

**ENVIRONMENTAL ASSESSMENT**

**Double-Crested Cormorant Damage Management in Ohio**

**Prepared by:**

**United States Department of Agriculture  
Animal and Plant Health Inspection Service  
Wildlife Services**

**In cooperation with:**

**Ohio Department of Natural Resources  
Division of Wildlife**

**&**

**United States Department of the Interior  
United States Fish and Wildlife Service  
Ottawa National Wildlife Refuge**



**November 2020**

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## LIST OF ACRONYMS

AMDUCA	Animal Medicinal Drug Use Clarification Act of 1994
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Survey
CBC	Christmas Bird Count
CCP	West Sister Island National Wildlife Refuge Comprehensive Conservation Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSA	Cooperative Service Agreement
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FDA	United States Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
FY	Federal Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NWRC	National Wildlife Research Center
ODCCG	Ohio Double-crested Cormorant Coordinating Group
ODNR	Ohio Department of Natural Resources
ODW	Ohio Division of Wildlife
ONWR	Ottawa National Wildlife Refuge
PRDO	Public Resource Depredation Order
SOP	Standard Operating Procedures
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WS	Wildlife Services

## CHAPTER 1: NEED FOR ACTION AND SCOPE OF ANALYSIS

### 1.1 INTRODUCTION

This Environmental Assessment (EA) evaluates the potential environmental effects of alternatives for WS' involvement in double-crested cormorant (*Phalacrocorax auritus*) damage management in Ohio. Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with the needs of wildlife, which increases the potential for conflicting human/wildlife interactions. Human/wildlife conflicts are complicated by the wide range of public perceptions of wildlife and associated damage.

Wildlife is 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 2013, The Wildlife Society 2016) and the North American Model of Wildlife Conservation (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. 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 Brown 2001).

Wildlife 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. 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. 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.

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 (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. . 8351-8352) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 8353)). WS is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from

private and public entities, including tribes and other governmental agencies. These entities are henceforth known as cooperators. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently in accordance with applicable federal, state, and local laws and Memoranda of Understanding (MOUs) between WS and other agencies. Federal agencies, including the United States Fish and Wildlife Service (USFWS), recognize the expertise of WS in addressing wildlife damage issues.

## 1.2 NEED FOR ACTION

The initiation of this EA was prompted in order to respond to the vacation of the Public Resource Depredation Order (PRDO) (50 CFR 21.48) by the U.S. Fish and Wildlife Service and to address changes in the need for action to manage damage or threats associated with double-crested cormorants in Ohio. This EA will assess the potential environmental impacts of program alternatives based on changes in the need for action regardless of the type of permit issued.

WS continues to assist the Ohio Department of Natural Resources (ODNR), Ohio Division of Wildlife (ODW) and the United States Fish and Wildlife Service (USFWS), Ottawa National Wildlife Refuge (ONWR) with addressing double-crested cormorant damage to critical colonial waterbird breeding habitat on three Lake Erie islands. Black-crowned night-herons (*Nycticorax nycticorax*) (state-listed Threatened), great egrets (*Ardea alba*), snowy egrets (*Egretta thula*) (state-listed Endangered), great blue herons (*Ardea herodias*), and cattle egrets (*Bubulcus ibis*) (state-listed Endangered) nest primarily on the islands of Lake Erie in Ohio. West Sister Island provides nesting habitat for 40% of all the nesting herons and egrets in the U.S. Great Lakes (BSBO 2019).

Beginning in 2005, the agencies formed the Ohio Double-crested Cormorant Coordinating Group (ODCCG) and have met annually to discuss progress and challenges with double-crested cormorant damage management in Ohio. The ODCCG reviews double-crested cormorant population data, impacts of double-crested cormorant damage management actions in Ohio individually and collectively, and information on regional and national double-crested cormorant management activities to ensure that double-crested cormorant damage management efforts in Ohio will not jeopardize the viability of state, regional or national cormorant populations. While each agency has set their own objectives on their individual areas of responsibility, the ONWR, WS and ODW have agreed that decisions on double-crested cormorant damage management projects, in particular with the Lake Erie islands, will be made only after consulting with the ODCCG. WS also receives requests for assistance with double-crested cormorants feeding on commercially raised fish at aquaculture facilities, damage to property, and risks to human health and safety, primarily associated with aircraft strikes.

This EA will determine if the proposed management of double-crested cormorant damage could have a significant impact on the human environment based on previous activities conducted and based on the anticipation of receiving additional requests for assistance. This EA anticipates additional requests for assistance, and the analyses are intended to apply to actions that may occur in any locale and at any time within Ohio as part of a coordinated program.

Managing damage caused by animals is often based on balancing animal populations and human perceptions in a struggle to preserve rare species, regulate species populations, oversee consumptive uses of animals, and conserve the environment that provides habitat. Animals are regarded as having aesthetic, ecological, economic, educational, nutritional, scientific and socio-cultural values (Chardonnet P. H. et al. 2002), and there is enjoyment in knowing species exist and contribute to natural ecosystems

(Decker and Brown 2001). However, when the presence of an adaptable and opportunistic species is combined with human expansion, land management conflicts often develop.

Double-crested cormorants add an aesthetic component to the environment, provide essential ecological functions, and provide people with a connection with nature. Many people, even those experiencing damage, consider the double-crested cormorants to be a charismatic and valuable component of their environment.

The need for action to manage damage and threats associated with double-crested cormorants arises from requests for assistance<sup>1</sup> received by WS to reduce and prevent damage. From federal fiscal year (FY) 2014 through FY 2019 WS received 161 requests for assistance with managing double-crested cormorant damage.

Two forms of assistance have been provided by WS to those people requesting assistance with resolving damage or the threat of damage. Technical assistance is the provision of information, recommendations, and demonstrations on available and appropriate methods that could be conducted by the requestor without WS' direct involvement in managing or preventing the damage. WS' technical assistance activities will be discussed further in Chapter 2 of this EA. Direct operational assistance is the direct application of methods by WS. Direct operational assistance can only commence after technical assistance has been provided (see WS Directive 2.101, WS Directive 2.201) and those persons requesting assistance have been informed of their options (see WS Directive 3.101). WS' direct operational assistance activities will be discussed further in Chapter 2 of this EA. The numbers of requests for assistance are representative of the damage and threats that could be caused by cormorants. Many of the requests for assistance involved multiple resources.

### **Need for Double-Crested Cormorant Damage Management to Resolve Damage to Natural Resources**

Double-crested cormorants can negatively affect natural resources through habitat degradation (Hebert et al. 2005), competition with other wildlife, and other factors. Habitat degradation occurs when large concentrations of birds in a localized area negatively affect characteristics of the surrounding habitat, which can then adversely affect other wildlife species. Competition occurs when birds compete for available resources, such as food or nesting habitat (Jarvie et al. 1997). When habitat degradation and competition occur concurrently bird populations can be negatively impacted (Mountainspring and Scott 1985, Newton 1998, Siriwardena 2004).

Double-crested cormorants are colonial nesting birds that prefer to nest in trees in Ohio (Personal Communication ODW 2018). Damage to habitat can occur due to changes in soil chemistry that a double-crested cormorant nesting colony causes through the accumulation of acidic and ammonium toxic feces (Cuthbert et al. 2002, Hebert et al. 2005, Koh et al. 2012). Double-crested cormorant feces kills vegetation and usually kills trees within three to ten years (Ayers et al. 2015).

