on several factors. If people employed methods as recommended by WS, the potential impacts to nontarget animals would likely be similar to Alternative 1. If people provided technical assistance did not use the recommended methods and techniques correctly or people used methods that WS did not recommend, the potential impacts on nontarget species, including T&E species, would likely be higher when compared to Alternative 1.

The potential impacts of hazing and exclusion methods on nontarget species would be similar to those described for Alternative 1. Hazing and exclusion methods would be easily obtainable and simple to employ. Because identification of targets would occur when employing shooting as a method, the potential impacts to nontarget species would likely be low under this alternative. However, the

knowledge and experience of the person could influence their ability to distinguish between similar bird species correctly.

Those people experiencing damage from birds may implement methods and techniques based on the recommendations of WS. The knowledge and skill of those persons implementing recommended methods would determine the potential for impacts to occur. If those persons experiencing damage do not implement methods or techniques correctly, the potential impacts from providing only technical assistance could be greater than Alternative 1. The incorrect implementation of methods or techniques recommended by WS could lead to an increase in nontarget animal removal when compared to the nontarget animal removal that could occur by WS under Alternative 1.

If WS provided technical assistance but none of the recommended actions were implemented and no further action was taken, the potential to remove nontarget animals would be lower when compared to Alternative 1. If those persons requesting assistance implemented recommended methods appropriately and as instructed or demonstrated, the potential impacts to nontarget animals would be similar to Alternative 1. If WS made recommendations on the use of methods to alleviate damage but the methods were not implemented as recommended by WS or if the methods recommended by WS were used inappropriately, the potential for lethal removal of nontarget animals would likely increase under a technical assistance only alternative. Therefore, the potential impacts to nontarget animals, including T&E species, would be variable under a technical assistance only alternative. It is possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal killing of birds, which could lead to unknown effects on local nontarget species populations, including some T&E species.

When the damage caused by wildlife reaches a level where assistance does not adequately reduce damage or where no assistance is available, people sometimes resort to using chemical toxicants that are illegal for use on the intended target species and often results in loss of both target and nontarget wildlife (*e.g.*, see White et al. 1989, USFWS 2001, United States Food and Drug Administration 2003). The use of illegal toxicants by individuals frustrated with the lack of assistance or assistance that inadequately reduces damage to an acceptable level can often result in the indiscriminate take of wildlife species.

The individuals requesting assistance are likely to use lethal methods because a damage threshold has been met that has triggered them to seek assistance to reduce damage. The potential impacts on nontarget animals by those persons experiencing damage would be highly variable. People whose bird damage problems were not effectively resolved by nonlethal control methods would likely resort to other means of legal or illegal lethal control. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than the proposed action.

WS' recommendation that birds be harvested during the regulated season by private entities to alleviate damage would not increase risks to nontarget animals. Shooting would essentially be selective for target species and the unintentional lethal removal of nontarget animals would not likely increase based on WS' recommendation of the method.

The ability to reduce negative effects caused by birds to wildlife species and their habitats, including T&E species, would be variable under this alternative. The skills and abilities of the person implementing damage management actions would determine the risks to nontarget animals.

Alternative 4 – WS would not provide any assistance with managing damage caused by birds in the USVI

Under this alternative, WS would not provide any assistance with managing damage associated with birds in the territory. Therefore, no direct impacts to nontarget animals or T&E species would occur by WS under this alternative. Risks to nontarget animals and T&E species would continue to occur from those people who implement damage management activities on their own or through recommendations by other federal, territory, and private entities. Although some risks could occur from those people that use methods in the absence of any involvement by WS, those risks would likely be low, and would be similar to those risks under the other alternatives.

The ability to reduce damage and threats of damage caused by birds would be variable based upon the skills and abilities of the person implementing damage management actions under this alternative. The risks to nontarget animals and T&E species would be similar across the alternatives because most of those methods described in Appendix B would be available to use by people if WS implements this alternative. If people apply those methods available as intended, risks to nontarget animals would be minimal to nonexistent. If people apply those methods available incorrectly or apply those methods without knowledge of animal behavior, risks to nontarget animals could be higher if WS implements this alternative. If frustration from the lack of available assistance causes those persons experiencing bird damage to use methods that are not legally available for use, risks to nontarget animals could be higher if WS implements this alternative. People have resorted to the use of illegal methods to resolve wildlife damage that have resulted in the lethal take of nontarget animals (*e.g*., see White et al. 1989, USFWS 2001, United States Food and Drug Administration 2003).

3.2.3 Issue 3 - Effects of Damage Management Methods on Human Health and Safety

A common concern is the potential adverse effects methods available could have on human health and safety. An evaluation of the threats to human health and safety associated with methods available under the alternatives occurs below for each of the four alternatives carried forward for further analysis.

Alternative 1 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI (Proposed Action/No Action)

If WS implements Alternative 1, WS' personnel would assess the damage or threat occurring, would evaluate the management methods available, and would formulate a management strategy to alleviate damage or reduce the risk of damage. A WS' employee would formulate a management strategy by selecting from those methods described in Appendix B that the employee determines to be practical for use. WS' employees who conduct activities to alleviate bird damage would be knowledgeable in the use of methods, the wildlife species responsible for causing damage or threats, and WS' directives. WS' personnel would incorporate that knowledge into the decision-making process inherent with the WS' Decision Model, which they would apply when addressing threats and damage caused by birds. Therefore, when evaluating management methods and formulating a management strategy for each request for assistance, WS' employees would consider risks to human health and safety associated with methods.

For example, WS' personnel would consider the location where activities could occur. Risks to human safety from the use of methods would likely be greater in highly populated urban areas in comparison to rural areas that are less densely populated. If WS' personnel conducted activities on rural private property, where the property owner or manager could control and monitor access to the property, the risks to human safety from the use of methods would likely be lower. If damage management activities occurred at or near public use areas, then risks of the public encountering damage management methods

and the corresponding risk to human safety would increase. In general, WS' personnel would conduct activities when human activity was minimal (*e.g.*, early mornings, at night) or in areas where human activity was minimal (*e.g.*, in areas closed to the public).

WS' personnel receive training in the safe use of methods and would follow the safety and health guidelines required by WS' directives (*e.g.*, see WS Directive 2.601, WS Directive 2.605, WS Directive 2.615, WS Directive 2.620, WS Directive 2.625, WS Directive 2.627, WS Directive 2.630, WS Directive 2.635). For example, WS' employees would adhere to safety requirements and use appropriate personal protective equipment pursuant to WS Directive 2.601. In addition, WS' personnel would also follow WS Directive 2.635 that establishes guidelines and standard training requirement for health, safety, and personal protection from zoonotic diseases. When using watercraft, WS' employees would follow the guidelines in WS Directive 2.630. In addition, the WS use of methods would comply with applicable federal, territory, and local laws and regulations (see WS Directive 2.210).

Before providing direct operational assistance, WS and the entity requesting assistance would sign a MOU, work initiation document, or a similar document that would indicate the methods the cooperating entity agrees to allow WS to use on the property they own or property they manage. Thus, the cooperating entity would be aware of the methods that WS could use on property they own or manage, which would help identify any risks to human safety associated with the use of those methods. WS' personnel would also make the cooperator requesting assistance aware of threats to human safety associated with the use of methods.

Besides direct operational assistance, WS could also recommend methods to people when providing technical assistance. As described previously, technical assistance would consist of WS' personnel providing recommendations on methods the requester could use themselves to resolve damage or threats of damage without any direct involvement by WS. Technical assistance could also consist of occasionally providing methods to a requester that might have limited availability, such as propane cannons. If people receiving technical assistance use methods according to recommendations and as demonstrated by WS, the potential risks to human safety would be similar to those risks if WS' personnel were using those methods. If people use methods without guidance from WS or apply those methods inappropriately, the risks to human safety could increase. The extent of the increased risk would be unknown and variable. However, methods inherently pose minimal risks to human safety given the design and the extent of the use of those methods. If WS implements Alternative 1, risks to human health and safety associated with WS' personnel providing technical assistance would be identical to those risks discussed if WS implemented Alternative 3. A discussion of threats to human health and safety for the methods discussed in Appendix B occurs below.

SAFETY OF NONCHEMICAL METHODS EMPLOYED

Section I and Section II in Appendix B discuss several nonchemical methods that would be available for use by WS. When using nonchemical lethal methods, WS' personnel would dispose of carcasses in accordance with WS Directive 2.515 and would comply with requirements in depredation orders, control orders, depredation permits, and/or authorizations issued by the USFWS and the DPNR for activities associated with birds. WS' personnel would also notify the cooperator requesting assistance of threats to human safety associated with the use of methods. Risks to human safety from activities and methods would be similar to the other alternatives because the same methods would be available. If the methods were misused or applied inappropriately, any of the methods available to alleviate bird damage could threaten human safety. However, when used appropriately, methods available to alleviate damage would not threaten human safety.

No adverse effects to human safety have occurred from WS' use of nonchemical methods to alleviate bird damage in the USVI from FY 2015 through FY 2019. The risks to human safety from the use of nonchemical methods, when used appropriately and by trained personnel, would be low. Based on the use patterns of methods available to address damage caused by birds, the use of nonchemical would comply with Executive Order 12898 and Executive Order 13045.

- *Human Presence*

As discussed previously, human presence may consist of physical actions of people or the presence of people and/or a vehicle. If WS implements Alternative 1, WS' activities would comply with relevant laws, regulations, policies, orders, and procedures. WS' personnel would follow the safety and health guidelines required by WS' directives (*e.g*., see WS Directive 2.601, WS Directive 2.605, WS Directive 2.615, WS Directive 2.620, WS Directive 2.625, WS Directive 2.627, WS Directive 2.630, WS Directive 2.635). Therefore, the physical actions of WS' employees, including the presence of employees and vehicles would not pose threat to human health and safety.

- *Changes in Cultural Practices and Exclusion Methods*

Based on their use profile for alleviating damage associated with wildlife, WS considers risks to human safety associated with changes in cultural practices and exclusion methods to be low. The use of fencing, surface coverings, overhead lines/wires, and netting to exclude birds would not pose risks to human health and safety. WS would not use electrified fencing in areas where risks to human safety would occur. For example, restricting the use of electrified fencing to agricultural areas where waterfowl are feeding on crops. Altering cultural practices would not pose a threat to human health and safety.

- *Auditory Deterrents*

Auditory deterrents that WS could use and/or recommend would include electronic hazing devices, pyrotechnics, and propane cannons. Risks to human health and safety would primarily occur from the noise produced by those methods, such as hearing loss from repeated and/or prolonged exposure to the noise produced by those methods. Other risks could include fire risks and bodily harm associated with the use of pyrotechnics and propane cannons. Although hazards to human safety from the use of auditory deterrents do occur, those methods are generally safe when used by trained individuals who have experience in their use. For example, although some risk of fire and bodily harm exists from the use of pyrotechnics, when used appropriately and in consideration of those risks, WS' personnel can use those methods with a high degree of safety. WS' employees would adhere to safety requirements and use appropriate personal protective equipment pursuant to WS Directive 2.601. WS' personnel who use pyrotechnics would follow the guidelines for using pyrotechnics in accordance with WS Directive 2.627.

- *Visual Deterrents*

Visual deterrents that WS' personnel could use and/or recommend would include Mylar tape, eyespot balloons, flags, effigies, lasers, and lights. Lasers and lights would pose minimal risks to the public because application occurs directly to target species by trained personnel, which limits the exposure of the public to misuse of the method. Similarly, the use of mylar tape, eyespot balloons, flags and effigies would not pose risks to human safety.

- *Trained Dogs*

WS could use and/or recommend the use of trained dogs to disperse waterfowl in areas where they are causing damage or posing a threat of damage. The use of trained dogs would primarily occur at parks,

airports, industrial complexes, and residential areas where waterfowl may congregate. WS would only use trained dogs that are responsive to their handler, which would minimize risks to the public.

- *High-pressure Water Spray*

WS expects the use of high-pressure water spray to pose minimal risks to human health and safety. WS' personnel would not direct water toward people and would be present on site to prevent people from access areas where WS' personnel use this method.

- *Live-capture Methods and Translocation*

Live-capture methods that would be available for WS' personnel to use and/or recommend would include bow nets, hand nets, drop nets, mist nets, net guns, cannon nets, cage traps, nest box traps, raptor traps, corral traps, and modified padded foothold traps. Live-capture methods are typically set in situations where human activity would be minimal to ensure public safety. Traps rarely cause serious injury because live-capture traps available for birds are typically walk-in style traps where birds enter but are unable to exit or require a target bird species to trigger the trap. Therefore, human safety concerns associated with live traps used to capture birds require direct contact to cause bodily harm. If left undisturbed, risks to human safety would be minimal. In addition, WS' personnel would be on site during the use of modified padded foothold traps and would monitor the traps. Other live-capture devices, such as cannon nets, pose minor safety hazards to the public because activation of the device occurs by trained personnel that are present on site and personnel would only activate the method after they observe target species in the capture area of the net. Personnel employing nets are present at the site during application to ensure the safety of the public and operators.

Although some fire and explosive hazards exist with cannon nets during ignition and storage of the explosive charges, safety precautions associated with the use of the method, when adhered to, pose minimal risks to human safety and primarily occur to the handler. WS would not use cannon nets in areas where public activity was high, which further reduces the risks to the public. WS would use nets in areas with restricted public access whenever possible to reduce risks to human safety. WS' personnel employing hand nets would also be present at the site during application to ensure the safety of the public. After using live-capture methods to capture birds, WS could translocate those birds to other areas. WS would primarily translocate raptor species when those species present an aircraft strike risk at airports. The translocation of birds would not pose a risk to the public. WS' personnel would wear gloves and other personal protective equipment to minimize the risks associated with handling and transporting translocated birds. Therefore, the release of birds after live-capture would not pose a risk to human health and safety.

- *Nest Destruction*

WS could use nest destruction to discourage birds from nesting in areas by removing nesting material. Removal of nesting material by WS' personnel would occur by hand, hand tools, and/or high-pressure water spray. Birds generally build nests using sticks, vegetation, and similar debris. The removal of nesting material by WS' personnel would not pose risks to the public and would pose a very low risk to WS' employees. Minor injuries could occur to WS' employees related to removing nesting material from the ground or from falling debris from removing nests in trees or other structures, such as bridges.

- *Unmanned Aerial Vehicles*

When using UAVs, WS' personnel would adhere to all federal, territory, and local laws. All WS' personnel who use UAVs are required to have a commercial Remote Pilot Certificate from the FAA. To

help ensure safe use and awareness, WS' employees who use UAVs receive training from an approved UAV training course and to remain certified to use UAVs, WS' employees must operate an UAV every 90 days to maintain proficiency. WS' personnel who use UAVs are also required to follow the guidelines established in the WS' Small Unmanned Aircraft System Flight Operations Procedures manual. When using UAVs, there would be a minimum of two WS' personnel present: a Pilot-in-Command, who is remotely controlling the UAV, and a Visual Observer, who alerts the Pilot-in-Command of any dangers while the UAV is being flown. The UAV must always remain in the visual line-of-sight of either the Pilot-in-Command and/or the Visual Observer. Additionally, UAVs are not to be operated over any person that is not directly involved with flight operations. By following the safety precautions outlined by the WS' Small Unmanned Aircraft System Flight Operations Procedures manual, UAVs pose minimal risks to human safety.

- *Firearms*

Certain safety issues can arise related to misusing firearms and the potential human hazards associated with the use of firearms to reduce damage. All WS' personnel who use firearms would follow the guidelines in WS Directive 2.615. To help ensure safe use and awareness, WS' employees who use firearms to conduct official duties receive training from an approved firearm safety-training course and to remain certified for firearm use, WS' employees must attend a re-certification safety-training course in accordance with WS Directive 2.615. WS' employees who carry and use firearms as a condition of employment are subject to the Lautenberg Domestic Confiscation Law and are required to inform their supervisor if they can no longer comply with the Lautenberg Domestic Confiscation Law (see WS Directive 2.615). WS would work closely with cooperators requesting assistance to ensure that WS' personnel consider all safety issues before deeming the use of firearms to be appropriate. Whether a person contacted WS or consulted with WS, the use of firearms to alleviate bird damage would be available if WS implements any of the alternatives unless otherwise prohibited by the USFWS in a depredation permit, depredation order, or a control order. Any legal method can be used to remove bird species afforded no protection from take under the MBTA, such as pigeons, starlings, and house sparrows. Because the use of firearms to alleviate bird damage would be available under any of the alternatives and the use of firearms by those persons experiencing bird damage could occur whether they contacted or consulted WS, the risks to human safety from the use of firearms would be similar among all the alternatives.

If WS' personnel use firearms to remove birds lethally, WS would retrieve the carcasses to the extent possible. WS' personnel would dispose of the carcasses retrieved in accordance with WS Directive 2.515 and would comply with requirements in depredation orders, control orders, depredation permits, and/or authorizations issued by the USFWS and the DPNR for activities associated with birds.

- *Egg Destruction*

Egg destruction would involve puncturing, breaking, shaking, or oiling an egg. Risks to human health and safety associated with egg destruction would be minimal. Egg oiling involves the use of corn oil to coat bird eggs in the nest, which renders the egg unviable. WS' personnel generally apply the corn oil by hand (rubbing oil over eggs), dipping eggs in corn oil, or spraying corn oil from a pump-type (non-aerosol) container. WS' personnel use commercially available, food-grade corn oil when oiling eggs. Egg oiling is generally a method used to treat the eggs of bird species that nest on the ground, such as waterfowl. WS' personnel coat each egg with a light to moderate amount of corn oil. WS only uses food-grade corn oil that people use every day when preparing food and uses a small amount of corn oil to treat each egg; therefore, risks to human safety associated with the use of corn oil to coat eggs would be extremely low.

- *Cervical Dislocation for Euthanasia*

After WS live-captured a bird, WS could euthanize the bird by cervical dislocation. The American Veterinary Medical Association (AVMA) guidelines on euthanasia list cervical dislocation as conditionally acceptable methods of euthanasia for free-ranging birds that can lead to a humane death (AVMA 2020). Risks would primarily occur to the person handling the bird and primarily from the bird scratching or biting the handler. In general, WS' personnel would perform cervical dislocation outside of public view, which would minimize risks to the public. WS would dispose of carcasses euthanized in accordance with WS Directive 2.515 and would comply with requirements in depredation orders, control orders, depredation permits, and/or authorizations issued by the USFWS and the DPNR for activities associated with birds.

- *Sport Hunting*

The recommendation by WS that the public be allowed to harvest birds during an annual hunting seasons would not increase risks to human safety above those risks already inherent with hunting birds. Recommendations of allowing hunting on property owned or managed by a cooperator to reduce a localized bird population that could then reduce bird damage or threats would not increase risks to human safety. Safety requirements established by the DPNR for annual hunting seasons would further minimize risks associated with hunting. Although hunting accidents do occur, the recommendation of allowing hunting to reduce localized bird populations would not increase those risks.

SAFETY OF CHEMICAL METHODS EMPLOYED

In addition to nonchemical methods, chemical methods could also be available for WS' personnel to use (see Appendix B). Many of the chemical methods would only be available to target certain bird species and/or to manage damage or threats of damage in specific situations. Those chemical methods that WS could use as part of an integrated methods approach include carbon dioxide for euthanasia, egg oiling, and paintballs. WS' personnel would use the WS' Decision Model to determine when chemical methods were appropriate to alleviate damage. WS' personnel would adhere to WS' directives when using chemical methods, such as WS Directive 2.430. All WS' personnel who handle and administered chemical methods would receive appropriate training to use those methods. WS would dispose of carcasses in accordance with WS Directive 2.515.

No adverse effects to human safety have occurred from WS' use of chemical methods to alleviate bird damage in the territory from FY 2015 through FY 2019. The risks to human safety from the use of chemical methods, when used appropriately and by trained personnel, would be low. Therefore, WS does not expect any direct, indirect, or cumulative effects to occur from WS' use of those chemical methods discussed below and described further in Appendix B. Based on the use patterns of methods available to address damage caused by birds, the use of nonchemical would comply with Executive Order 12898 and Executive Order 13045.

- *Carbon Dioxide for Euthanasia*

After target bird species were live-captured, WS could euthanize those birds by placing the birds into a sealed chamber and releasing compressed carbon dioxide inside the chamber. The AVMA (2020) guidelines on euthanasia list carbon dioxide as conditionally acceptable methods of euthanasia for free-ranging birds that can lead to a humane death. The carbon dioxide released into the sealed chamber would diffuse into the atmosphere once WS' personnel opened the chamber to dispose of the animal. The use of carbon dioxide for euthanasia would occur in ventilated areas where exposure of the applicator or the public to large concentrations of carbon dioxide from the release of carbon dioxide would not occur.

Based on the use patterns from the use of carbon dioxide in sealed chamber to euthanize animals, the risks to human safety is extremely low.

- *Egg Oiling*

Egg oiling involves the use of corn oil to coat the eggs in the nest of a target bird species, which renders the egg unviable. WS' personnel generally apply the corn oil by hand (rubbing oil over eggs), dipping eggs in corn oil, or spraying corn oil from a pump-type (non-aerosol) container. WS' personnel use commercially available, food-grade corn oil when oiling eggs. Egg oiling is generally a method used to treat the eggs of bird species that nest on the ground. WS' personnel coat each egg with a light to moderate amount of corn oil. WS only uses food-grade corn oil that people use every day when preparing food and uses a small amount of corn oil to treat each egg; therefore, risks to human safety associated with the use of corn oil to coat eggs would be extremely low. The United States Environmental Protection Agency has ruled that use of corn oil for this purpose is exempt from registration requirements under Federal Insecticide, Fungicide, and Rodenticide Act.

- *Paintballs*

WS could also use paintball guns to disperse target bird species. Paintballs do not actually contain paint, but are marking capsules that consist of a gelatin shell filled with a nontoxic glycol and water-based coloring that rapidly dissipates and is not harmful to the environment. Although the ingredients may vary slightly depending on the manufacturer, paintball ingredients may include polyethylene glycol, gelatin, glycerine (glycerol), sorbitol, water, ground pigskin, dipropylene glycol, mineral oil, and dye as the colorant (Donaldson 2003). Paintballs are considered nontoxic to people and do not pose an environmental hazard, as described on product labeling and Material Safety Data Sheets.

EFFECTS OF NOT EMPLOYING METHODS TO REDUCE THREATS TO HUMAN SAFETY

Section 1.4.2 discusses the need to resolve threats to human safety associated with the bird species addressed in this EA. Threats to human safety associated with those bird species addressed in this EA are primarily associated with the risks of aircraft striking birds at airports in the territory. Other risks to human safety can include the threats of disease transmission between birds and people or the aggressive behavior of certain bird species toward the public. If WS implements Alternative 1, those methods identified in Appendix B would be available for WS' personnel to use when formulating a management strategy using the WS Decision Model. WS' personnel would not necessarily use every method from Appendix B to address every request for assistance but would use the WS' Decision Model to determine the most appropriate approach to address each request for assistance, which could include using additional methods from Appendix B if initial efforts did not adequately reduce threats to human safety.

Implementation of Alternative 1 would provide the widest selection of methods to resolve requests for assistance. Restricting methods or limiting the availability of methods could lead to incidents where risks to human safety increase because the only available methods may not be effective enough to reduce risks to human safety adequately. In addition, implementation of Alternative 1 would provide another way for people to resolve threats to human safety because WS would be available to provide direct operational assistance and/or technical assistance. People experiencing threats to human safety could conduct activities themselves to alleviate threats, they could seek assistance from private businesses/entities, they could seek assistance from WS, they could seek assistance from other territory or federal agencies, and/or they could take no further action. The mission of the national WS program is to provide federal leadership with managing conflicts with wildlife. In some cases, WS may be the only entity available to manage threats to human safety, such as in rural areas or remote air facilities.

Overall, implementation of this alternative would likely result in a higher likelihood of successfully reducing threats to human safety because of the availability of WS and WS' ability to use the widest range of available methods to reduce threats associated with those bird species addressed in this EA.

Alternative 2 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI using only nonlethal methods

Implementation of this alternative would require WS to only recommend and use nonlethal methods to manage and prevent damage caused by target bird species. WS would provide technical assistance and direct operational assistance under this alternative recommending and using only nonlethal methods. If WS implements Alternative 2, the nonlethal methods that would be available for WS to recommend and/or use would have the potential to threaten human safety.

SAFETY OF NONCHEMICAL METHODS EMPLOYED

Alternative 1 discusses the threats to human safety associated with nonchemical methods that would be available if WS implements Alternative 2. If WS implements Alternative 2, the threats to human safety associated with nonchemical methods would be the same as those threats that would occur if WS implemented Alternative 1 because WS would use the same nonchemical methods that were also nonlethal methods. Nonchemical methods that WS could use and/or recommend if WS implements Alternative 2 include limited habitat modification, exclusion methods, auditory deterrents, visual deterrents, live-capture methods, and inactive nest destruction.

No adverse effects to human safety have occurred from WS' use of nonchemical methods to alleviate bird damage in the territory from FY 2015 through FY 2019. The risks to human safety from the use of nonchemical methods, when used appropriately and by trained personnel, would be low. Based on the use patterns of methods available to address damage caused by birds, this alternative would comply with Executive Order 12898 and Executive Order 13045.

Other entities could and would likely continue to use nonchemical lethal methods if WS implements this alternative, such as firearms. Many of the lethal methods available to manage bird damage would be available for use by other entities. This could result in less experienced persons implementing lethal methods, which could lead to greater risks to human safety. Other entities could use lethal methods where WS' personnel may not because WS' personnel would consider threats to human safety when formulating strategies to alleviating bird damage.

SAFETY OF CHEMICAL METHODS EMPLOYED

If WS implements Alternative 2, those nonlethal chemical methods that would be available for WS to use would include paintballs fired from paintball equipment. To reduce redundancy, the safety of WS' use of paintballs occurs in the discussion for Alternative 1. WS' use of paintball if WS implemented Alternative 2 would be the same as Alternative 1.

No adverse effects to human safety have occurred from WS' use of chemical methods to alleviate bird damage in the USVI from FY 2015 through FY 2019. The risks to human safety from the use of chemical methods, when used appropriately and by trained personnel, would be low. Based on the use patterns of methods available to address damage caused by birds, this alternative would comply with Executive Order 12898 and Executive Order 13045.

EFFECTS OF NOT EMPLOYING METHODS TO REDUCE THREATS TO HUMAN SAFETY

As discussed previously, using nonlethal methods can be effective at alleviating damage associated with birds. The use of nonlethal methods in an integrated approach can be effective at dispersing birds (*e.g.*, see Avery et al. 2008, Chipman et al. 2008, Seamans and Gosser 2016). Section 1.4.2 discusses the need to resolve threats to human safety associated with the target bird species. Threats to human safety associated with birds are primarily associated with the risks of aircraft striking birds at airports in the USVI but can include threats of pathogen transmission. Limiting the methods available could lead to higher risks to human health and safety. For example, many bird species have the potential to cause severe damage to aircraft, which can threaten the safety of flight crews and passengers. Risks of aircraft strikes could increase if birds near airports and/or military facilities habituate to the use of nonlethal methods and no longer respond to the use of those methods.

Alternative 3 - WS would recommend an integrated methods approach to managing bird damage in the USVI through technical assistance only

If WS implements this alternative, WS' personnel would only provide recommendations on methods the requester could use to alleviate bird damage themselves with no direct involvement by WS. On occasion, WS' personnel could demonstrate the use of methods but WS' personnel would not conduct any direct operational activities to manage damage caused by birds. WS' personnel would only recommend for use those methods that were legally available to the requester for use. WS would only provide technical assistance to those persons requesting assistance with bird damage and threats.

SAFETY OF NONCHEMICAL METHODS EMPLOYED

If WS implements this alternative, those people that request assistance from WS could conduct activities and use methods recommended by WS' personnel, they could implement other methods, they could seek further assistance from other entities, or they could take no further action. Therefore, the requester and/or other entities would be responsible for using those methods available, including methods recommended by WS. The skill and knowledge of the person applying methods would determine the safety and efficacy of the methods the person was using. If people receiving technical assistance use nonchemical methods according to recommendations and as demonstrated by WS, the potential risks to human safety would be similar to those risks if WS' personnel were using those methods. If people implement nonchemical methods inappropriately, without regard for human safety, and/or use methods not recommended by WS, risks to human health and safety could be higher than those risks associated with the implementation of Alternative 1. The extent of the increased risk would be unknown and variable. However, nonchemical methods inherently pose minimal risks to human safety given the design and the extent of the use of those methods.