Forested islands are preferred locations for nesting colonies as they provide nest sites relatively free of human and predator disturbance and are adjacent to open water which provides easy access to foraging areas. Forested island nesting habitat is available throughout Ohio in large rivers and reservoirs, but the Western Basin of Lake Erie currently supports the highest breeding population of double-crested cormorants (Personal Communication ODW 2018). Islands in the Western Basin of Lake Erie are home

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<sup>1</sup> WS only conducts damage management after receiving a request for assistance. Before initiating damage activities, a Memorandum of Understanding, cooperative service agreement, or other comparable document must be signed between WS and the cooperating entity which lists all the methods the property owner or manager will allow to be used on property they own and/or manage.

to over 1,000 species of vascular plants (Duncan et al. 2010) several of which are listed as threatened or endangered by both the ODNR and the USFWS. Many of these islands are comprised of Carolinian vegetation and/or alvar habitats which are rare or endangered throughout the world.

Cormorants can displace colonial waterbird species such as black-crowned night-herons, great egrets, great blue herons, gulls, common terns (*Sterna hirundo*), and Caspian terns (*Hydroprogne caspia*) through habitat degradation and nest site competition (Farquhar et al. 2003). Cormorants defoliate shrubs and trees used for nesting and roosting which displaces waterbird species such as herons and egrets (Lemmon et al. 1994, Shieldcastle and Martin 1997, Farquhar et al. 2003). Once they have destroyed all available trees for nesting, cormorants will often shift to ground nesting. While cormorants easily adapt to ground nesting, other colonial waterbirds (i.e., herons and egrets) prefer to nest higher in the trees to avoid predation (Cuthbert et al. 2002). However, it has also been shown that cormorant management activities themselves can have negative and/or positive impacts on species that co-habituate with cormorants (Wyman et al. 2018).

The presence of suitable trees and shrubs is vital for many nesting colonial waterbirds. Wires et al. (2001) identified vegetation die off as an important threat to 66% of the colonial waterbird sites designated as 'conservation sites of priority' in the Great Lakes of the United States. Cormorants were present at 23 of the 29 priority conservation sites reporting vegetation die offs (Wires et al. 2001). Cormorants were reported to impact the herbaceous layers and trees used for nesting due to fecal deposition, and often the herbaceous layer was reduced or eliminated from the colony site (Wires et al. 2001). In addition, natural resource managers reported that the impacts to avian species from cormorants were primarily from habitat degradation and from competition for nest sites (Wires et al. 2001). Although loss of vegetation can have an adverse impact on many species, some colonial waterbirds such as pelicans, gulls and terns do prefer sparsely vegetated substrates.

Forest communities provide nesting and loafing habitat for many bird species. However, cormorants may damage shrubs and trees through the removal of foliage and branches by loafing or for nest making activities (Koh et al. 2012). Cormorants may also harm forest communities comprising several acres by altering the soil characteristics through the deposition of acidic droppings (Koh et al. 2012). Accumulations of ammonium nitrogen rich guano alter the soil beneath cormorant colonies, decreasing the pH levels and increasing nitrogen and phosphorus concentrations (Cuthbert et al. 2002, Koh et al. 2012). Many native trees and vegetation respond poorly to these soil alterations, and begin to die or weaken in as little as three years after use for nesting (Koh et al. 2012). As trees become unstable, cormorants and other breeding birds in the colony will abandon them for more favorable trees (Koh et al. 2012). As the lack of suitable nesting habitat begins to occur, cormorants may adapt by nesting on the ground, but other bird species may abandon the site (Koh et al. 2012).

The Lake Erie islands in Ohio are important nesting habitat for many bird species. Black-crowned night-herons, great egrets, snowy egrets, great blue herons, and cattle egrets nest primarily on the islands of Lake Erie in Ohio. The growth of the double-crested cormorant colonies on Ohio's Lake Erie islands has the potential to negatively affect the other colonial nesting birds that occupy the islands by directly displacing them from their nest sites and/or damaging the vegetation where they nest.

### **Need for Double-crested Cormorant Damage Management to Reduce or Prevent Threats to Human Health and Safety**

Threats to human health and safety are primarily associated with aircraft striking double-crested cormorants at or near airports. Although there have been no reports of aircraft strikes involving double-crested cormorants in Ohio from 1990 through 2018, it is still feasible that aircraft could strike

cormorants, particularly at airports near open water bodies. When aircraft strike double-crested cormorants, structural damage can occur to the aircraft and, in some circumstances, could cause a catastrophic failure of the aircraft leading to crashes, especially when an aircraft ingests double-crested cormorants into an engine or engines.

Although rare, aircraft strikes involving wildlife, including double-crested cormorants, can lead to human injuries and human fatalities. From 1990 through 2017, four aircraft strikes involving double-crested cormorants caused injuries to five people in the United States (Dolbeer and Begier 2019). It is more common for wildlife-aircraft strikes to result in expensive repairs, flight delays, or aborted aircraft movements than injury or loss of human life.

When ranking the 66 most hazardous bird groups or species to aircraft in the United States from 1990 to 2009, DeVault et al. (2011) concluded that double-crested cormorants were the sixth most hazardous bird group or bird species to aircraft. DeVault et al. (2011) based those hazard estimates on the number of strikes involving a bird group or species, the amount of damage strikes involving those bird groups or species caused to aircraft, the effect on the flight after the strike, and the average body mass of a bird species or birds in a group. Pfeiffer (2018) ranked double-crested cormorants as the ninth most hazardous species group to military aircraft in the United States out of 108 species groups assessed.

Fecal droppings from roosting or nesting birds can contain pathogens (*e.g.*, coliform bacteria, streptococcus bacteria, salmonella) and contaminants (*e.g.*, toxic chemicals, nutrients), which can result in poor water quality depending on the number of birds, the amount of excrement, and the size of the water body. Fecal accumulations from other waterbirds, such as gulls (*Larus spp.*), Canada geese (*Branta canadensis*), and great cormorants (*Phalacrocorax carbo*), that occur at high concentrations over or near water bodies can influence water quality (*e.g.*, see (Hussong et al. 1979, Benton et al. 1983, Alderisio and Deluca 1999, Lévesque et al. 2000, Kirschner et al. 2004, Meerburg et al. 2011, Klimaszyk and Rzymiski 2013, Klimaszyk et al. 2015, Han et al. 2017)). Fecal contamination of water can also accelerate the process of eutrophication (*e.g.*, see (Nakamura et al. 2010, Klimaszyk and Rzymiski 2013)). However, linking the elevated presence of pathogens and contaminants in water to a single source can be difficult because those inputs could originate from many other sources (*e.g.*, water runoff, landfills, leaking pipes) or may be the accumulated result associated with multiple inputs. Although anecdotal evidence may exist connecting concentrations of double-crested cormorants to specific water quality concerns (Wires et al. 2001), very little research has occurred that directly links double-crested cormorants to specific instances of poor water quality, including concerns involving public water supplies.

Lafferty J. R. (2016) did not find evidence that double-crested cormorants nesting on islands within an Alabama lake were having a direct effect on water quality. However, Lafferty J. R. (2016) stated, “*cormorants may have indirect effects due to interactions among nutrient flow, aquatic plant growth and slight differences in pH associated with cormorant colonies.*” In addition, Lafferty J. R. (2016) noted that nesting densities on islands within an Alabama lake (97.1 cormorants per square hectare) were much lower than nesting densities that may occur in areas further north (*e.g.*, more than 500 cormorants per square hectare).