SAFETY OF CHEMICAL METHODS EMPLOYED

Carbon dioxide for euthanasia, egg oiling, and paintballs are chemical methods that would continue to be available to the public for use. Similar to the use of nonchemical methods, the skill and knowledge of the person applying methods would determine the safety and efficacy of the methods the person was using. If people receiving technical assistance from WS implement chemical methods appropriately and in consideration of human safety, the effects of implementing this alternative on human health and safety would be similar to the effects if WS implemented Alternative 1. If the chemical methods were implemented inappropriately, without regard for human safety, and/or methods not recommended by WS were used, risks to human health and safety could be higher than those risks associated with the implementation of Alternative 1.

EFFECTS OF NOT EMPLOYING METHODS TO REDUCE THREATS TO HUMAN SAFETY

As discussed previously, if WS implements this alternative, the skill and knowledge of the person using methods would determine how effective those methods were at reducing threats to human health and safety. If methods are implemented as intended at a similar level that would occur if WS' personnel were conducting those activities, the ability to reduce threats to human health and safety would be similar. If the individuals attempting to reduce threats to human health and safety applied methods incorrectly or were not as diligent at employing methods, then the reduction of threats to human health and safety would be lower than Alternative 1. This would likely occur on a case by case basis because one individual may apply methods as intended at a similar intensity level as would occur if WS were conducting the activities while another person may not apply methods as intended or may not apply those methods at a similar intensity level. Therefore, implementing this alternative would likely be effective at reducing threats to human health and safety similar to Alternative 1 in some cases but would not be as effective in other cases. However, implementing this alternative would likely be more effective at reducing threats to human health and safety than the implementation of Alternative 4 because WS would be available to provide technical assistance and demonstration to those persons seeking assistance.

Alternative 4 - WS would not provide any assistance with managing damage caused by birds in the USVI

If WS implements Alternative 4, WS would not provide assistance with any aspect of managing damage caused by those target bird species addressed in this EA, including providing technical assistance. People could contact WS for assistance but WS would refer those people to other entities, such as the USFWS, DPNR, and/or private entities. Due to the lack of involvement in managing damage caused by those target bird species addressed in this EA, no impacts to human safety would occur directly by WS. This alternative would not prevent those entities from conducting damage management activities in the absence of WS' assistance. The methods discussed in Appendix B would be available to those persons experiencing damage or threats and, when required, people could continue to take birds lethally when authorized by the USFWS and the DPNR.

SAFETY OF NONCHEMICAL METHODS EMPLOYED

If WS implements this alternative, the individuals experiencing bird damage could conduct activities themselves, they could seek assistance from other entities, or they could take no action. The requester and/or other entities would be responsible for using those methods available. Nonchemical methods available to alleviate or prevent damage associated with birds generally do not pose risks to human safety. Most nonchemical methods available to alleviate bird damage involve the live-capture or hazing of birds. The skill and knowledge of the person applying methods would determine the safety and efficacy of the methods the person was using. If people implement nonchemical methods appropriately and in consideration of human safety, then the effects of using nonchemical methods would be similar to those effects if WS implemented Alternative 1. If people implement nonchemical methods inappropriately, without regard for human safety, and/or use illegal methods, risks to human health and safety could be higher than those risks associated with the implementation of Alternative 1. Although some risks to human safety are likely to occur with the use of pyrotechnics, propane cannons, exclusion devices, and firearms, those risks would likely be minimal when people use those methods appropriately and in consideration of human safety.

SAFETY OF CHEMICAL METHODS EMPLOYED

Similar to Alternative 3, several chemical methods would continue to be available for use by the public if WS implements Alternative 4. Carbon dioxide for euthanasia, egg oiling, and paintballs are chemical

methods that would continue to be available to the public for use. Similar to the use of nonchemical methods, the skill and knowledge of the person applying methods would determine the safety and efficacy of the methods the person was using. If people use chemical methods appropriately and in consideration of human safety, including follow label requirements, then the effects of implementing this alternative on human health and safety would be similar to those effects if WS implemented Alternative 1. If chemical methods are implemented inappropriately, without regard for human safety, and/or illegal methods are used, risks to human health and safety could be higher than those risks associated with the implementation of Alternative 1.

EFFECTS OF NOT EMPLOYING METHODS TO REDUCE THREATS TO HUMAN SAFETY

As discussed previously, if WS implements this alternative, the skill and knowledge of the person using methods would determine how effective those methods were at reducing threats to human health and safety. If people implement methods as intended at a similar level that would occur if WS' personnel were conducting those activities, the ability to reduce threats to human health and safety would be similar. If people attempting to reduce threats to human health and safety applied methods incorrectly or were not as diligent at employing methods, then the ability of those people to reduce threats to human health and safety would be lower than Alternative 1. This would likely occur on a case by case basis because one person may apply methods as intended at a similar intensity level as would occur if WS were conducting the activities while another person may not apply methods as intended or may not apply those methods at a similar intensity level. Therefore, implementing this alternative would likely be effective at reducing threats to human health and safety similar to Alternative 1 in some cases but would not be as effective in other cases. However, implementing this alternative would likely be less effective at reducing threats to human health and safety than the implementation of Alternative 3 because WS would not be available to provide technical assistance and demonstration to those persons seeking assistance.

3.2.4 Issue 4 - Humaneness and Animal Welfare Concerns of Methods

As discussed previously, a common issue often raised is concerns about the humaneness and animal welfare concerns of methods available under the alternatives for resolving damage and threats. Discussion of method humaneness and animal welfare concerns for those methods available under the alternatives occurs below.

Alternative 1 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI (Proposed Action/No Action)

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that people interpret in a variety of ways. Schmidt (1989) indicated that vertebrate damage management for societal benefits could be compatible with animal welfare concerns, if *"…the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."* The AVMA has previously described suffering as a *"…highly unpleasant emotional response usually associated with pain and distress"* (AVMA 1987). However, suffering *"…can occur without pain…,"* and *"…pain can occur without suffering…"* (AVMA 1987). Because suffering carries with it the implication of occurring over time, a case could be made for *"…little or no suffering where death comes immediately…"* (California Department of Fish and Game 1991). Pain and physical restraint can cause stress in animals and the inability of animals to effectively deal with those stressors can lead to distress. Suffering occurs when people do not take action to alleviate conditions that cause pain or distress in animals.

Defining pain as a component in humaneness appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain. However,

pain experienced by individual animals probably ranges from little or no pain to considerable pain (California Department of Fish and Game 1991). Research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness (Bateson 1991, Sharp and Saunders 2008, Sharp and Saunders 2011). Therefore, the challenge in coping with this issue is how to achieve the least amount of animal suffering.

The AVMA has previously stated "*...euthanasia is the act of inducing humane death in an animal*" and "*... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness*" (Beaver et al. 2001). Some people would prefer the use of AVMA accepted methods of euthanasia when killing all animals, including wild animals. However, the AVMA has previously stated, "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress-free death may not be possible*" (Beaver et al. 2001).

Humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane because the resulting fate is the death of the animal. Others believe that certain lethal methods can lead to a humane death. Others believe most nonlethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. Given the multitude of attitudes on the meaning of humaneness and the varying perspectives on the most effective way to address damage and threats in a humane manner, the challenge for agencies is to conduct activities and employing methods that people perceive to be humane while assisting those persons requesting assistance to manage damage and threats associated with wildlife. The goal of WS would be to use methods as humanely as possible to resolve requests for assistance to reduce damage and threats to human safety. WS would continue to evaluate methods and activities to minimize the pain and suffering of methods addressed when attempting to resolve requests for assistance.

Some people and groups of people have stereotyped methods as "*humane*" or "*inhumane*". However, many "*humane*" methods can be inhumane if not used appropriately. Therefore, the goal would be to address requests for assistance effectively using methods in the most humane way possible that minimizes the stress and pain to the animal. When formulating a management strategy using the WS Decision Model, WS' personnel would give preference to the use of nonlethal methods, when practical and effective, pursuant to WS Directive 2.101.

Although some issues of humaneness could occur from the use of nonlethal methods, when used appropriately and by trained personnel, those methods would not result in the inhumane treatment of birds. The nonlethal methods of primary concern would be the use of live-capture methods, such as nets and cage traps. Concerns from the use of those nonlethal methods would be from injuries to birds while those methods restrain birds and from the stress of the bird while being restrained or during the application of the method. However, WS' personnel would be present on-site during capture events or methods would be checked frequently to ensure birds captured are addressed timely and to prevent injury. Although stress could occur from being restrained, timely attention to live-captured wildlife would alleviate suffering. Stress would likely be temporary.

Under the proposed action, WS could also use lethal methods to resolve requests for assistance to resolve or prevent bird damage and threats. Lethal methods would include firearms, egg destruction, euthanasia after birds are live-captured, and the recommendation that birds be harvested during regulated hunting seasons. WS' use of euthanasia methods under the proposed action would follow those required by WS Directive 2.505.

The euthanasia methods being considered for use under the proposed action for live-captured birds are cervical dislocation and carbon dioxide. The AVMA guideline on euthanasia lists cervical dislocation and carbon dioxide as an acceptable method of euthanasia for free-ranging birds, which can lead to a humane death (AVMA 2020). The use of cervical dislocation or carbon dioxide for euthanasia would occur after the animal has been live-captured and away from public view. Although the AVMA guideline also lists gunshot as a conditionally acceptable method of euthanasia for free-ranging wildlife, there is greater potential the method may not consistently produce a humane death (AVMA 2020). WS' personnel that employ firearms to address bird damage or threats to human safety are trained in the proper placement of shots to ensure a timely and quick death.

When WS' personnel deem firearms to be an appropriate method to alleviate damage or threats of damage using the WS Decision Model, WS' personnel would strive to minimize the distress and pain of target birds and to induce death as rapidly as possible. The use of carbon dioxide for euthanasia would occur after WS' personnel live-capture a bird. WS' personnel that use firearms and carbon dioxide would receive training in the proper use of the methods to ensure a timely and quick death. Egg destruction would involve puncturing an egg, breaking an egg, shaking an egg, or oiling an egg. In general, egg destruction would represent a humane method of making an egg unviable. In accordance with WS Directive 2.505, when taking an animal's life, WS' personnel would exhibit a high level of respect and professionalism toward the animal, regardless of method.

WS' personnel would be experienced and professional in their use of management methods (see WS Directive 1.301). WS' personnel would receive training in the latest and most humane devices/methods to manage damage associated with birds. Consequently, WS' personnel would implement methods in the most humane manner possible. People experiencing damage or threats of damage associated with birds could use those methods discussed in Appendix B regardless of the alternative implemented by WS. Therefore, the issue of humaneness associated with methods would be similar across any of the alternatives because people could use those methods in the absence of WS' involvement. Those persons who view a particular method as humane or inhumane would likely continue to view those methods as humane or inhumane under any of the alternatives.

Alternative 2 - WS would continue the current integrated methods approach to managing damage caused by birds in the USVI using only nonlethal methods

If WS implemented this alternative, WS would only use nonlethal methods, which most people would generally regard as humane. WS would use nonlethal methods to live-capture, exclude, or disperse birds. The humaneness and animal welfare concerns of nonlethal methods would be identical to those described for Alternative 1 because those same nonlethal methods would be available for use if WS implemented this alternative. Although some issues of humaneness and animal welfare concerns could occur from the use of nonlethal methods, those methods, when used appropriately and by trained personnel, would not result in the inhumane treatment of birds.

Alternative 3 - WS would recommend an integrated methods approach to managing bird damage in the USVI through technical assistance only

If WS implemented this alternative, the issue of method humaneness and animal welfare concerns would be similar to the humaneness and animal welfare concerns discussed for Alternative 1 because many of the same methods would be available for people to use. WS would not directly be involved with damage management activities if WS implemented Alternative 3. However, the entity receiving technical assistance from WS could employ those methods that WS recommends. Therefore, by recommending

methods and, thus, a requester employing those methods, the issue of humaneness and animal welfare concerns would be similar to Alternative 1.

WS would instruct and demonstrate the proper use of methodologies to increase their effectiveness and to ensure people have the opportunity to use methods to minimize pain and suffering. However, the skill and knowledge of the person applying methods would determine the humane use of the methods the person was using despite WS' demonstration. Therefore, a lack of understanding of the behavior of animals or improperly identifying the damage caused by animals along with inadequate knowledge and skill in using methodologies to resolve the damage or threat could lead to incidents with a greater probability of people perceiving those activities as inhumane. In those situations, people are likely to regard the pain and suffering to be greater than discussed for Alternative 1.

Those persons requesting assistance would be directly responsible for the use and placement of methods and if monitoring or checking of those methods does not occur in a timely manner, captured wildlife could experience suffering and if not addressed timely, could experience distress. The amount of time an animal is restrained under the proposed action would be shorter compared to a technical assistance alternative if those requesters implementing methods are not as diligent or timely in checking methods. It is difficult to evaluate the behavior of individual people. In addition, it is difficult to evaluate how those people will react under given circumstances. Therefore, this alternative can only evaluate the availability of WS' assistance because determining human behavior can be difficult. If those persons seeking assistance from WS apply methods recommended by WS through technical assistance as intended and as described by WS, then those people could apply those methods humanely to minimize pain and distress. If those persons provided technical assistance by WS apply methods not recommended by WS or do not employ methods as intended or without regard for humaneness or animal welfare concerns, then the issue of method humaneness and animal welfare concerns would be of greater concern because the pain and distress of birds would likely be higher.

Alternative 4 – WS would not provide any assistance with managing damage caused by birds in the USVI

WS would not provide any assistance in the USVI if WS implemented Alternative 4. Those people experiencing damage or threats associated with birds could use those methods legally available. Those persons who consider methods inhumane would likely consider those methods inhumane under any alternative because people often label methods inhumane no matter the entity employing those methods. A lack of understanding regarding the behavior of birds or methods used could lead to an increase in situations perceived as being inhumane to wildlife despite the method used. Despite the lack of involvement by WS under this alternative, those methods perceived as inhumane by certain individuals and groups would still be available to the public to use to resolve damage and threats caused by birds.

3.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Based on the best available information, the analyses in Section 3.2.1 and the information discussed in Appendix D indicate the direct, indirect, and cumulative effects on target bird populations associated with implementing Alternative 1 would be of low magnitude. The cumulative lethal removal of target bird species from all known sources of mortality would not reach a threshold that would cause a decline in their respective populations. The implementation of Alternative 2, Alternative 3, or Alternative 4 would likely have similar effects on target bird populations to implementing Alternative 1 because the same or similar activities could occur by other entities. The USFWS and the DPNR could issue depredation permits and authorizations to entities experiencing damage or threats of damage caused by birds despite WS only providing technical assistance if WS implemented Alternative 3 or provided no assistance if WS implemented Alternative 4.

If WS implemented Alternative 1, those methods that WS could use to alleviate damage would essentially be selective for target bird species because WS' personnel would consider the methods available and their potential to disperse, capture, or kill nontarget animals based on the use pattern of the method. WS' personnel would have experience with managing animal damage and would receive training in the use of methods, which would allow WS' employees to use the WS Decision Model to select the most appropriate methods to address damage caused by birds and to reduce the risks to nontarget animals. No take of nontarget animals has occurred by WS during prior activities to manage bird damage in the territory.

If WS implemented Alternative 3, the knowledge and skill of the individuals implementing the recommended methods would determine the potential for impacts to occur. If methods or techniques were not implemented correctly, the potential impacts from providing only technical assistance could be greater than Alternative 1. The incorrect implementation of methods or techniques recommended by WS could lead to an increase in nontarget animal removal when compared to the nontarget animal removal that could occur by WS under Alternative 1. Similarly, if WS implemented Alternative 4, the knowledge and skill of the individuals implementing methods would determine the potential for impacts to occur. If the individuals experiencing damage do not implement methods or techniques correctly, the potential impacts from implementing Alternative 4 could be greater than Alternative 1.

The risks to human health and safety from the use of available methods, when used appropriately and by trained personnel, would be low. No adverse effects to human safety have occurred from WS' use of methods to alleviate bird damage in the territory from FY 2015 through FY 2019. Based on the use patterns of methods available to address damage caused by birds, implementation of Alternative 1 would comply with Executive Order 12898 and Executive Order 13045. Other entities could conduct activities to manage bird damage in the USVI. If people implemented methods appropriately and in consideration of human safety, threats to human health and safety would be minimal. If people implemented methods inappropriately, without regard for human safety, and/or used illegal methods, risks to human health and safety would increase.

The individuals experiencing damage or threats of damage associated with birds could use those methods discussed in Appendix B regardless of the alternative implemented by WS. Therefore, the issue of humaneness associated with methods would be similar across any of the alternatives because the individuals could use those methods in the absence of WS' involvement. Those who view a particular method as humane or inhumane would likely continue to view those methods as humane or inhumane under any of the alternatives. In addition, many "*humane*" methods can be inhumane if not used appropriately. For example, live trapping may be viewed as a humane method because the trap captures an animal alive. Yet, without proper care, a bird captured in a live trap can be treated inhumanely if not attended to appropriately.

CHAPTER 4: PUBLIC INVOLVEMENT SUMMARY

WS made the EA available to the public for review and comment by a legal notice published in the *Virgin Islands Daily News* on September 21, 2020, September 22, 2020, and September 23, 2020. WS also made the EA available to the public for review and comment on the APHIS website on September 16, 2020 and on the federal e-rulemaking portal at the regulations.gov website beginning on September 15, 2020. WS also sent out direct e-mails to local known stakeholders and an electronic notification to stakeholders registered through the APHIS Stakeholder Registry. The public involvement process ended on October 30, 2020.

4.1 SUMMARY OF PUBLIC COMMENTS AND WS' RESPONSES TO THE COMMENTS

During the public comment period, WS received four comment responses on the draft EA. Section 4.1 summarizes the comments received and provides WS' responses to the comments.

Comment – WS wants to kill all wildlife, including birds; WS should not kill birds or other wildlife species

Response: The EA only analyzes the environmental impacts of WS' damage management activities to alleviate damage or threats of damage caused by birds. The WS Decision Model would be the implementing mechanism for a bird damage management program under applicable alternatives that WS' personnel would adapt to an individual damage situation. When WS receives a request for direct operational assistance, WS would conduct site visits to assess the damage or threats, would identify the cause of the damage, and would apply the Decision Model described by Slate et al. (1992) and WS Directive 2.201 (see Appendix E) to determine the appropriate methods to resolve or prevent damage. Discussion of the Decision Model and WS' use of the Model occurs in the description of Alternative 1 in Section 2.2.2, but WS' use of the Model would also be applicable if WS implemented Alternative 2 and Alternative 3. In addition, WS would give preference to non-lethal methods when practical and effective (see WS Directive 2.101). Appendix B discusses many non-lethal methods that WS' personnel could recommend or employ to resolve damage under the applicable alternatives. The WS program does not attempt to eradicate any native bird species in the USVI. WS operates in accordance with federal and territory laws and regulations enacted to ensure species viability.

Comment – WS sneaks into areas with no notice to anyone and lies to the public

Response: WS only provides assistance after receiving a request for such assistance and only after the entity requesting assistance and WS sign a MOU, work initiation document, or another similar document. Therefore, the decision-maker for what activities WS conducts is the entity that owns or manages the affected property. The decision-makers have the discretion to involve others as to what occurs or does not occur on property they own or manage. Therefore, in the case of an individual property owner or manager, the involvement of others and to what degree others were involved in the decision-making process would be a decision made by that individual. Section 2.2.1 discusses the decision-making process associated with communities, private property owners, and public property managers.

Comment – WS seeks money to kill animals

Response: WS only provides assistance after receiving a request for such assistance that is specifically directed to WS, normally through phone calls, emails, and in-person communication. The WS program does not initiate solicitation of any of the services offered by WS. Furthermore, the WS program does not consider publicly advertised solicitations, notices, or bid advertisements seeking wildlife damage management activities that are open to private sector service providers (see WS Directive 3.101). Funding for WS' activities could occur from federal appropriations, through territory funding, and/or through money received from the entity requesting assistance. In most cases, those entities requesting assistance would provide the funding for activities conducted by WS. The activities that WS' personnel conduct when providing assistance would be the basis for funding, not whether WS' employees use non-lethal or lethal methods.

Comment – Taxpayers should not pay for WS' activities; WS should shut down

Response: WS identified an alternative approach that would require cooperators completely fund activities (see Section 2.2.3). However, WS did not consider the alternative in detail for the reasons

provided in Section 2.2.3. Also, WS considered an alternative where WS would not provide any assistance with managing damage caused by target bird species (see Alternative 4 in Section 2.2.2). In those cases where WS receives governmental funding to conduct activities, government officials have made the decision to provide funding for damage management activities and have allocated funds for such activities. Additionally, damage management activities are an appropriate sphere of activity for government programs because managing wildlife is a government responsibility.

Comment – WS uses poisons, gases, and cyanide to lethally remove animals

Response: Carbon dioxide and egg oiling are the only lethal chemical methods that WS proposes to use for bird damage management in the USVI. The use of carbon dioxide and egg oiling presents minimal risks to nontarget species (see Section 3.2.2), as well as human health and safety (see Section 3.2.3). WS would only use carbon dioxide as a euthanasia method in sealed containers or chambers. Because carbon dioxide dissipates quickly once the containers or chambers are opened, only target birds placed in the containers or chambers would be exposed to lethal amounts of carbon dioxide. The WS program would not use cyanide or any type of poison for bird damage management activities in the USVI.

Comment – Farmers should use nonlethal methods to reduce damage caused by birds; Farmers should use dogs to alleviate bird damage

Response: As discussed in Section 2.2.3, people often use nonlethal methods to alleviate bird damage. In addition, WS has used nonlethal methods to alleviate bird damage in the USVI (see Section 3.2.1). The continued use of nonlethal methods often leads to the habituation of birds to those methods, which can decrease the effectiveness of those methods (Conover 2002, Avery et al. 2008, Chipman et al. 2008, Seamans and Gosser 2016). Therefore, people often use lethal methods when nonlethal methods no longer reduce damage or reduce damage threats. Although dogs can be effective at dispersing some bird species, such as waterfowl, they are not an effective method in all situations. As discussed in the EA, WS is considering the use of trained dogs to disperse birds when WS' personnel deem them to be an appropriate method and when the entity requesting assistance allow WS to use trained dogs on property they own or manage.

Comment – Pearly-eyed thrasher populations exceed the carrying capacity; thrashers cause damage to agricultural crops and natural resources

Response: The USFWS has the overall regulatory authority to manage populations of migratory bird species, while the DPNR has the authority to manage wildlife populations in the USVI. Thus, the WS program does not manage for populations of bird species, including the pearly-eyed thrasher. WS could provide technical assistance and/or direct operational assistance to reduce and prevent damage associated with pearly-eyed thrashers. WS would only conduct activities after receiving a request from the appropriate property owner or property manager. The take of pearly-eyed thrashers by WS would only occur at the discretion of the USFWS and the DPNR and only at levels permitted by the USFWS and the DPNR.

Comment – USDA should withdraw its proposed mandate to force the use of cattle eartags and to register farms with the government.

Response: As discussed in Section 1.2, WS is the lead federal agency responsible for managing conflicts between people and wildlife. To comply with the NEPA, WS prepared this EA to determine whether the potential environmental effects caused by several alternative approaches to managing bird damage might be significant, requiring the preparation of an EIS. Mandating the use of cattle eartags and requiring the registration of farms with the USDA or any other governmental agency is outside the scope of the EA.

CHAPTER 5 - LIST OF PREPARERS, REVIEWERS, AND PERSONS CONSULTED

5.1 LIST OF PREPARERS

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5.2 LIST OF PERSONS CONSULTED AND REVIEWERS

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APPENDIX A
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APPENDIX B
METHODS AVAILABLE FOR RESOLVING OR PREVENTING BIRD DAMAGE IN THE USVI

WS is evaluating the use of an adaptive approach to managing damage associated with birds, when requested, through the implementation and integration of safe and practical methods based on local problem analyses and the informed decisions of trained WS' personnel. WS' personnel would formulate integrated method approaches using the WS Decision Model (Slate et al. 1992; see Appendix E). An integrated approach to resolving requests for assistance using the Decision Model would allow WS' personnel greater flexibility and more opportunity to develop an effective damage management strategy for each request for assistance, such as considerations for threatened, endangered, or candidate species, that could be present in an area.

When selecting damage management techniques for specific damage situations, WS' personnel would consider the species involved along with the magnitude, geographic extent, duration, frequency, and likelihood of further damage. WS' personnel would also consider the status of target and potential nontarget species, local environmental conditions and impacts, social and legal aspects, humaneness of methods, animal welfare concerns, and relative costs of damage reduction options. The cost of damage reduction may sometimes be a secondary concern because of the overriding environmental, legal, and animal welfare considerations. WS' personnel would evaluate those factors when formulating damage management strategies that incorporate the application of one or more techniques.

A variety of methods would potentially be available to WS relative to the management or reduction of damage from birds. Various federal, territory, and local statutes and regulations and WS directives would govern WS' use of damage management methods. WS would develop and recommend or implement strategies based on resource management, physical exclusion, and wildlife management approaches. Within each approach there may be available a number of specific methods or techniques. WS could recommend or use the methods in Appendix B when responding to requests for assistance. The methods described would also be available to other entities in the absence of any involvement by WS.

I. NONLETHAL METHODS

Nonlethal methods consist primarily of tools or devices used to disperse, exclude, or capture a particular bird or a local population of birds to alleviate damage and conflicts. When evaluating management methods and formulating a management strategy, WS' personnel would give preference to nonlethal methods when they determine those methods to be practical and effective (see WS Directive 2.101). Most of the nonlethal methods available to WS would also be available to other entities within the USVI and other entities could employ those methods to alleviate bird damage.

Human presence: Human presence may consist of physical actions of people, such as clapping, waving, or shouting, or the presence of people and/or a vehicle at a location where damage or threats of damage are occurring. For example, birds may associate a vehicle with previous hazing activities and approaching an area in that vehicle or a similar vehicle may disperse target bird species from an area. Similarly, making a person's presence known to target bird species by clapping, waving, or shouting can often disperse birds from an area. When birds begin to associate people with hazing and/or shooting activities, the presence of people can disperse those birds when they see people approach. Human activities can also enhance the effectiveness of effigies, such as human effigies, because they associate people with hazing or shooting activities.

Modifying cultural practices: WS' personnel could make recommendations to people on where to locate facilities, the design of facilities, modifications of existing facilities, and fisheries management to reduce

the threat of bird damage. WS' personnel could make recommendations on facility design or modifications to existing facilities to minimize the attractiveness of the facilities to birds, such as removing or altering areas where birds can perch and loaf. WS' personnel could also make recommendations on operations management, such as areas to locate vulnerable fish stock, stocking rates, and the timing of releasing vulnerable fish stock.

Recommendations could include modifying the behavior of people that may be attracting or contributing to the damage caused by birds. For example, artificial feeding of waterfowl by people can attract and sustain more birds in an area than could normally be supported by natural food supplies. Recommendations may include altering planting dates so that crops are less vulnerable to damage when birds may be present. Modifying human behavior could include recommending people plant crops that are less attractive or less vulnerable to damage. At feedlots or dairies, cultural methods generally involve modifications to the level of care or attention given to livestock, which may vary depending on the age and size of the livestock. WS could make recommendations on changes to animal husbandry practices, such as feeding animals at night, feeding animals indoors, removing spilled grain or standing water, and use of bird proof feeders.

In situations where the presence of birds at or near airports results in threats to human safety and cannot be resolved by other means, WS' personnel could recommend airports or military facilities alter aircraft flight patterns or schedules to avoid risks of striking birds. However, altering operations at airports to decrease the potential for strike hazards involving birds would generally not be feasible unless an emergency exists. Otherwise, the expense of interrupted flights and the limitations of existing facilities generally make this practice prohibitive.

Removal of domestic waterfowl could be recommended or implemented by WS and other entities to alleviate damage. Flocks of urban/suburban domestic waterfowl can act as decoys and attract other migrating waterfowl (Crisley et al. 1968, Woronecki 1992). Avery (1994) reported that birds learn to locate food sources by watching the behavior of other birds. The removal of domestic waterfowl from water bodies removes birds that act as decoys that attract other waterfowl. Domestic waterfowl could also carry diseases, which can threaten wild populations.

Limited habitat modification: In most cases, the resource or property owner would be responsible for implementing habitat modifications, and WS would only provide recommendations on the type of modifications that would provide the best chance of achieving the desired effect. Habitat management would most often be a primary component of damage management strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Management of vegetation and water from areas adjacent to aircraft runways can minimize many bird problems on airport properties. WS could also recommend limited habitat modification in urban areas. For example, habitat management would often be necessary to minimize damage caused by cattle egrets that form large roosts during spring and summer months in urban areas. Selectively thinning trees or pruning trees can greatly reduce bird activity at a roost location.