### **Need to Address Double-crested Cormorant Damage to Aquaculture**

Aquaculture producers often identify double-crested cormorants as the most serious depredator of farm-raised aquaculture species (Stickley and Andrews 1989, Price and Nickum 1995, Dorr et al. 2012, Craig et al. 2016). The Ohio State University conducted a survey of Ohio’s Aquaculture Producers regarding bird predation in 2017. Sixty-seven percent of producers responded that double-crested cormorants were the main fish-eating bird negatively effecting production (Personal Communication ODW 2017). In the



last five years, WS has fielded 43 requests for assistance from aquaculture producers regarding double-crested cormorant damage.

During 2017, the Ohio Division of Wildlife's six fish hatchery units were unable to include double-crested cormorants on their Migratory Bird Depredation Permits and therefore could not use lethal reinforcement as a means of damage management. This resulted in increased double-crested cormorant predation on channel catfish, blue catfish, muskellunge, and yellow perch of various sizes. The Ohio Division of Wildlife estimated that 273,386 fish, valued at \$199,431, were lost to double-crested cormorant predation at the six facilities (Personal Communication ODW 2017).

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. The magnitude of economic impacts that double-crested cormorants have on the aquaculture industry can vary dependent upon many different variables, including the value of the fish stock, number of depredating birds present, and the time of year the predation is taking place.

### **Need to Reduce Double-crested Cormorant Damage Occurring to Property**

Double-crested cormorants can cause damage to many types of property, primarily from accumulation of fecal droppings under areas where congregations of double-crested cormorants nest and roost. Double-crested cormorants can nest and roost on artificial structures, such as power transmission line towers and bridges (Dorr et al. 2014). Corrosion caused by fecal uric acid from nesting or roosting congregations of double-crested cormorants can damage metal surfaces. Likewise, fecal material can cause damage landscaping trees, decks/porches, and outdoor furniture. In addition, accumulations of fecal droppings can be esthetically displeasing to property owners along with the unpleasant smell associated with fecal accumulations.

## **1.3 NATIONAL ENVIRONMENTAL POLICY ACT AND WS DECISION-MAKING**

All federal actions are subject to the National Environmental Policy Act (NEPA) (Public Law 9-190, 42 USC 4321 et seq.), including the actions of WS. The WS program follows the Council on Environmental Quality (CEQ) regulations implementing the NEPA (40 CFR 1500 et seq.) along with USDA (7 CFR 1b) and APHIS Implementing Guidelines (7 CFR 372) as part of the decision-making process. WS will proceed under the 1978 regulations and existing APHIS procedures as this EA was initiated prior to the September 14, 2020 NEPA revisions. The NEPA sets forth the requirement that all federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. In part, the CEQ regulates federal activities affecting the physical and biological environment through regulations in 40 CFR 1500-1508. The NEPA and the CEQ guidelines generally outline five broad types of activities that a federal agency must accomplish as part of projects they conduct. Those five types of activities are public involvement, analysis, documentation, implementation, and monitoring.

Pursuant to the NEPA and the CEQ regulations, WS is preparing this EA to document the analyses associated with proposed federal actions and to inform decision-makers and the public of reasonable alternatives capable of avoiding or minimizing adverse effects. This EA will serve as a decision-aiding mechanism to ensure that WS infuses the policies and goals of the NEPA and the CEQ into the actions of each agency. This EA will also aid WS with clearly communicating the analysis of individual and cumulative impacts of proposed activities to the public. In addition, the EA will facilitate planning, promote interagency coordination, and streamline program management analyses between WS and its

interagency partners. This EA was prepared by integrating as many of the natural and social sciences as warranted, based on the potential effects of the alternatives. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

WS initially developed the issues and alternatives associated with double-crested cormorant damage management in consultation with the cooperating agencies. To assist with identifying additional issues and alternatives to managing damage, WS will make this EA available to the public for review and comment prior to the issuance of a Decision (either a Finding of No Significant Impact (FONSI) or a Notice of Intent to prepare an Environmental Impact Statement).

#### **1.4 DECISIONS TO BE MADE**

Based on agency relationships, MOUs, and legislative authorities, WS is the lead agency for this EA, and therefore, responsible for the scope, content, and decisions made. Management of migratory birds is the responsibility of the USFWS while the ODW is responsible for managing wildlife in the state, including birds. WS' activities to reduce and/or prevent cormorant damage would be coordinated with the USFWS and the ODW, which would ensure WS' actions are incorporated into population objectives established by those agencies. The take of cormorants can only occur when authorized by a depredation permit issued by the USFWS and/or the ODW; therefore, the take of cormorants would only occur at the discretion of those agencies. In addition, WS' (and the cooperating agencies) annual take of cormorants would only occur at levels authorized by those agencies as specified in depredation permits.

Based on the scope of this EA, the decisions to be made are:

- How can WS and the cooperating agencies best respond to the need to reduce cormorant damage in Ohio?
- Do the alternatives have significant cumulative impacts meriting an Environmental Impact Statement (EIS)?

Although the lead and cooperating agencies have worked together to produce a joint document and intend to collaborate on double-crested cormorant damage management in Ohio, each agency will make its own decision on the alternative to be selected in accordance with the standard practices and legal requirements relevant to each agency's decision making process.

#### **1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT**

Double-crested cormorants can occur statewide and throughout the year in Ohio. Double-crested cormorants are dynamic and mobile; therefore, damage and threats of damage caused by double-crested cormorants can occur wherever double-crested cormorants occur in the state. Although double-crested cormorants can occur throughout the year in Ohio and breed throughout the state, they are more abundant during the spring/summer at breeding areas which are primarily concentrated in the Western basin of Lake Erie. The fall migration period for double-crested cormorants generally occurs from August through early November with the peak occurring from late August through mid-October (Dorr et al. 2014). The spring migration period generally occurs from late March through the end of May with the peak occurring from early March through mid-April (Dorr et al. 2014).

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. Although WS could predict some of the possible locations or types of situations and sites where some requests for assistance could occur, the program 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. Therefore, WS must be ready to provide assistance on short notice anywhere in Ohio when receiving a request for assistance. Therefore, the geographic scope of the actions and analyses in this EA is statewide and this EA analyzes actions that could occur on federal, state, county, city, and private lands, when requested, including the properties that the ODW and ONWR owns and/or manages.

### **Site Specificity**

This EA analyzes the potential impacts of alternative approaches to managing damage and threats associated with double-crested cormorants that could be conducted on private and public lands in Ohio where WS and the appropriate entities have entered into an agreement through the signing of a MOU, Cooperative Service Agreement (CSA), or other comparable document. WS would only conduct damage management activities when requested by the appropriate resource owner or manager. This EA also addresses the potential impacts of conducting damage management activities in areas where additional MOUs, CSAs or other comparable documents may be signed in the future. Because the need for action is to reduce damage and because the goals and directives of WS are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional efforts could occur. Thus, this EA anticipates those additional efforts and analyzes the impacts of such efforts as part of the alternatives.

Double-crested cormorants can be found across the state throughout the year. Therefore, damage or threats of damage associated with cormorants could occur wherever these birds occur. Planning for the management of damage and threats associated with cormorants must be viewed as being conceptually similar to the actions of other entities whose missions are to stop or prevent adverse consequences from anticipated future events, such as natural disasters, for which the actual site and locations where they would occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire departments, police departments, emergency clean-up organizations, and insurance companies. Some of the sites where damage could occur can be predicted; however, all specific locations or times where such damage would occur in any given year cannot be predicted. The threshold triggering an entity to request assistance from WS to manage damage and threats associated with cormorants is often unique to the individual; therefore, predicting where and when such a request for assistance will be received by WS would be difficult. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever damage or the threat of damage could occur, and those issues are treated as such in this EA.