Supplemental feeding and lure crops: Supplemental feeding and lure crops are food resources planted or provided to attract wildlife away from more valuable resources (*e.g.*, crops). The intent is to provide a more attractive food source so that the animals causing damage would consume it rather than a more valuable resource. In feeding programs, an alternative food source with a higher appeal is offered to target birds with the intention of luring them from feeding on affected resources. This method can be ineffective if other food sources are available. For lure crops to be effective, the ability to keep birds from surrounding fields would be necessary, and the number of alternative feeding sites must be minimal (Fairaizl and Pfeifer 1988). Additionally, lure crops reduce damage for only a short time (Fairaizl and

Pfeifer 1988) and damage by birds is often continuous. The resource owner would be limited in implementing this method contingent upon ownership of or ability to manage the property.

Fencing: WS could recommend and implement fencing to alleviate bird damage; however, fencing has limited application for birds. WS' personnel would primarily use and recommend fencing when addressing requests for assistance associated with waterfowl. Similar to other exclusion methods, the intent of fencing is to prevent waterfowl from accessing an area. For example, WS could place fencing between a crop and a pond that waterfowl use. The fencing would act as a barrier to prevent waterfowl from leaving the pond and walking to feed on the crop. Exclusion adequate to stop bird movements can also restrict movements of livestock, people, and other wildlife (Fuller-Perrine and Tobin 1993).

In addition, limits to the use of fencing arise where there are multiple landowners, the size of the area, and its proximity to bodies of water used by waterfowl. Unfortunately, there have been situations where barrier fencing designed to inhibit goose nesting has entrapped young and resulted in starvation (Cooper 1998). The preference for geese to walk or swim, rather than fly, during certain periods contributes to the success of barrier fences. Birds that are capable of full or partial flight render this method useless, except for enclosed areas small enough to prevent landing.

Fencing could include the use and recommendation of electrified fencing. Cooper and Keefe (1997) found peopled viewed the use of electric fencing as highly effective. The application of electrified fencing would be limited to rural settings, due to the possibility/likelihood of interaction with people and pets in populated areas. Problems that typically reduce the effectiveness of electric fences include vegetation on fence, flight capable birds, fencing knocked down by other animals, and poor power.

Surface coverings: WS could recommend or use surface coverings to discourage birds from using areas. For example, covering the surface of a pond with plastic balls that float on the surface of the water can prevent access by waterfowl and gulls. However, a "*ball blanket*" would render a pond unusable for boating, swimming, fishing, and other recreational activities. It would also make it difficult to harvest fish from the pond. In addition, this method can be very expensive depending on the area covered, which often restricts its applicability to small water retention ponds.

Overhead wire grids: Overhead lines and wires consist of a line (*e.g.*, fishing line) or wire (*e.g.*, high-tensile galvanized or stainless steel wire) grid that is stretched over a resource to prevent access by birds. The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed. Johnson (1994) found that wire grids could deter crow use of specific areas where they are causing a nuisance. Waterfowl may be excluded from ponds using overhead wire grids (Fairaizl 1992, Lowney 1993) and are most applicable on ponds of two acres or less. Exclusion may be impractical in most settings (*e.g.*, commercial agriculture); however, wire grids could be practical in small areas (*e.g.*, personal gardens) or for high-value crops (*e.g.*, grapes) (Johnson 1994). A few people would find exclusionary devices such as wire grids unsightly and a lowering of the esthetic value of the neighborhood when used in residential areas or public areas. Wire grids can render an area unusable by people.

Netting: In some limited situations, WS could recommend or use netting to exclude birds. Similar to overhead wire grids, netting is not likely practical in most situations because the size of the area requiring netting would be too large, such as fields used for commercial agriculture. In addition, as they attempt to access resources, birds may entangle themselves in nets causing injuries or death.

Visual scaring techniques: Visual scaring techniques that WS may use and/or recommend include Mylar tape, eyespot balloons, flags, effigies, lasers, and lights. Visual scaring techniques can act as novel

stimuli that birds act to avoid. WS' personnel would place those methods in areas to scare and disperse target bird species, such as at roosting locations or areas where target birds nest.

Mylar tape has a highly reflective surface that produces flashes of light as sunlight reflects off the surface, which can startle birds. In addition, the metallic rattle and quick movement of Mylar tape as it moves in the wind can startle birds. WS' personnel would attach Mylar tape to a stake and then insert the stake into the ground so the Mylar tape was visible and could move in the wind. In addition, WS' personnel could tie Mylar tape to structures in a similar manner to using a stake. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et. al. 1988). Reflective tape has been used successfully to repel some birds from crops when spaced at three to five meter intervals (Bruggers et al. 1986, Dolbeer et al. 1986). Mylar flagging has been reported effective at reducing migrant Canada goose damage to crops (Heinrich and Craven 1990). Other studies have shown reflective tape ineffective (Bruggers et al. 1986, Tobin et al. 1988, Conover and Dolbeer 1989). Flagging often works similar to Mylar tape, which often creates quick movements when they blow in the wind.

Eyespot balloons are large balloons that people can hang inside buildings to disperse birds. When inflated, the balloons appear to have a large eye or eyes that apparently give birds a visual cue that a large predator is present.

Scarecrows and effigies are models or silhouettes that often depict predator animals (*e.g.*, alligators, owls), people (*e.g.*, scarecrows), or mimic distressed target species (*e.g.*, dead geese, dead vultures) that applicators can place in areas where birds cause damage or pose a threat of damage. Scarecrows and effigies may elicit a flight response from target birds, which disperses those birds from the area. Avery et al. (2002) and Seamans (2004) found that the use of vulture effigies were an effective nonlethal method to disperse roosting vultures. Avery et al. (2008) found that effigies could be effective at dispersing crows. Effigies and scarecrows that pop-up into the air and/or have moving parts are often more effective at dispersing birds. Scarecrows and effigies would be most effective when they were moved frequently, alternated with other methods, and were well maintained. However, scarecrows and effigies tend to lose effectiveness over time and become less effective as populations increase (Smith et al. 1999).

WS' personnel could use lasers and lights to disperse birds when low-light conditions exist (Glahn et al. 2000, Blackwell et al. 2002). Lasers and lights may be novel stimuli that birds act to avoid. Lasers and lights have advantages over other dispersal methods because they are silent and WS' personnel can use those methods directly at birds. Therefore, WS' personnel can use those methods is areas where disturbing other wildlife is a concern.

For best results and to disperse numerous birds from a roost, a laser is most effectively used in periods of low light, such as after sunset and before sunrise. In the daytime, the laser can be used during overcast conditions or in shaded areas to move individual and small numbers of birds, although the effective range of the laser may be diminished. Blackwell et al. (2002) tested lasers on several bird species and observed varied results among species. Lasers were ineffective at dispersing pigeons and mallards with birds habituating in approximately five minutes and 20 minutes, respectively (Blackwell et al. 2002). Similarly, lasers were ineffective at dispersing starlings and cowbirds (Blackwell et al. 2002). Lasers were found to be only moderately effective for hazing geese, with a reduction in night roosting, but little to no reduction in diurnal activity at the site pre- and post-use (Sherman and Barras 2004).

Lights would primarily consist of high-powered spotlights. Similar to the use of lasers, application of spotlights to haze birds from night roosts has proven to be a moderately effective method. It is a method that can be incorporated with other methods in integrated management plans (VerCauteren et al. 2003).

Birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics. Visual scaring techniques can be impractical in many locations and has met with some concerns due to the negative esthetic appearance presented on the properties where those methods are used.

Trained Dogs: The use of trained dogs can be effective at hazing waterfowl to keep them off turf and beaches (Conover and Chasko 1985, Castelli and Sleggs 2000). Around water, this technique appears most effective when the body of water is less than two acres in size (Swift and Felegy 2009). WS would recommended and encourage the use of dogs where appropriate.

Electronic Hazing Devices: WS could recommend and/or use electronic devices that mimic the sounds exhibited when target species are in distress, which is intended to cause a flight response and disperse target animals from the area. Alarm calls are given by birds when they detect predators while distress calls are given by birds when they are captured by a predator (Conover 2002). When other birds hear these calls, they know a predator is present or a bird has been captured (Conover 2002). Recordings of both calls have been broadcast in an attempt to scare birds from areas where they are unwanted. Recordings have been effective in scaring starlings from airports and vineyards, gulls from airports and landfills, finches from grain fields, and herons from aquaculture facilities and American crows from roosts (Conover 2002). However, the effectiveness of alarm or distress calls can be reduced as birds become accustomed to the sounds and learn to ignore them (Seamans and Gosser 2016).

Because alarm or distress calls are given when a bird is being held by a predator or when a predator is present, birds should expect to see a predator when they hear these calls. If they do not, they may become accustomed to alarm or distress calls more quickly. Birds can habituate to hazing techniques (Zucchi and Bergman 1975, Summers 1985, Aubin 1990, Seamans and Gosser 2016). For this reason, scarecrows or effigies should be paired with alarm or distress calls (Conover 2002), pyrotechnics (Mott and Timbrook 1988), or other methods to achieve maximum effectiveness. Although Mott and Timbrook (1988) reported distress calls were effective at repelling resident geese 100 meters from the distress unit, the birds would return shortly after the calls stopped. The repellency effect was enhanced when pyrotechnics were used with the distress calls. Whitford (2003) used a combination of noise harassment, dogs, nest displacement, and visual hazing to chase geese from an urban park during the nesting season. Birds responded by dispersing and continued hazing with alarm calls prevented recolonization of the site during the nesting season.

The use of electronic hazing devices can have some drawbacks. For example, birds hazed from one area where they were causing damage frequently move to another area where they continue to cause damage (Brough 1969, Conover 1984, Summers 1985). In some situations, the level of volume required for this method to be effective may disturb local residents or be prohibited by local noise ordinances.

Paintballs: WS' personnel may use paintballs and recreational paintball equipment to supplement other hazing methods. Paintballs consist of a gelatin shell filled with a nontoxic glycol and water-based coloring that rapidly dissipates and is not harmful to the environment. A paintball marker (or gun) uses compressed CO_2 to propel paintballs an average of 280 feet per second but they are not very accurate. The discharge of the paintball marker combined with the sound of paintballs hitting the ground or splashing in water may be effective in dispersing birds, especially when combined with other hazing techniques. Although paintballs break easily and velocity rapidly decreases with distance, firing at close range is discouraged to avoid harming birds. The use of paintballs may be restricted in some areas by local ordinances.

Pyrotechnics: The term "*pyrotechnic*" encompasses a number of commercially available devices that produce a loud noise after firing the device. People may refer to some of the common individual devices

as "*bird bombs*", "*screamers*", "*bangers*", "*shell crackers*", or "*CAPA*". The most common pyrotechnics are pyrotechnics that people fire from a pyrotechnic launcher or from a shotgun. Those pyrotechnics fired from a launcher or from a shotgun travel approximately 200 to 300 feet downrange. Some types of pyrotechnics emit a loud whistle as they travel while some travel downrange and then explode with a bang. Pyrotechnics that whistle as they travel and those that explode with a bang after travelling downrange generally emit a 100-decibel report that can startle target animals. A long-range pyrotechnic that is commercially available can travel approximately 1,000 feet downrange and produce a 150-decibel report. Pyrotechnics are one of the primary methods that WS' personnel use to disperse birds.

Williams (1983) reported an approximate 50% reduction in blackbirds at two south Texas feedlots because of pyrotechnics and propane cannon use. These devices are sometimes effective but usually only for a short period before birds become accustomed and learn to ignore them (Arhart 1972, Rossbach 1975, Schmidt and Johnson 1983, Shirota et al. 1983, Mott 1985, Bomford 1990). There are also safety and legal implications regarding their use. Discharge of pyrotechnics is inappropriate and prohibited in some urban/suburban areas. Pyrotechnic projectiles can start fires, ricochet off buildings, pose traffic hazards, trigger dogs to bark incessantly, and annoy and possibly injure people. Use of pyrotechnics in certain municipalities would be constrained by local firearm discharge and noise ordinances.

Propane cannons: These small cannons operate using propane gas and when fired, produce a noise similar to a firearm. The user attaches the cannon to a propane tank using a hose. Opening the valve on the propane tank releases propane gas into a bladder system on the propane cannon, which begins to fill with propane gas. Once the bladder system fills, it releases the propane gas into the chamber of the cannon and simultaneously, a striking mechanism produces a spark that ignites the gas causing a loud explosion similar to the sound of a firearm firing. Propane cannons use a timing mechanism that people can adjust to vary how often the cannon fires. For example, propane cannons may be set to fire every five minutes. Some models are capable of being set to produce multiple blasts. For example, the user can set the propane cannon to produce a random series of single, double, or triple blasts. In addition, attachments to propane cannons can allow the user to control when the cannon operates during a 24-hour period. For example, the user may set the cannon to begin firing in the morning and then shut off in the evening. The user can also fit cannons with mechanisms that allow the cannon to rotate so that each firing occurs from a different direction.

High-pressure water spray: WS could use high-pressure water to scare birds from a location (*e.g.*, areas where birds loaf or roost) and/or to clean surfaces (*e.g.*, remove fecal droppings, remove inactive nests). Spray from a high-pressure sprayer would be persistent enough to irritate birds and cause them to leave an area, but would not be strong enough to cause physical damage. For example, WS could use this method when rousing gregarious bird species from a roost. Using high-pressure water may be more acceptable than using loud noises or chemicals in some areas, such as urban areas. WS could also use high-pressure water to remove inactive nests to discourage nesting. Logistical issues with using this method arise due to the size of the equipment needed and access to water.

Bow nets: Bow nets are suitcase or basket-type traps that people use to primarily live-capture raptors. Bow nets consist of two semi-circular bows as a frame with loose netting strung between the bows that the user places on the ground. Hinges and springs connect the two semi-circular bows at their bases with one bow fixed to the ground. The other semi-circular frame is folded and held together with the staked portion of the bow net that are held together by a trigger or release mechanism (Bloom et al. 2007). The user typically places an attractant near the center of the circle. For example, WS could use a mouse inside a small cage or a tethered rock pigeon in the center of the bow net to attract raptors. For other bird species, WS could place the bow net to envelope a nest on the ground. Therefore, the nest would act as the attractant. When a target bird approaches the nest, the user activates the bow net by a line or electronic mechanism that the user pulls or that personnel trigger while monitoring the trap. When

activated, the net envelopes the bird. WS' personnel would be present on site during the use of bow nets to address birds live-captured in the net.

Cage traps: Cage traps often consist of wire mesh or netting and are available in a variety of styles to live-capture birds. Cage traps allow target bird species to enter inside the trap through a one-way door or opening but prevent the target bird from exiting the trap. When using cage traps, WS' personnel would place a visual attractant or bait inside the trap to attract target bird species. Visual attractants usually consist of a decoy bird or birds of the same species as the target birds. The feeding behavior and calls of the decoy birds attract other birds to the trap. WS could also place cage traps over nests where the nest acts as the attractant. Target bird species enter the trap through one-way doors or openings to access the bait or attractant but are then unable to exit. People often refer to cage traps that use a visual attractant as decoy traps. WS' personnel could use decoy traps for a variety of species, such as European starlings (Homan et al. 2017), blackbirds (Dolbeer and Linz 2016), crows (Johnson 1994), and rock pigeons (Williams and Corrigan 1994). When using live decoy birds in traps, WS' personnel would ensure the birds have sufficient food, water, and shelter to assure their survival. WS' personnel may also configure perches within the trap to allow birds to roost and perch above the ground. WS' personnel would monitor decoy traps appropriately (*e.g.*, daily) to remove target bird species and to replenish food and water.

Nest box traps: Nest box traps are similar to cage traps; however, nest box traps resemble a nest box used by cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976). When birds enter inside the box trap, they trigger a mechanism that closes the opening to the box. WS would place nest box traps on the side of a building or on a tree in an area where the target birds are active.

Raptor traps: There are a variety of traps available designed to capture raptors. WS would primarily use raptor traps at airports to live-capture raptors that pose a risk of an aircraft strike. The bal-chatri trap, dho-gaza trap, the phai hoop trap, and the Swedish goshawk traps are some of the more common raptor traps. The designs of several raptor traps are similar to the use of nets (*e.g.*, dho-gaza trap) and the use of cage traps (*e.g.*, Swedish goshawk trap). Raptor traps use a prey animal (*e.g.*, mouse, pigeon) to attract raptors to the traps.

Bal-chatri traps consist of a small cage made from mesh wire. The small cage is often in a conical, half cylinder, or rectangle shape and holds the prey animal. To capture raptors, the user attaches one end of short pieces of monofilament line to the exposed areas of the cage trap and creates a noose with the other end of the monofilament line. As a raptor attempts to grab the prey item in the cage with their foot or feet, the noose tightens around the raptor's foot or feet, which holds the raptor at the location. WS' personnel place weights on or anchor Bal-chatri traps to prevent the raptor from flying off with the trap attached to their foot or feet. Phai hoop traps function in a similar way to the bal-chatri trap. Phai hoop traps consist of a circular hoop with upright nooses placed along the length of the hoop with the lure animal placed inside the hoop. As a raptor attempts to grab the prey animal, the nooses close on their feet and/or legs. Similar to bal-chatri traps, personnel would place weights on the trap or anchor the hoop to the ground to prevent raptors from flying off with the trap.

Dho-gaza traps function similar to mist nets. Personnel attach the four corners of a small net to a pole frame. WS' personnel attach the net to the pole frame is such a way as to allow the net to easily detach from the pole frame, such as attaching the net to the pole frame using paper clips. A cinch-line string runs through the mesh along all four sides of the net with the ends of the cinch-line string securely attached to the pole frame. WS' personnel place the net in front of a lure animal that acts to attract the target raptor. Personnel place the net and frame perpendicular to the anticipated approach of the raptor to the lure animal. As the raptor swoops in to grab the attractant, the raptor hits the net, which causes the net to detach from the pole frame and the cinch-line string to close the net behind the raptor. The closing net forms a net bag around the raptor.

The Swedish goshawk trap consists of two parts. The base consists of a cage made from wire mesh that holds a prey animal while the upper portion contains the trap. The trap portion attaches to the top of the cage containing the prey animal. A trigger stick holds the top part of the trap open. As a raptor attempts to land on the trigger stick to investigate the prey animal, the trigger stick falls away causing springs to close the doors of the trap quickly. Once shut, the raptor is unable to exit the trap.

Corral traps: WS could use corral traps to live capture waterfowl or other birds that are unable to fly. WS' personnel can slowly guide birds unable to fly into corral traps. Corral traps as described by Costanzo et al. (1995) are lightweight, portable panels (approximate size 4' x 10') that WS could use to surround and slowly guide target birds into a moveable catch pen. Catch pens consist of panels erected and attached to form a "U" shape. WS' personnel would guide a target bird or birds through the open end of the "U" using hand held panels. As the bird or birds enter the "U", the hand held panels are brought together to close the catch pen and prevent birds from exiting. Once WS' personnel confine a target bird or birds inside the catch pen, employees can live-capture the bird or birds.

Hand nets: The hand nets WS' personnel could use would be similar to those used during fishing, such as a dip net or hand-thrown net. Generally, dip nets have netting at one end of a long pole that a user uses to scoop up a target animal. A hand-thrown net would be a net that a WS' employee throws over a target bird. Hand-thrown nets typical have weights on the edges of the net.

Cannon nets: The term cannon net refers to net deployment systems that use rockets, cannons, or compressed air to propel a net over a target area. Rocket nets and cannon nets are projectile-type net traps comprised of three to five rockets or cannons and a large net (*e.g.*, 33 x 57 foot with 2-inch square nylon mesh) (Dill and Thornberry 1950, Cox and Afton 1994). The user would anchor the rear of the net to 5- or 10-pound boat anchors or would tie the rear of the net with inner tubes to stakes driven into the ground. Smokeless powder or black powder charges propel the rockets or projectiles in the cannons that a user would ignite with an electric squib inside the charge. The user would place the charges inside the rockets or cannon tubes and test with a galvanometer for electrical continuity. The user would unspool at least 200 to 350 feet of 18 or larger gauge wire and connect one end to the charges and the other end to a blasting machine. When an adequate number of birds gather in front of the net, the user would charge the blasting machine and fire the net. Firing the blasting machine sends an electrical charge down the wire and ignites the charges in the rockets or cannon tubes, which discharge the net. Pneumatic cannon nets deploy under similar methodology as the cannon or rocket nets but do not use smokeless powder or black powder charges to deploy the net. Pneumatic cannons utilize compressed air to deploy the net. The user also remotely discharges the pneumatic air cannon through push button controls wired to a mechanism that releases the compressed air. WS' personnel would primarily use cannon nets in areas where birds routinely congregate or loaf. In most cases, WS' personnel would use an attractant (*e.g.*, food source) to acclimate target birds to feeding at the location and to position the birds in an area that ensures the net envelopes the target birds.

Drop nets: Although not a commonly used method for birds, WS could occasionally use drop nets to capture target bird species. The use of drop nets is similar to cannon nets; however, instead of propelling the net outward when fired, WS' personnel would drop the net on top of target birds. WS' personnel could manually drop the net onto target birds or remotely trigger the net to drop onto target birds. When dropped, the net would envelope target birds. WS' personnel would use attractants to ensure target birds were using the location and to ensure the net envelopes target birds. Attractants could include a food source or decoy birds.

Net guns: Net guns are another method that WS does not frequently use to live-capture birds. Net guns are similar to cannon nets except the nets are smaller and the nets are propelled from a hand-held launcher similar to a gun. The hand-held gun launches a weighted net over a target bird or birds using a firearm

blank or compressed air. Similar to the use of cannon nets and drop nets, the use of net guns is often associated with the use of an attractant. WS may use net guns to capture individual birds or a small number of birds that WS is unable to capture using other methods.

Mist nets: Mist nets consist of a fine black silk or nylon net that are generally three to 10 feet wide and 25 to 35 feet long. Users of mist nets generally suspend the net between two poles anchored into the ground. Mist nets contain overlapping pockets that extend the length of the net. As a bird flies into the net, the bird falls into the pocket and becomes entangled in the net. In general, WS would use mist nets to capture small birds, such as sparrows, blackbirds, and starlings. However, WS could occasionally use mist nets to catch larger bird species, such as raptors and waterfowl. When in use, WS' personnel would monitor mist nets to address birds captured in the net. WS may use decoys and/or electronic calls to enhance the effectiveness of mist nets.

Modified padded foothold traps: Another live-capture method that WS' personnel could consider is a modified foothold trap with padded jaws. WS' personnel would modify padded foothold traps by removing or weakening springs on the trap so that when the jaws snap shut on the leg of a bird, the jaws do not injure the bird. WS' personnel would primarily use modified padded foothold traps at airports where WS' personnel would place the trap atop poles (*i.e.*, pole traps). Pole traps live-capture raptors as they land atop a pole to perch. When landing atop the pole, the raptor triggers the modified padded foothold trap, which closes around the foot or leg of the bird. WS' personnel would attach the modified padded foothold trap to a guide wire that runs from the trap down the pole to the ground. Once live-captured by the foothold trap, the trap and raptor slide down the guide wire to the ground for handling. WS could occasionally place modified padded foothold traps on the ground or submerge the trap in shallow water to live-capture larger bird species.

Nest destruction: The destruction of nests involves the removal of nesting materials during the construction phase of the nesting cycle or the removal of an inactive nest. Nest destruction could also occur after destroying eggs in the nests or after euthanizing nestlings in the nest. WS could destroy nests by hand, using hand tools, and/or using high-pressure water.

Live-capture and translocation: WS' personnel could use live-capture methods to capture birds and then translocate those birds to other areas. Once live-captured, WS' personnel would place the birds in appropriately sized containers (*e.g.*, pet carriers) for transport to a release site. Translocation would only occur when authorized by the USFWS and the DPNR. WS' personnel would only release birds on properties where the appropriate landowner or manager agrees to allow the release of those birds. WS would primarily translocate raptor species and primarily when those species present an aircraft strike risk at airports. WS often uses translocation when damage or threats of damage occur during the migratory periods when many bird species do not have well defined territories as birds migrate to and/or through the territory.

Unmanned Aerial Vehicles: UAVs have several applications to prevent or reduce damage caused by birds. UAVs are receiving increasing attention as a wildlife management tool (Watts et al. 2010, Koh and Wich 2012, Martin et al. 2012, Lyons et al. 2017, Wang et al. 2019). WS' personnel could use UAVs to locate nuisance birds, haze birds, and monitor bird nests for the presence of eggs or chicks. Unmanned aircraft generally produce less noise, use less fuel, and are generally less expensive to operate than manned aircraft (Watts et al. 2010). When using UAVs, WS would adhere to all federal, territory, and local laws. WS would also follow the guidelines established in the WS' Small Unmanned Aircraft System Flight Operations Procedures manual.

II. LETHAL METHODS

In addition to the use of nonlethal methods, WS' personnel could also use lethal methods. The lethal removal of birds by WS would only occur when authorized by the USFWS and the DPNR (when required) and only at levels authorized. In addition, WS would only use those lethal methods authorized by the USFWS and the DPNR.

Egg destruction: WS' personnel could make eggs of target birds unviable in several different ways. Egg destruction would involve puncturing, breaking, shaking, or oiling an egg. When puncturing an egg, a person holds the egg securely in a hand that they brace against the ground and then inserts a long, thin metal probe into the pointed end of the egg with slow steady pressure. The person inserts the probe all of the way through the egg until the tip of the probe hits against the inside of the shell at the opposite side of entry. While the person has the probe inserted into the egg, the egg is swirled in a circular motion to emulsify the yolk sac, ensuring the embryo is unviable. After removing the metal probe from the egg, a person can seal the puncture hole with a small amount of glue to prevent the contents of the egg from leaking out of the egg. WS' personnel can then place the egg back in the nest so that birds continue to incubate the egg.

WS' personnel could destroy eggs by manually gathering the eggs and breaking them open or by vigorously shaking an egg numerous times, which causes the embryo to detach from the egg sac. Egg oiling involves spraying a small quantity of food grade corn oil on eggs in a nest. The oil prevents exchange of gases through the eggshell and causes asphyxiation of developing embryos. Puncturing, shaking, or oiling eggs often has advantages over breaking an egg open because the adults may continue to incubate the egg and do not re-nest. The United States Environmental Protection Agency has ruled that use of corn oil for this purpose is exempt from registration requirements under the Federal Insecticide, Fungicide, and Rodenticide Act.

Firearm: WS' personnel could use firearms to lethally remove and/or haze target bird species. Firearms are mechanical methods that WS could use to remove birds lethally and to reinforce the noise associated with nonlethal methods, such as pyrotechnics or propane cannons. In addition, the noise associated with discharging a firearm can disperse birds. As appropriate, WS' personnel could use suppressed firearms to minimize noise impacts. Pursuant to the standard conditions included with the current depredation permit issued to WS, when using a shotgun, WS' personnel would not use shotguns larger than 10-gauge. In addition, when using shotguns to take migratory birds pursuant to the current depredation permit, WS would use nontoxic shot as listed in 50 CFR 20.21(j). When using rifles, WS could use ammunition that contains lead. WS' personnel would retrieve the carcasses of birds to the extent possible and would dispose of the carcasses in accordance with WS Directive 2.515. As noted for pyrotechnics, some commercially available pyrotechnics require the use of a shotgun to fire the pyrotechnic. WS' firearm use and safety would comply with WS Directive 2.615.

Cervical dislocation: WS' personnel could use cervical dislocation to euthanize birds that are captured in live traps. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA (2020) considers this technique as a conditionally acceptable method of euthanasia and states that cervical dislocation when properly executed may be a humane technique for euthanasia of poultry and other small birds. Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (AVMA 2020).

Carbon dioxide: Carbon dioxide is another method that WS' personnel may use to euthanize birds after personnel live-capture those birds using other methods. After capture, WS' personnel would place a bird or birds into a container or chamber that personnel seal shut. WS' personnel would then slowly release

carbon dioxide gas into the container or chamber. The carbon dioxide gas would begin to displace oxygen in the container or chamber. At high concentrations, inhaling carbon dioxide can induce anesthesia initially followed by loss of consciousness in bird species.

Sport hunting: WS could recommend sport hunting as a viable damage management method when the target species can be legally hunted in the USVI. A valid hunting license and other licenses or permits may be required by the DPNR and the USFWS for certain species. This method provides sport and food for hunters and requires no cost to the landowner. Sport hunting is occasionally recommended if it can be conducted safely.

APPENDIX C
FEDERAL AND TERRITORY THREATENED
AND ENDANGERED SPECIES FOR THE USVI (11/2/2020)

Note:
The status of the federally threatened and endangered species listed in Table C-1 is current as of 11/2/2020.