The analyses in this EA are intended to apply to any action that may occur in any locale and at any time within Ohio. In this way, WS believes it meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with the NEPA and still be able to address damage and threats associated with cormorants.

## **1.6 ROLES AND AUTHORITIES OF FEDERAL AND STATE AGENCIES**

The authorities of WS and other agencies as those authorities relate to conducting activities to alleviate animal damage are discussed by agency below:

### ***Wildlife Services (WS)***

The primary statutory authorities for the WS program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 8351-8352) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 8353). The WS program is the lead federal authority in managing damage to agricultural resources, natural resources, property, and threats to human safety associated with wildlife. WS' directives define program objectives and guide WS' activities managing animal damage and threats.

### ***United States Fish and Wildlife Service (USFWS)***

The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitat. The USFWS has specific responsibilities for the protection of migratory birds, threatened and endangered species, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters managed by the agency in the National Wildlife Refuge System. The USFWS has statutory authority for enforcing the Fish and Wildlife Improvement Act of 1978 (16 USC 7.12), the Fish and Wildlife Act of 1956 (16 USC 742 a-j), and the Migratory Bird Treaty Act (16 USC 703-711).

### ***Ottawa National Wildlife Refuge Complex***

The Ottawa National Wildlife Refuge was established in 1961 under the authority of the Migratory Bird Conservation Act "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." The Refuge was also established to preserve a portion of the remaining Lake Erie marshes. Cedar Point National Wildlife Refuge was established in 1964 under this same authority and purpose. Today the Refuge Complex consists of three separate refuges (Ottawa, Cedar Point and West Sister Island) that total approximately 9,000 acres. The focus of the Ottawa National Wildlife Refuge Complex is to protect, enhance, and restore habitat for threatened and endangered species; provide suitable nesting habitat for migratory birds; provide spring and fall migration habitat for waterfowl and other migratory birds; provide habitat for native resident flora and fauna; and provide the public with wildlife-dependent recreation opportunities. West Sister Island National Wildlife Refuge is the oldest member of the Ottawa Complex and the most isolated. The 80-acre island became a national wildlife refuge by Executive Order 7937 on August 2, 1937, and in 1975 was designated as a Federal wilderness area under the Wilderness Act of 1964. The Service manages 77 acres of the island and the U.S. Coast Guard owns the remaining acreage and a lighthouse. The island is home to the largest great blue heron and great egret rookery in the United States Great Lakes and is also home to snowy egrets and one of the largest black-crowned night-heron colonies on the United States Great Lakes. The island is not accessible to the public.

### ***United States Environmental Protection Agency (USEPA)***

The USEPA is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which regulates the registration and use of pesticides, including repellents and pesticides available for use to manage damage associated with animals.

### ***United States Food and Drug Administration (FDA)***

The U.S. Food and Drug Administration (FDA) is responsible for protecting the public health by assuring the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, our nation's food supply, cosmetics, and products that emit radiation. The FDA is also responsible for advancing the public health by helping to speed innovations that make medicines and foods more

effective, safer, and more affordable; and helping the public get the accurate, science-based information they need to use medicines and foods to improve their health.

### ***Ohio Department of Natural Resources, Division of Wildlife***

The ODW is the division within the Ohio Department of Natural Resources which is responsible for “conserving and improving fish and wildlife resources and their habitats for sustainable use and appreciation by all.” The powers and responsibilities of the ODW are outlined in Ohio Administrative Code 1501:31 and in the Ohio Revised Code 1531 and 1533. This includes issuing depredation permits for deer and turkey and overseeing management of state threatened and endangered species.

### ***United States Army Corps of Engineers (USACE)***

The USACE is a major cooperating agency with WS to help resolve wildlife damage management in Ohio. The mission of the USACE is to deliver vital public and military engineering services and partnering in peace and war, to strengthen our Nation’s security, energize the economy, and reduce risks from disasters.

## **1.7 DOCUMENTS RELATED TO THIS ENVIRONMENTAL ASSESSMENT**

Additional environmental documents relate to activities that WS could conduct to manage damage or threats of damage associated with double-crested cormorants in the state. Environmental documents also relate to activities that could occur on properties owned and/or managed by the ODW and ONWR. The relationship of those documents to this EA occurs below for each of those documents.

### ***WS’ Double-crested Cormorant Damage Management Environmental Assessment***

WS previously developed an EA that analyzed the need for action to manage damage associated with double-crested cormorants. That EA identified the issues associated with managing damage linked to double-crested cormorants in the state and analyzed alternative approaches to meet the specific need identified in the EA while addressing the identified issues. Changes in the need for action and the affected environment along with the vacation of the PRDO (50 CFR 21.48) by the U.S. Fish and Wildlife Service have prompted WS to initiate this new analysis to address damage management activities in the state. This new EA will address more recently identified changes and will assess the potential environmental effects of program alternatives. Because this EA will re-evaluate activities conducted under the previous EA, the outcome of the Decision issued based on the analyses in this EA will supersede the previous EA that addressed managing damage caused by double-crested cormorants.

### ***Atlantic and Mississippi Flyways Double-crested Cormorant Management Plan***

The Atlantic Flyway Council and the Mississippi Flyway Council developed a joint management plan that “...provides the basic principles and strategies to help guide management of [double-crested cormorants] in the Atlantic and Mississippi Flyways (Atlantic Flyway Council and Mississippi Flyway Council 2010). The main goal of the Atlantic and Mississippi Flyways Double-crested Cormorant Management Plan is to minimize “...negative ecological impacts to habitats, other species, or personal property and other socioeconomic interests” associated with double-crested cormorants while maintaining “...the double-crested cormorant as a natural part of the waterbird biodiversity of the Atlantic and Mississippi Flyway...” (Atlantic Flyway Council and Mississippi Flyway Council 2010).

### ***West Sister Island National Wildlife Refuge Comprehensive Conservation Plan (CCP)***

A CCP is the guiding document for a specific refuge which covers a span of 10-15 years and which is subject to NEPA including requirements for analysis of alternatives and public involvement. It addresses all aspects of refuge management, including wildlife, habitats, and public use, with specific objectives and goals, and identifies strategies to meet those goals. The West Sister Island National Wildlife Refuge CCP establishes a goal to preserve and protect the largest wading bird colony within the Great Lakes ecosystem in accordance with the national wilderness designation. The West Sister Island National Wildlife Refuge CCP also aims to provide habitat conditions favorable to colonial nesting wading birds without compromising the wilderness integrity and while maintaining nesting habitat for approximately 1,000 great blue herons, 800 great egrets, 500 black-crowned night-herons and 1,500 double-crested cormorants (USFWS 2000).

### ***Proposal to Permit Take as Provided Under the Final Programmatic Environmental Impact Statement for the Eagle Rule Revision***

Developed by the USFWS, this EIS evaluated the issues and alternatives associated with the promulgation of new regulations to authorize the “take” of bald eagles and golden eagles as defined under the Bald and Golden Eagle Protection Act. The preferred alternative in the EIS evaluated the management on an eagle management unit level (similar to the migratory bird flyways) to establish limits on the amount of eagle take that the USFWS could authorize in order to maintain stable or increasing populations. This alternative further establishes a maximum duration for permits of 30 years with evaluations in five-year increments (USFWS 2016). A Record of Decision was made for the preferred alternative in the EIS. The selected alternative revised the permit regulations for the “take” of eagles (see 50 CFR 22.26 as amended) and a provision to authorize the removal of eagle nests (see 50 CFR 22.27 as amended). The USFWS published a Final Rule on December 16, 2016 (81 FR 91551-91553).

## **1.8 PUBLIC INVOLVEMENT**

Issues and alternatives related to cormorant damage management as conducted by WS were initially developed by WS in consultation with agency partners. Issues were defined and preliminary alternatives were identified through the scoping process. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS’ NEPA implementing regulations, this document will be noticed to the public for review and comment. The public will be informed through legal notices published in local print media, via a notice on the APHIS stakeholder registry and Regulations.gov, and by posting this EA on the APHIS website at <http://www.aphis.usda.gov/wildlifedamage/nepa>.

WS will provide for a minimum of a 30-day comment period for the public and interested parties to provide new issues, concerns, and/or alternatives. Through the public involvement process, WS will clearly communicate to the public and interested parties the analyses of potential environmental impacts on the quality of the human environment. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a Decision.

## **1.9 RATIONALE FOR PREPARING AN ENVIRONMENTAL ASSESSMENT RATHER THAN AN ENVIRONMENTAL IMPACT STATEMENT**

WS has the discretion to determine the geographic scope of their analyses under the NEPA. The intent in developing this EA is to determine if the proposed action would potentially have significant individual and/or cumulative impacts on the quality of the human environment that would warrant the preparation of

an EIS or a FONSI. In terms of considering cumulative effects, one EA analyzing impacts for the entire state will provide a more comprehensive and less redundant analysis than multiple EAs covering smaller areas. If a determination is made through this EA that the proposed action or the other alternatives might have a significant impact on the quality of the human environment, then an EIS would be prepared.

## **1.10 ENVIRONMENTAL STATUS QUO**

As defined by the NEPA implementing regulations, the “human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment” (40 CFR 1508.14). Therefore, when a federal agency analyzes its potential impacts on the “human environment,” it is reasonable for that agency to compare not only the effects of the proposed federal action, but also the potential impacts that could or would occur from a non-federal entity conducting the action in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with resident wildlife species managed by the state natural resources agency, invasive species, or unprotected species.

Most native wildlife species are protected under state or federal law. Pursuant to the MBTA, the USFWS can issue depredation permits to those entities experiencing damage associated with migratory birds, when deemed appropriate.

When a non-federal entity (e.g., agricultural producers, health agencies, municipalities, counties, private companies, individuals) takes an action to alleviate bird damage, the action is typically not subject to compliance with the NEPA due to the lack of federal involvement<sup>2</sup> in the action. Under such circumstances, the environmental baseline or status quo must be viewed as an environment that includes those resources as they are managed or impacted by non-federal entities in the absence of the federal action being proposed.

Therefore, in those situations in which a non-federal entity has decided that a management action directed towards birds should occur and even the particular methods that would be used, WS’ involvement in the action would not affect the environmental status quo. WS’ involvement would not change the environmental status quo if the requestor had conducted the action in the absence of WS’ involvement in the action.

## **1.11 LAWS AND STATUTES RELATED TO THIS DOCUMENT**

Several laws or statutes authorize, regulate, or otherwise would affect WS’ activities. WS complies with all applicable federal, Commonwealth, and local laws and regulations in accordance with WS Directive 2.210. Those laws and regulations relevant to managing damage in the Commonwealth are addressed below:

### ***Endangered Species Act (ESA) (16 USC 1531-1544):***

The ESA recognizes that our natural heritage is of “esthetic, ecological, educational, recreational, and scientific value to our Nation and its people.” The purpose of the Act is to protect and recover species that are in danger of becoming extinct. It is administered by the USFWS and the Department of National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for terrestrial and freshwater

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<sup>2</sup>If a federal permit is required to conduct damage management activities, the issuing federal agency would be responsible for compliance with the NEPA for issuing the permit.

species while the NMFS is primarily responsible for marine organisms. Under the ESA, species may be listed as endangered or threatened. Endangered is defined as a species that is in danger of becoming extinct throughout all or a significant portion of its range while threatened is defined as a species likely to become endangered in the foreseeable future. Under the ESA, “all federal departments and agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act” (Sec.2(c)). Additionally, the Act requires that, “each Federal agency shall in consultation with and with the assistance of the Secretary, insure 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 or result in the destruction or adverse modification of habitat of such species.....each agency will use the best scientific and commercial data available” (Sec.7 (a) (2)). WS consults with the USFWS or the NMFS to ensure that the agencies actions, including the actions proposed in this EA, are not likely to jeopardize the existence of endangered or threatened species or their habitat.

***National Historic Preservation Act (NHPA) (16 USC 470 et seq.), as amended:***

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on such undertakings if an agency determines that the agency’s actions are “undertakings”. Undertakings are defined in Sec. 800.16(y) as a “project, activity, or program funded in whole or part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license or approval”. 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. None of the methods described in this EA that would be available for use under the alternatives cause major ground disturbance, any physical destruction or damage to property, any alterations of property, wildlife habitat, or landscapes, nor involves the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they were used that could result in effects on the character or use of historic properties. Therefore, the methods that could be used by WS under the relevant alternatives are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources were planned under an alternative selected because of a decision on this EA, the site-specific consultation as required by Section 106 of the NHPA would be conducted, as necessary.

Noise-making methods, such as firearms, that are used at or in close proximity to historic or cultural sites for the purposes of hazing or removing animals have the potential for audible effects on the use and enjoyment of historic property. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage problem, which means such use would be to the benefit of the historic property. A built-in minimization factor for this issue is that virtually all the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by the Section 106 of the NHPA would be conducted as necessary in those types of situations.

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

The Migratory Bird Treaty Act (MBTA) makes it unlawful to, “to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase” some migratory bird species, or their parts, or active nests (16 USC 703-711). Active nests (nests with eggs or chicks present) are protected under the MBTA. Inactive nests (nests without eggs or chicks present) may not be collected or possessed but are not protected from destruction (USFWS 2003).



However, some inactive nests are legally protected by statutes other than the MBTA (e.g., Endangered Species Act, Bald and Golden Eagle Protection Act). A list of bird species protected under the MBTA can be found in 50 CFR 10.13. Free-ranging domestic and feral waterfowl, and mute swans, addressed in this EA are not protected under the MBTA (70 FR 12710-12716). The MBTA provides the USFWS with statutory authority for enforcing the MBTA. Under this authority, the USFWS may issue depredation orders or depredation permits to resolve damage caused by bird species protected under the Act (50 CFR 13 and 50 CFR 21).

***Bald and Golden Eagle Protection Act (16 USC 668-668c), as amended:***

Populations of bald eagles showed periods of steep declines in the lower United States during the early 1900s attributed to the loss of nesting habitat, hunting, poisoning, and pesticide contamination. To curtail declining trends in bald eagles, Congress passed the Bald Eagle Protection Act (16 USC 668) in 1940 prohibiting the take or possession of bald eagles or their parts. The Bald Eagle Protection Act was amended in 1962 to include the golden eagle and is now referred to as the Bald and Golden Eagle Protection Act. Certain populations of bald eagles were listed as “endangered” under the Endangered Species Preservation Act of 1966, which was extended when the modern Endangered Species Act (ESA) was passed in 1973. The “endangered” status was extended to all populations of bald eagles in the lower 48 states, except populations of bald eagles in Minnesota, Wisconsin, Michigan, Washington, and Oregon, which were listed as “threatened” in 1978. As recovery goals for bald eagle populations began to be reached in 1995, all populations of eagles in the lower 48 States were reclassified as “threatened”. In 1999, the recovery goals for populations of eagles had been reached or exceeded and the eagle was proposed for removal from the ESA. The bald eagle was officially de-listed from the ESA on June 28, 2007 with the exception of the Sonora Desert bald eagle population. Although officially removed from the protection of the ESA across most of its range, the bald eagle is still afforded protection under the Bald and Golden Eagle Protection Act.