Note: The species listed in Table C-1 are representative of the federally threatened and endangered species believed or known to occur in the USVI. For federally listed species, the USFWS feels utilizing this data set is a better representation of species occurrence. There may be other federally listed species that are not currently known or expected to occur in the USVI but are covered by the ESA wherever they are found. Thus, if new surveys detected them in the USVI, they are still covered by the ESA.

Table C-1: Federally Threatened and Endangered Species and Critical Habitats Protected by the ESA in the USVI.

Common Name	Scientific Name	Status†	Determination‡
Animals			
Reptiles			
St. Croix ground lizard	*Ameiva polops*	E, CH	MANLAA
Loggerhead sea turtle	*Caretta carettta*	T	MANLAA
Green sea turtle	*Chelonia mydas*	T	MANLAA
Leatherback sea turtle	*Dermochelys coriacea*	E, CH	MANLAA
Virgin Islands tree boa	*Chilabothrus granti*	E	MANLAA
Hawksbill sea turtle	*Eretmochelys imbricata*	E	MANLAA
Birds			
Red knot	*Calidris canutus rufa*	T	MANLAA
Piping plover	*Charadrius melodus*	T	MANLAA
Roseate tern	*Sterna dougallii dougallii*	T	MANLAA
Mammals			
West Indian manatee	*Trichechus manatus*	T	MANLAA
Plants			
Egger's century plant	*Agave eggersiana*	E, CH	NE
Vahl's boxwood	*Buxus vahlii*	E	NE
Thomas' lidflower	*Calyptranthes thomasiana*	E, CH	NE
Tropical thorn lily	*Catesbaea melanocarpa*	E	NE
Marron bacora	*Solanum conocarpum*	PE, PCH	NE
St. Thomas prickly-ash	*Zanthoxylum thomasianum*	E	NE

†T=Threatened; E=Endangered; PE=Proposed Endangered; CH=Critical habitat; Proposed Critical Habitat

‡NE=No effect; MANLAA=May affect, not likely to adversely affect

Note:
The list of species considered as threatened and endangered by the territory of the USVI in Table C-2 was updated to be current as of 11/2/2020. All species listed in Table C-2 are protected throughout the entire territory of the USVI, including St. Croix, St. John, St. Thomas, and offshore cays.

Note:
The Endangered and Indigenous Species Act of 1990 created a threatened and endangered species list for the USVI. The Endangered and Indigenous Species Act of 1990 also set forth procedures to amend the

list as needed, including requiring the Endangered Species Protection Commission to approve any changes to the threatened and endangered list. In the CWCS from 2005, a new list was proposed to revise and update the threatened and endangered species list created by the Endangered and Indigenous Species Act of 1990. However, the Endangered Species Protection Commission was never convened. Thus, the updated listed shown in the CWCS from 2005 was never approved as a formal threatened and endangered species list. Although the list from 2005 was never officially adopted, it is still recognized as the most recent recognition of species the DPNR considers as needing protection. Therefore, when drafting this EA, WS considered the threatened and endangered species list from both the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005. Both lists are shown in Table C-2. For the purposes of this EA, WS chose to recognize the highest classification between the two lists. For example, if a species is not listed in the 1990 list, but is listed as endangered in the 2005 list, WS will treat that species as an endangered species.

Table C-2: List of Threatened and Endangered Species Protected by the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005 in the USVI.

Common Name	Scientific Name	1990 Status*‡	2005 Status*†
Animals			
Amphibians			
Virgin Islands bo-peep	*Eleutherodactylus schwartzi*	NL	E
Reptiles			
St. Croix ground lizard	*Ameiva polops*	NL	E
St. Croix racer	*Borikenophis sanctaecrucis*[1]	NL	E
Puerto Rican racer	*Borikenophis portoricensis*[2]	NL	T
Green sea turtle	*Chelonia mydas*	NL	T
Virgin Islands tree boa	*Chilabothrus granti*[3]	NL	E
Leatherback sea turtle	*Dermochelys coriacea*	NL	E
Hawksbill sea turtle	*Eretmochelys imbricata*	NL	E
Slipperyback skink	*Spondylurus sloanii*[4]	E	T
Birds			
White-cheeked pintail	*Anas bahamensis*	E	SC
Antillean mango	*Anthracothorax dominicus*	E	E
Great egret	*Ardea alba*	E	NL
Great blue heron	*Ardea herodias*	E	NL
Red knot	*Calidris canutus*	NL	E
Snowy plover	*Charadrius nivosus*[5]	E	E
Antillean nighthawk	*Chordeiles gundlachii*	E	T
White-necked crow	*Corvus leucognaphalus*	NL	E
West Indian whistling duck	*Dendrocygna arborea*	NL	E
Snowy egret	*Egretta thula*	E	NL
Brown-throated parakeet	*Eupsittula pertinax*[6]	E	NL
Magnificent frigatebird	*Fregata magnificens*	NL	E
American coot	*Fulica americana*[7]	NL	T
Bridled quail-dove	*Geotrygon mystacea*	E	T
American oystercatcher	*Haematopus palliatus*	NL	T
Least bittern	*Ixobrychus exilis*	E	E
Puerto Rican screech owl	*Megascops nudipes*	E	E
Puerto Rican flycatcher	*Myiarchus antillarum*	E	E
Whimbrel	*Numenius phaeopus*	NL	T

Black-crowned night-heron	*Nycticorax nycticorax*	E	NL
Ruddy duck	*Oxyura jamaicensis*	E	SC
White-crowned pigeon	*Patagioenas leucocephala*[8]	E	T
White-tailed tropicbird	*Phaethon lepturus*	E	T
American flamingo	*Phoenicopterus ruber*[9]	NL	E
Audubon's shearwater	*Puffinus lherminieri*	E	E
Clapper rail	*Rallus crepitans*[10]	E	E
Least tern	*Sternula antillarum*	E	SC
Masked booby	*Sula dactylatra*	NL	E
Red-footed booby	*Sula sula*	NL	T
Least grebe	*Tachybaptus dominicus*	E	E
Willet	*Tringa semipalmata*[11]	E	T
Mammals			
Cave bat	*Brachyphylla cavernarum*	E	NL
Fisherman bat	*Noctilio leporinus*	E	NL
Red Fruit bat	*Stenoderma rufum*	E	NL
Fish			
Jewfish	*Epinephelus itajara*	E	NL
Corals			
Black coral		E	NL
Plants			
Egger's agave	*Agave eggersiana*	E	E
Century plant	*Agave missionum*	NL	T
Egger's sida	*Bastardiopsis eggersii*[12]	E	E
Daddy longlegs orchid	*Brassavola cucullata*	E	E
Vahl's boxwood	*Buxus vahlii*	NL	E
	Byrsonima lucida x. B. spicata	NL	E
	Byrsonima sp.	E	NL
Capa rosa	*Callicarpa ampla*	E	E
Thomas' lidflower	*Calyptranthes thomasiana*	E	E
Mato colorado	*Canavalia nitida*	NL	E
Tropical thorn lily	*Catesbaea melanocarpa*	E	E
Ortegon	*Coccoloba rugosa*	E	E
Fishlock's croton	*Croton fishlockii*	E	E
West Indian tree fern	*Cyathea arborea*	NL	E
	Cyclopogon cranichoides	NL	E
Tall ladies'-tresses	*Cyclopogon elatus*[13]	E	T
	Cypselia humifusa	E	T
	Epidendrum anceps	NL	E
	Epidendrum bifidum	E	NL
Christmas orchid	*Epidendrum ciliare*	E	E
Egger's cockspur	*Erythrina eggersii*	E	E
Earhart's eugenia	*Eugenia earhartii*	NL	E
	Eugenia sintenisii	NL	E
	Eugenia sp.	E	NL

	Eugenia xerophytica	NL	E
Egger's galactia	*Galactia eggersii*	E	E
Lignum vitae	*Guaiacum officinale*	E	E
Winged bog orchid	*Habenaria alata*	E	E
Central American oak	*Ilex sideroxyloides*	E	NL
Urban's holly	*Ilex urbaniana*[14]	E	E
Sebucan	*Leptocereus grantianus*	NL	E
Woodbury's machaonia	*Machaonia woodburyana*	E	E
	Malpighia coccigera	NL	E
Stinging bush	*Malpighia infestissima*	E	E
Bastard cherry	*Malpighia linearis*	E	E
	Malpighia sp.	E	NL
Cowage cherry	*Malpighia woodburyana*	E	NL
Wooly nipple	*Mammillaria nivosa*	E	E
Bulletwood	*Manilkara bidentata*	E	E
Caribbean mayten	*Maytenus cymosa*	E	E
	Nashia inaguensis	E	E
	Operculina triquetra	E	NL
Spanish lady	*Opuntia triacantha*	E	E
Myrtle-leaved pepermonia	*Peperomia myrtifolia*	E	NL
Wheeler's pepermonia	*Peperomia wheeleri*	NL	E
Richard's clearwood	*Pilea richardii*	E	E
Greater yellowspike orchid	*Polystachya concreta*	E	E
Hairy shadow witch	*Ponthieva racemosa*	E	E
Small prescott orchid	*Prescottia oligantha*	E	E
Mountain prescott orchid	*Prescottia stachyoides*	E	E
Clamshell orchid	*Prosthechea cochleata*[15]	E	NL
Mountain guava	*Psidium amplexicaule*	E	NL
	Psidium sp.	E	NL
Butterfly orchid	*Psychillis macconnelliae*	NL	T
Puerto Rican royal palm	*Roystonea borinquena*	NL	E
Hat palm	*Sabal casuarium*	NL	E
	Schoepfia obovata	NL	E
	Schoepfia schreberi	E	NL
Marron bacoba	*Solanum conocarpum*	E	E
	Solanum mucronatum	E	E
Cobana negra	*Stahlia monosperma*	NL	E
Organ pipe cactus	*Stenocereus peruvianus*	NL	E
Serpentine wallflower orchid	*Tetramicra canaliculata*	E	E
Water island grass orchid	*Tetramicra canaliculata alba*	E	E
Pinon	*Tillandsia lineatispica*	E	E
Yellow dancing lady orchid	*Tolumnia prionochilum*[16]	E	E
White dancing lady orchid	*Tolumnia variegatum*[17]	E	E

Sea lavender	*Tournefortia gnaphalodes*[18]	NL	T
St. Peter's grass	*Uniola virgatata*	NL	E
Leafless vanilla orchid	*Vanilla barbellata*	E	E
Long-leaved vanilla	*Vanilla planifolia*	NL	E
Satinwood	*Zanthoxylum flavum*	NL	T
St. Thomas prickly-ash	*Zanthoxylum thomasianum*	NL	E

‡ The 1990 status is the status of each species as listed in the Endangered and Indigenous Species Act of 1990.
† The 2005 status is the status of each species as shown in the CWCS from 2005.

List Abbreviations

E = Territory-designated Endangered Species
T = Territory-designated Threatened Species
NL = Not Listed as a Territory-designated Threatened or Endangered Species

List Notations

[1] Listed as *Alsophis sanctaecrucis* in the CWCS in 2005.
[2] Listed as *Alsophis portoricensis* in the CWCS in 2005.
[3] Listed as *Epicrates monensis granti* in the CWCS in 2005.
[4] Listed as *Mabuya mabouya* in the Endangered and Indigenous Species Act of 1990 and as *Mabuya sloanii* in the CWCS in 2005.
[5] Listed as *Charadrius alexandrinus* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[6] *Listed as Aratinga pertinax* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[7] The American coot (*Fulica americana*) now includes the previously separate species known as the Caribbean coot (*Fulica caribaea*), which was considered endangered by both the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[8] Listed as *Columba leucocephala* in the CWCS in 2005.
[9] Listed as Greater flamingo (Phoenicopterus rubber) in CWCS in 2005.
Listed as *Rallus longirostris* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[11] Listed as *Catoptrophorus semipalmatus* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[12] Listed as *Sida eggersi* in the Endangered and Indigenous Species Act of 1990.
[13] Listed as *Spiranthes elata* in the Endangered and Indigenous Species Act of 1990.
[14] Listed as *Ilex urbanii* in the Endangered and Indigenous Species Act of 1990.
[15] Listed as *Epidendrum cochleatum* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.
[16] Listed as *Oncidium prionochilum* in the Endangered and Indigenous Species Act of 1990.
[17] Listed as *Oncidium variegatum* in the Endangered and Indigenous Species Act of 1990.
[18] Listed as *Argusia gnaphalodes* in the CWCS in 2005.

APPENDIX D
ADDITIONAL TARGET BIRD SPECIES THAT WS COULD ADDRESS IN THE USVI

In addition to the bird species identified in Section 1.2 of the EA, WS could also receive requests for assistance to manage damage and threats of damage associated with several additional bird species but those requests would occur infrequently or the requests would involve only a few individual birds. Damages and threats of damages associated with those species would occur primarily at airports where those species pose a threat of aircraft strikes. WS anticipates addressing those requests for assistance using primarily nonlethal dispersal methods. Under Alternative 1, WS could receive requests for assistance to use lethal methods to remove those species when nonlethal methods were ineffective or were determined to be inappropriate using the WS Decision model. An example could include birds that pose an immediate strike threat at an airport where attempts to disperse the birds were ineffective.