Under the Bald and Golden Eagle Protection Act (16 USC 668-668c), the take of bald eagles is prohibited without a permit from the USFWS. Under the Act, the definition of “take” includes actions that “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb” eagles. The regulations authorize the USFWS to issue permits for the take of bald eagles and golden eagles on a limited basis (see 81 FR 91551-91553, 50 CFR 22.26, 50 CFR 22.27). As necessary, WS would apply for the appropriate permits as required by the Bald and Golden Eagle Protection Act.

***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, is directed to develop and implement, a MOU with the USFWS that shall promote the conservation of migratory bird populations”.

***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 minorities and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with the NEPA. All WS’ activities are evaluated for their impact on the human environment and compliance with Executive Order

12898. WS would only use or recommend legal, effective, and environmentally safe methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minorities and persons or populations of low income.

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

Children may suffer disproportionately from environmental health and safety risks because their physical and mental systems are still developing. Each federal agency must therefore, “make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children” and “ensure that its policies, programs, activities and standards address disproportionate risks to children”. WS would only employ and/or recommend legally available and approved methods under the alternatives where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

***Invasive Species - Executive Order 13112:***

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”.

***The Wilderness Act of 1964 (Public Law 88-577, 16 U.S.C. 1131-1136):***

The Wilderness Act established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as "wilderness areas", where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.

***The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq.):***

The NAGPRA establishes procedures for federal agencies when Native American “cultural items” are inadvertently discovered on federal or tribal lands. Cultural items may include human remains, funerary objects, sacred objects, and objects of cultural patrimony. In part, the NAGPRA requires federal agencies making such discoveries to notify the Secretary of the Department that manages the federal lands or the tribal leaders on tribal lands on which the discovery was made. Additionally, once a discovery is made, work must be stopped and reasonable efforts must be made to protect the item.

***Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 et seq.):***

The FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The USEPA is responsible for implementing and enforcing the FIFRA. All chemical methods described in Appendix B, are registered with and regulated by the USEPA and used or recommended by WS in compliance with labeling procedures and requirements.

***Federal Food, Drug, and Cosmetic Act (21 USC 360):***

This law places administration of pharmaceutical drugs, including those immobilizing drugs used for wildlife capture and handling, under the Food and Drug Administration (FDA).

***Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA):***

The AMDUCA and its implementing regulations (21 CFR 530) establish several requirements for the use of animal drugs, including those animal drugs used to capture and handle wildlife in damage management programs. Those requirements are: (1) a valid “veterinarian-client-patient” relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under any alternative where WS could use those immobilizing and euthanasia drugs. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period after a drug was administered that must lapse before an animal may be used for food) for specific drugs. Animals that people might consume within the withdrawal period must be identifiable (e.g., use of ear tags) and labeled with appropriate warnings.

***Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33):***

The Coastal Zone Management Act 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 state’s Coastal Zone Management Program.

***Protection of Wetlands – Executive Order 11990:***

Executive Order 11990 was signed to “minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands”. To meet those objectives, Executive Order 11990 requires federal agencies to consider alternatives to wetland sites, in planning their actions, and to limit potential damage, if a federal agency cannot avoid an activity affecting a wetland.

**CHAPTER 2: ISSUES AND ALTERNATIVES**

This chapter contains a discussion of the issues which were used to develop alternatives to address the need for action. It also contains a discussion of Integrated Wildlife Damage Management (IWDM) as well as a description of WS’ strategies, decision making process and SOPs. Finally, this chapter presents alternatives developed to address the issues and meet the need for action. It also presents alternatives considered but not analyzed in detail, with rationale.

## 2.1 ISSUES USED TO DEVELOP ALTERNATIVES

Issues are concerns of the public and/or professional community raised regarding potential adverse effects that might occur from a proposed action. Such issues are considered in the NEPA decision-making process. Issues related to managing damage associated with double-crested cormorants in Ohio were developed by WS in consultation with cooperating agencies, cooperators, and stakeholders. The issues analyzed in detail are the following:

### **Issue 1 - Effects of Damage Management on the Double-crested Cormorant Population**

A common issue when addressing damage caused by wildlife is the potential impacts of management actions on the populations of target species. Nonlethal methods can exclude, disperse, or otherwise make an area unattractive to double-crested cormorants causing damage, which can reduce the presence of those double-crested cormorants at the site and potentially the immediate area around the site. Lethal methods could result in local cormorant population reductions. The number of double-crested cormorants that WS could remove from the population using lethal methods under the alternatives would be dependent on the number of requests for assistance received, the number of individual double-crested cormorants 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 double-crested cormorant population from the use of lethal methods would be a measure of the number of individuals lethally removed in relation to the abundance of double-crested cormorants. 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 double-crested cormorants by comparing the number of double-crested cormorants lethally removed with overall populations or trends. WS' personnel would only use lethal methods at the request of a cooperator seeking assistance and only after the USFWS authorized the take of double-crested cormorants pursuant to the MBTA. 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, and human-induced alterations of wildlife habitat.

Information on the double-crested cormorant population and population trend data can be available from several sources and available literature. Further information on those sources of information occurs below.

#### ***Breeding Bird Survey (BBS)***

The BBS is conducted annually in the United States and Canada, across a large geographical area, under standardized survey guidelines. The BBS is a large-scale inventory of North American birds coordinated by the United States Geological Survey (USGS), Patuxent Wildlife Research Center (Sauer et al. 2017). 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. Trends can be determined using different population equations and statistically tested to determine if a trend is statistically significant. Current estimates of population trends from BBS data are derived from hierarchical model analysis (Link and Sauer 2002, Sauer and Link 2011) and are dependent upon a variety of assumptions (Link and Sauer 1998). The statistical significance of a trend for a given species is also determined using BBS data (Sauer et al. 2017).

### ***Potential Take Limit Model Developed by the USFWS***

The USFWS has developed a Potential Take Limit model to estimate the potential impacts of lethal removal on the double-crested cormorant population. The Potential Take Limit model developed by the USFWS is a biologically based model that allows the USFWS to integrate scientific and policy elements into the decision-making process of allowing the take of double-crested cormorants to manage damage and to manage the double-crested cormorant population. For a detailed discussion of the Potential Take Limit model and its application, please see Appendix 1 in the EA developed by the USFWS for issuing depredation permits to manage damage caused by double-crested cormorants (USFWS 2017).

### ***Ohio Division of Wildlife (ODW) Surveys***

Ohio Division of Wildlife biologists conduct counts of double-crested cormorant nests from the ground, and where appropriate, from the air, between May and June every year at known nesting colonies throughout the state. In addition, several inland lakes and reservoirs host non-breeding and migratory cormorants. Since 2005, ODW biologists have conducted an aerial survey of these areas using fixed-wing aircraft in late August/early September.

### ***USFWS Ottawa National Wildlife Refuge Surveys***

West Sister Island contains the largest heron/egret rookery on the U.S. side of the Great Lakes and the mainland refuge is a critical feeding area. Annual surveys occur in June and July to monitor population size of colonial waders and double-crested cormorants. The survey is a grid of plots with a 25-foot radius located every 150 feet. Nests are counted if they are in a tree with a base that occurs within the survey plot radius. Nests are identified to species. The methodology allows for estimation of population densities and nesting distribution by species on the island. Biologists have completed annual surveys of nesting waterbirds at West Sister Island since 1992.

## **Issue 2 - Effects on the Populations of Nontarget Species, Including Threatened and Endangered Species**

The use of nonlethal and lethal methods has the potential to inadvertently disperse, capture, or kill nontarget wildlife. Appendix B describes the methods available for use under the alternative approaches.

The ESA makes it illegal for any person to ‘take’ any listed endangered or threatened species or their critical habitat. The ESA defines take as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 USC 1531-1544). Critical habitat is a specific geographic area or areas that are essential for the conservation of a threatened or endangered species. The ESA requires that federal agencies conduct their activities in a way to conserve species. It also requires that federal agencies consult with the appropriate implementing agency (either the USFWS or the NMFS) prior to undertaking any action that may take listed endangered or threatened species or their critical habitat pursuant to Section 7(a)(2) of the ESA.

There may also be concerns that WS’ activities could result in the disturbance of eagles that may be near or within the vicinity of WS’ activities. Under 50 CFR 22.3, the term “disturb”, as it relates to take under the Bald and Golden Eagle Act, has been defined as “to agitate or bother a bald and golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” The environmental consequences evaluation conducted in Chapter 3 of this EA will discuss the potential for WS’ activities to disturb eagles as defined by the Act.

### **Issue 3 - Effects of Damage Management Activities 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 double-crested cormorants. Risks can occur to persons employing methods and to persons coming into contact with methods. Risks can be inherent to the method itself or related to the misuse of the method. 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 double-crested cormorants. Still, some concerns exist regarding the safety of methods despite their legality, selectivity, and effectiveness. This EA will analyze the potential for proposed methods to pose a risk to members of the public and employees of WS.

### **Issue 4— Humaneness and Animal Welfare Concerns**

The issue of humaneness and animal welfare, as it relates to the killing or capturing of animals is an important but very complex concept that can be interpreted 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.*”

Suffering has previously been described by the American Veterinary Medical Association (AVMA), 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...*” 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 action is not taken 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).

The AVMA has previously stated that “[f]or 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” (AVMA 2001).

Pain and suffering, as it relates to methods available for use to manage animal damage has both a professional and lay point of arbitration. The professional community and the public would be better served to recognize the complexity of defining suffering, because “...*neither medical nor veterinary curricula explicitly address suffering or its relief*” (California Department of Fish and Game 1991). Research suggests that some methods can cause “*stress*” (Kreeger et al. 1990). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness (Bateson 1991).

The decision-making process can involve trade-offs between the above aspects of pain and humaneness. Therefore, 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. The challenge in coping with this issue is how to achieve the least amount of animal suffering.

## **Issue 5 – Effects of Damage Management Activities on the Aesthetic Values of Double-crested Cormorants**

An additional issue raised is that activities to alleviate damage and threats associated with double-crested cormorants would result in the loss of the aesthetic benefits of these birds to persons in the area where damage management activities take place. Animals are generally regarded as providing utilitarian, monetary, recreational, scientific, ecological, existence and historic values (Conover 2002). These benefits can be tangible or intangible. Both recreational and existence values are related in part to aesthetics. Aesthetics is the philosophy dealing with the nature of beauty or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature and dependent upon what an observer regards as beautiful.

Many people enjoy watching or hearing wildlife and take pleasure from knowing they exist. In modern societies a large percentage of households have pets. However, some people may consider individual wild animals as “pets” and exhibit affection towards these animals.

The values people place on animals is unique to the individual and can be based on many factors. Public attitudes toward animals vary considerably. To alleviate damage, some people support lethal removal, some people believe that all animals should be captured and relocated or handed over to local law enforcement or animal control authorities while others strongly oppose any management and want management agencies to teach tolerance. Some of the people who oppose removal do so because of human-affectionate bonds with individual animals. Attitudes can also differ significantly depending upon if the individual is affected by the damage or threats of damage.

## **2.2 DAMAGE MANAGEMENT STRATEGIES**

### **Integrated Wildlife Damage Management**

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective manner, while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate modification of cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local reductions, elimination of invasive species or any combination of these, depending on the circumstances of the specific damage problem.

### **IWDM Strategies Employed by WS**

#### **Operational Damage Management Assistance (Direct Control)**

Direct operational assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct operational assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and when a Memorandum of Understanding, Cooperative Service Agreement, or other comparable document provides for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem, species responsible for the damage, and methods available to resolve the problem.

#### **Technical Assistance**

Technical assistance is the provision of information, recommendations and demonstrations on available and appropriate wildlife damage management methods and approaches. The implementation of damage

management actions is the responsibility of the requester with no direct involvement by WS. In some cases, WS provides supplies or materials that are not readily available. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems. These strategies are based on the level of risk, need, and the practicality of their application. In some instances, wildlife-related assistance provided to the requestor by WS results in tolerance and / or acceptance of the situation. In other instances, management options are discussed and recommended.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving wildlife damage problems.

### **Education and Outreach**

Education is an important element of WS program activities because wildlife damage management is about finding compromise 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. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, WS provides lectures, courses, and demonstrations to producers, homeowners, state and county agents, colleges and universities, and other interested groups. Cooperating agencies frequently collaborate with other entities in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that other wildlife professionals and the public are periodically updated on recent developments in damage management technology, projects, laws and regulations, and agency policies.



### **Research and Development**

The National Wildlife Research Center (NWRC) functions as the research unit of WS. NWRC uses scientific expertise to develop methods to resolve conflicts between humans and animals while maintaining the quality of the human environment. NWRC research biologists work closely with wildlife managers, researchers, and others to develop and evaluate damage management techniques. NWRC biologists have authored hundreds of scientific publications and reports and are respected worldwide for their expertise.

### **WS' Decision Making Procedures**

The WS Decision Model (WS Directive 2.201) described by Slate et al. (1992) depicts how WS' personnel would use a thought process for evaluating and responding to damage complaints. WS' personnel would assess the problem and then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, WS' employees would incorporate methods deemed practical for the situation into a damage management strategy. After WS' employees implemented this strategy, employees would continue to monitor and evaluate the strategy to assess effectiveness. If the strategy were effective, the need for further management would end. In terms of the WS Decision Model, most efforts to resolve bird damage consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions, including WS.