Those species that WS could address in low numbers and/or infrequently when those species cause damage or pose a threat of damage include: common gallinule (*Gallinula galeata*), common moorhen (*Gallinula chloropus*), Wilson's snipe (*Gallinago delicata*), blue-winged teal (*Spatula discors*), green-winged teal (*Anas crecca*), American wigeon (*Mareca americana*), ring-necked duck (*Aythya collaris*), northern shoveler (*Spatula clypeata*), lesser scaup (*Aythya affinis*), Muscovy duck (*Cairina moschata*), little egret (*Egretta garzetta*), little blue heron (*Egretta caerulea*), green heron (*Butorides virescens*), yellow-crowned night-heron (*Nyctanassa violacea*), tricolored heron (*Egretta tricolor*), double-crested cormorant (*Phalacrocorax auritus*), American bittern (*Botaurus lentiginosus*), ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), black-headed gull (*Chroicocephalus ridibundus*), brown booby (*Sula leucogaster*), ruddy turnstone (*Arenaria interpres*), American golden-plover (*Pluvialis dominica*), semipalmated plover (*Charadrius semipalmatus*), Wilson's plover (*Charadrius wilsonia*), black-bellied plover (*Pluvialis squatarola*), stilt sandpiper (*Calidris himantopus*), least sandpiper (*Calidris minutilla*), upland sandpiper (*Bartramia longicauda*), spotted sandpiper (*Actitis macularius*), western sandpiper (*Calidris mauri*), semipalmated sandpiper (*Calidris pusilla*), white-rumped sandpiper (*Calidris fuscicollis*), pectoral sandpiper (*Calidris melanotos*), solitary sandpiper (*Tringa solitaria*), dunlin (*Calidris alpina*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*Tringa flavipes*), sanderling (*Calidris alba*), short-billed dowitcher (*Limnodromus griseus*), long-billed dowitcher (*Limnodromus scolopaceus*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), brown noddy (*Anous stolidus*), sooty tern (*Onychoprion fuscatus*), bridled tern (*Onychoprion anaethetus*), common tern (*Sterna hirundo*), sandwich tern (*Thalasseus sandvicensis*), royal tern (*Thalasseus maximus*), caspian tern (*Hydroprogne caspia*), Forster's tern (*Sterna forsteri*), gull-billed tern (*Gelochelidon nilotica*), white-winged tern (*Chlidonias leucopterus*), belted kingfisher (*Megaceryle alcyon*), red-billed tropicbird (*Phaethon aethereus*), brown pelican (*Pelecanus occidentalis*), American kestrel (*Falco sparverius*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), common nighthawk (*Chordeiles minor*), chuck-will's-widow (*Antrostomus carolinensis*), scaly-naped pigeon (*Patagioenas squamosa*), Eurasian collared-dove (*Streptopelia decaocto*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), cliff swallow (*Petrochelidon pyrrhonota*), bank swallow (*Riparia riparia*), cave swallow (*Petrochelidon fulva*), Caribbean martin (*Progne dominicensis*), yellow-billed cuckoo (*Coccyzus americanus*), mangrove cuckoo (*Coccyzus minor*), smooth-billed ani (*Crotophaga ani*), lesser Antillean bullfinch (*Loxigilla noctis*), European starling (*Sturnus vulgaris*), northern mockingbird (*Mimus polyglottos*), curve-billed thrasher (*Toxostoma curvirostre*), wood thrush (*Hylocichla mustelina*), bananaquit (*Coereba flaveola*), black-faced grassquit (*Melanospiza bicolor*), yellow-faced grassquit (*Tiaris olivaceus*), Caribbean elaenia (*Elaenia martinica*), helmeted guineafowl (*Numida meleagris*), Indian peafowl (*Pavo cristatus*), shiny cowbird (*Molothrus bonariensis*), and bobolink (*Dolichonyx oryzivorus*).

Many of those bird species can cause damage to or pose threats to a variety of resources. The bird species associated with requests for assistance that WS could receive and the resource types those bird species primarily damage in the USVI occur in Table D-1.

Table D-1 - Additional bird species that WS could address in the USVI and the resource types damaged by those species

Species	Resource*				Species	Resource*			
	A	N	P	H		A	N	P	H
Common gallinules			X	X	Sooty tern			X	X
Common moorhen			X	X	Bridled tern			X	X
Wilson's snipe			X	X	Common tern			X	X
Blue-winged teal	X		X	X	Sandwich tern			X	X
Green-winged teal	X		X	X	Royal tern			X	X
American wigeon	X		X	X	Caspian tern			X	X
Ring-necked duck	X		X	X	Forster's tern			X	X
Northern shoveler	X		X	X	Gull-billed tern			X	X
Lesser scaup	X		X	X	White-winged tern			X	X
Muscovy duck	X		X	X	Belted kingfisher	X	X	X	X
Little egret	X		X	X	Red-billed tropicbird			X	X
Little blue heron	X	X	X	X	Brown pelican	X		X	X
Green heron	X	X	X	X	American kestrel	X	X	X	X
Yellow-crowned night-heron	X		X	X	Peregrine falcon	X	X	X	X
Tricolored heron	X		X	X	Merlin	X	X	X	X
Double-crested cormorant	X		X	X	Osprey	X	X	X	X
American bittern			X	X	Northern harrier	X	X	X	X
Ring-billed gull	X	X	X	X	Red-tailed hawk	X	X	X	X
Herring gull	X	X	X	X	Common nighthawk			X	X
Black-headed gull	X	X	X	X	Chuck-will's-widow			X	X
Brown booby			X	X	Scaly-naped pigeon	X		X	X
Ruddy turnstone			X	X	Eurasian collared-dove	X		X	X
American golden-plover			X	X	Mourning dove	X		X	X
Semipalmated plover			X	X	White-winged dove	X		X	X
Wilson's plover			X	X	Cliff swallow			X	X
Black-bellied plover			X	X	Bank swallow			X	X
Stilt sandpiper			X	X	Cave swallow			X	X
Least sandpiper			X	X	Caribbean martin			X	X
Upland sandpiper			X	X	Yellow-billed cuckoo			X	X
Spotted sandpiper			X	X	Mangrove cuckoo			X	X
Western sandpiper			X	X	Smooth-billed ani			X	X
Semipalmated sandpiper			X	X	Lesser Antillean bullfinch			X	X
White-rumped sandpiper			X	X	European starling	X	X	X	X
Pectoral sandpiper			X	X	Northern mockingbird			X	X
Solitary sandpiper			X	X	Curve-billed thrasher			X	X
Dunlin			X	X	Wood thrush			X	X
Greater yellowlegs			X	X	Bananaquit			X	X
Lesser yellowlegs			X	X	Black-faced grassquit			X	X
Sanderling			X	X	Yellow-faced grassquit			X	X
Short-billed dowitcher			X	X	Caribbean elaenia			X	X
Long-billed dowitcher			X	X	Helmeted guineafowl		X	X	X
Black-necked stilt			X	X	Indian peafowl		X	X	X
American avocet			X	X	Shiny cowbird		X	X	X
Brown noddy			X	X	Bobolink			X	X

*A=Agriculture, N=Natural Resources, P=Property, H=Human Health and Safety

Based on previous requests for assistance and the take levels necessary to alleviate those requests for assistance, WS would not lethally remove more than 25 individuals annually of any of those species

identified in Table D-1. WS does not expect the annual take of those species identified in Table D-1 to occur at any level that would adversely affect populations of those species. Take would be limited to those individuals deemed causing damage or posing a threat. The MBTA protects most of those bird species from take unless the USFWS permits the take pursuant to the MBTA. In addition, the DPNR may also require a permit to lethally take those bird species. If the USFWS and the DPNR did not issue a permit, no take would occur by WS. In addition, take could only occur at those levels stipulated in a permit or authorization. Therefore, the take of those bird species would occur in accordance with applicable territory and federal laws and regulations authorizing take of migratory birds and their active nests and eggs, including the USFWS and the DPNR permitting processes.

The USFWS and/or the DPNR, as the agencies with management responsibility for birds, could impose restrictions on depredation take as needed to assure cumulative take does not adversely affect the continued viability of populations. This would assure that cumulative effects on those bird populations would not have a significant adverse effect on the quality of the human environment. In addition, WS would report annually to the USFWS and/or the DPNR any take of the bird species listed in Table D-1 in accordance with a depredation permit, depredation/control order, and/or other authorizations.

Table D-2 identifies those bird species designated as threatened or endangered in the USVI by the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005 that WS could address in extreme cases where human safety is at risk. Table D-2 is not a complete list of species designated as threatened or endangered in the USVI by the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005 (see Table C-2 in Appendix C). The USFWS has not designated any of the species listed in Table D-2 as federally threatened or endangered in the USVI pursuant to the ESA. WS would only lethally take those bird species listed in Table D-2 under extreme situations that necessitate lethal removal in order to protect human health and safety, such as preventing a bird strike with an aircraft. WS would inform the DPNR of the take of any endangered species within 24 hours.

The Endangered and Indigenous Species Act of 1990 created a threatened and endangered species list for the USVI. The Endangered and Indigenous Species Act of 1990 also set forth procedures to amend the list as needed, including requiring the Endangered Species Protection Commission to approve any changes to the threatened and endangered list. In the CWCS from 2005, a new list was proposed to revise and update the threatened and endangered species list created by the Endangered and Indigenous Species Act of 1990. However, the Endangered Species Protection Commission was never convened. Thus, the updated listed shown in the CWCS from 2005 was never approved as a formal threatened and endangered species list. Although the list from 2005 was never officially adopted, it is still recognized as the most recent recognition of species the DPNR considers as needing protection. Therefore, when drafting this EA, WS considered the threatened and endangered species list from both the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005. Both lists are shown in Table C-2. For the purposes of this EA, WS chose to recognize the highest classification between the two lists. For example, if a species is not listed in the 1990 list, but is listed as endangered in the 2005 list, WS will treat that species as an endangered species.

Table D-2: Bird species designated as threatened or endangered in the USVI by the Endangered and Indigenous Species Act of 1990 and the CWCS from 2005 that WS could address in extreme cases where human safety is at risk.

Species	Scientific Name
White-cheeked pintail	*Anas bahamensis*
Great egret	*Ardea alba*
Great blue heron	*Ardea herodias*
Antillean nighthawk	*Chordeiles gundlachii*
Snowy egret	*Egretta thula*
Brown-throated parakeet	*Eupsittula pertinax*[1]
Magnificent frigatebird	*Fregata magnificens*
American coot	*Fulica americana*[2]

American oystercatcher	*Haematopus palliatus*
Least bittern	*Ixobrychus exilis*
Puerto Rican flycatcher	*Myiarchus antillarum*
Whimbrel	*Numenius phaeopus*
Black-crowned night-heron	*Nycticorax nycticorax*
Ruddy duck	*Oxyura jamaicensis*
White-crowned pigeon	*Patagioenas leucocephala*[3]
White-tailed tropicbird	*Phaethon lepturus*
American flamingo	*Phoenicopterus ruber*[4]
Audubon's shearwater	*Puffinus lherminieri*
Least tern	*Sternula antillarum*
Masked booby	*Sula dactylatra*
Red-footed booby	*Sula sula*
Willet	*Tringa semipalmata*[5]

List Notations

[1] Listed as *Aratinga pertinax* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.

[2] The American coot (*Fulica americana*) now includes the previously separate species known as the Caribbean coot (*Fulica caribaea*), which was considered endangered by both the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.

[3] Listed as *Columba leucocephala* in the CWCS in 2005.

[4] Listed as Greater Flamingo (*Phoenicopterus rubber*) in the CWCS in 2005.

[5] Listed as *Catoptrophorus semipalmatus* in the Endangered and Indigenous Species Act of 1990 and in the CWCS in 2005.

APPENDIX E
Wildlife Services Directive 2.201

United States Department of Agriculture
Animal and Plant Health Inspection Service

Wildlife Services Directive

2.201
July 15, 2014

WS DECISION MODEL

1. PURPOSE

To provide Wildlife Services (WS) personnel with a systematic approach to decision- making for wildlife damage management activities.

2. REPLACEMENT HIGHLIGHTS

This directive revises WS Directive 2.201 dated July 21, 2008.

3. AUTHORITY

Authority to promulgate a policy is pursuant to The Act of March 2, 1931, (46 Stat. 1468; 7 USC 426), as amended:

Section 426. Predatory and other wild animals.
"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day October 28, 2000."

4. POLICY

a. The WS Decision Model is intended to conceptualize and describe the thought process involved in addressing wildlife damage problems. It is not intended to require documentation or a written record each time it is used.

b. This directive provides WS personnel with a step-by-step approach to help address requests for assistance with wildlife damage. The major aspects presented in the WS Decision Model should be used when responding to requests for assistance.

5. BACKGROUND

a. Wildlife damage management focuses on reducing conflicts between humans and wildlife that occur when wildlife negatively impact agricultural and natural resources, properties, and public health and safety. The WS decision making process is a thought process for evaluating and responding to wildlife damage problems, and is similar in approach to the decision making process used within other professions. WS professionals evaluate the appropriateness of

strategies, and methods are evaluated for their availability (i.e., legal and administrative) and suitability based on biological, economic, environmental and social considerations. Fallowing the thought process, the methods deemed practical for the situation are developed into a management strategy. The WS Decision Model is designed to serve as a useful management tool and meaningful communication instrument; however, it necessarily oversimplifies complex thought processes.

6. IMPLEMENTATION

The following discussion is depicted in Attachment 1.

a. Receive Request For Assistance. Wildlife damage management services are provided only in response to requests for assistance.

b. Assess Problem. First, a determination should be made as to whether the problem is within the authority of WS. If it is, damage information should be gathered and analyzed to determine factors such as what species was responsible for the damage; the type, extent, and magnitude of damage; the current economic loss and potential losses; the local history of damage; and what management methods, if any, were used to reduce past damage and the results of those actions.

c. Evaluate Management Methods. Once a problem assessment is completed, an evaluation of management methods must be conducted. Methods should be evaluated in the context of their legal and administrative availability and their acceptability based on biological, environmental, social, and cultural factors.

d. Formulate Management Strategy. Methods determined to be practical for use are formulated into a management strategy. The concept of IWDM (WS Directive 2.105, The WS Integrated Wildlife Damage Management Program) should be applied when formulating each management strategy. This approach encourages the use of several management techniques rather than relying on a single method. Consideration of factors such as available expertise, legal constraints on methods used, costs, and effectiveness is essential in formulating each management strategy.

e. Provide Assistance. Program service can be provided by two basic means: technical assistance and direct management (WS Directive 2.101, Selecting Wildlife Damage Management Methods).

f. Monitor and Evaluate Results of Management Actions. When direct management is provided, it is necessary to monitor the results. Monitoring is important for determining whether further assistance is required or whether the problem has been resolved. Evaluation is used to determine whether additional techniques are necessary.

g. End of Project. With technical assistance, the projects normally end after recommendations or advice are provided to the requestor. An operational project normally ends when WS personnel have stopped or reduced the damage to an acceptable level. Problems such as chronic predation on livestock or at aquaculture facilities may require continuing or intermittent attention and may have no well-defined end point.

7. APPLICABILITY

This applies to all WS employees and programs.

8. REFERENCES

a. WS Directive 2.101, Selecting Wildlife Damage Management Methods (10/29/03); www.aphis.usda.gov/wildlife_damage/directives/2.101.pdf
b. WS Directive 2.105, The WS Integrated Wildlife Damage Management Program (03/01/04); www.aphis.usda.gov/wildlife_damage/directives/2.105.pdf

William H. Clay

Deputy Administrator

Attachment 1
WS Directive 2.201