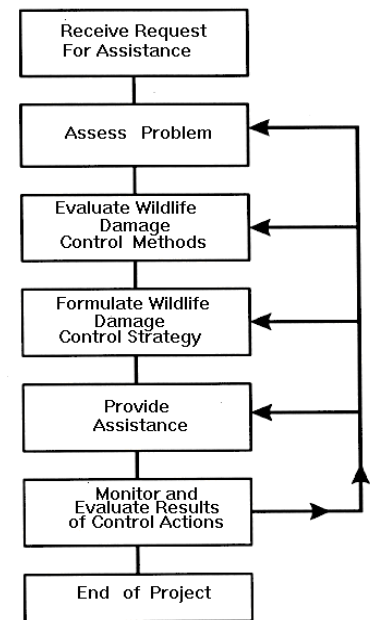
### **Community-based Decision Making**

The WS program follows the “*co-managerial approach*” to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, WS could provide technical assistance regarding the biology and ecology of birds and effective, practical, and reasonable methods available to the local decision-maker(s) to reduce damage or threats. This could include nonlethal and lethal methods. WS and other state and federal wildlife management agencies may facilitate discussions at local community meetings when resources are available. Resource owners and others directly affected by double-crested cormorant damage or conflicts have direct input into the resolution of such problems. They may implement management recommendations provided by WS or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

By involving decision-makers in the process, damage management actions can be presented to allow decisions to involve those individuals that the decision-maker(s) represents. Requests for assistance to manage cormorants 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) are 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 allows decisions on activities to be made based on local input.

### **Private Property Decision Makers**

WS often receives requests for assistance from private property owners. In the case of private property owners, the decision-maker is the individual that owns or manages the affected property. The decision-



**Figure 1.** WS Decision Model as presented by Slate et al. (1992) for developing a strategy to respond to a request for assistance with human-wildlife conflicts.

maker has the discretion to involve others as to what occurs or does not occur on property they own or manage.

### ***Public Property Decision Makers***

The decision-maker for local, state, 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. WS could provide technical assistance to this person and provide recommendations to reduce damage. Direct Damage Management could be provided by WS if requested, when funding was provided, and the requested actions were within the recommendations made by WS.

## **2.3 STANDARD OPERATING PROCEDURES FOR DOUBLE-CRESTED CORMORANT DAMAGE MANAGEMENT**

SOPs improve the safety, selectivity, and efficacy of those methods available to resolve or prevent damage. The current WS program uses many such SOPs. Those SOPs would be incorporated into activities conducted by WS when addressing double-crested cormorant damage and threats.

Some key SOPs pertinent to the proposed action and alternatives include the following:

- ◆ The WS Decision Model, which is designed to identify effective wildlife damage management strategies and their impacts, would consistently be used and applied when addressing double-crested cormorant damage.
- ◆ Applicable Safety Data Sheets and site safety protocols would be provided to all WS' personnel involved with specific damage management activities.
- ◆ Reasonable and prudent measures would be established through consultation when necessary with the USFWS and the ODW and implemented to avoid adverse impacts to T&E species.
- ◆ Carcasses of birds retrieved after damage management activities have been conducted are disposed of in accordance with WS Directive 2.515.
- ◆ All personnel who would use chemicals are trained and certified to use such substances or would be supervised by trained or certified personnel.
- ◆ All personnel who use firearms would be trained according to WS' Directive 2.615.
- ◆ Management actions would be directed toward specific cormorants posing a threat to human safety or causing damage to aquaculture, natural resources, or property.
- ◆ Personnel would be trained in the most humane and effective devices/methods for removing problem cormorants.
- ◆ All methods or techniques applied to resolve damage or threats to human safety would be agreed upon by entering into a cooperative service agreement, MOU, or comparable document prior to the implementation of those methods.

## **2.4 ADDITIONAL STANDARD OPERATING PROCEDURES SPECIFIC TO THE ISSUES**

Several additional SOPs are applicable to the alternatives and the issues identified, including the following:

### **Issue 1 - Effects of Damage Management Activities on Target Populations**

- ◆ Management actions would be directed toward specific cormorants that are causing or at risk of causing damage.
- ◆ Lethal removal of cormorants by WS would be monitored by WS and the cooperating agencies and reported to the USFWS to evaluate population trends and the magnitude of WS' removal of cormorants in the state.
- ◆ Preference would be given to nonlethal methods, when practical and effective. If practical and effective nonlethal control methods are not available and if lethal control methods are available and appropriate for WS to implement, WS and the cooperating agencies may implement lethal methods.

### **Issue 2 - Effects of Double-crested Cormorant Damage Management Activities on Nontarget Wildlife Species Populations, Including T&E Species**

- ◆ When conducting removal operations via shooting, identification of the target animal would occur prior to application.
- ◆ WS' personnel would use bait, trap placements, and capture devices that are strategically placed at locations likely to capture a target animal and minimize the potential of nontarget wildlife captures.
- ◆ Personnel would be present during the use of live-capture methods, or live-traps would be checked in accordance to state and federal regulation or guidance to ensure nontarget species are released in a timely manner or are prevented from being captured.
- ◆ Any nontarget wildlife captured in traps, nets, or any other restraining device would be released whenever it is possible and safe to do so.
- ◆ WS would consult the USFWS iPaC website and the ODW for indication or presence of threatened and endangered species.

### **Issue 3 - Effects of Double-crested Cormorant Damage Management Activities on Human Health and Safety**

- ◆ All personnel who use firearms or pyrotechnics would be trained according to WS Directives (2.615 and 2.625).
- ◆ Damage management via shooting would be conducted during times when public activity and access to the control areas are reduced/restricted.

#### **Issue 4 - Humaneness and Animal Welfare Concerns**

- WS personnel would be trained in the latest and most humane devices and methods for removing double-crested cormorants.
- WS' use of euthanasia methods would comply with WS Directive 2.505.

#### **Issue 5 – Effects of Damage Management Activities on the Aesthetic Values of Double-crested Cormorants**

- WS would set capture devices to minimize visibility of captured animals in compliance with WS Directive 2.450.

### **2.5 ALTERNATIVES CONSIDERED IN DETAIL**

Alternatives were developed for consideration based on the need for action and issues using the WS Decision model (Slate et al. 1992). The alternatives will receive detailed environmental impacts analysis in Chapter 3 (Environmental Consequences). The following alternatives were developed to meet the need for action and address the identified issues associated with managing damage caused by double-crested cormorants.

#### **Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

The proposed action/no action alternative would continue the current implementation of an adaptive integrated approach utilizing nonlethal and lethal techniques, as deemed appropriate using the WS Decision Model, to reduce damage and threats associated with double-crested cormorants. WS would continue to assist the cooperating agencies with meeting and maintaining double-crested cormorant management objectives on the three Lake Erie islands. WS could respond to requests for assistance by: 1) taking no action, if warranted, 2) providing technical assistance to property owners or managers on actions they could take to reduce damage or threats of damage, or 3) providing technical assistance and direct operational assistance to a property owner or manager experiencing damage or threats of damage. Direct operational assistance could be provided when funding is available through federal appropriations or cooperative funding. WS' response to requests for assistance is dependent upon on those persons initiating the request. Those persons receiving technical assistance could 1) take no action, 2) choose to implement WS' recommendations on their own, 3) use the services of a private nuisance wildlife control agent, 4) use volunteer services of private individuals or organizations, 5) use the services of local law enforcement or animal control authorities or 6) use the services of WS (direct operational assistance) when available. Direct operational assistance would only be conducted by WS after a memorandum of understanding, cooperative service agreement, or other comparable document listing all the methods the property owner or manager will allow to be used on property they own and/or manage was signed by WS and those requesting assistance.

The most effective approach to resolving any animal damage problem is to use an IWDM approach that may call for the use of several methods simultaneously or sequentially. IWDM may incorporate both nonlethal and lethal methods depending upon the circumstances of the specific damage problem. Nonlethal methods disperse or otherwise make an area where the damage is occurring unattractive or unavailable to the species causing the damage, thereby reducing the presence of those species in the area. Nonlethal methods would be given priority when addressing requests for assistance (WS Directive 2.101). However, nonlethal methods would not necessarily be employed to resolve every request for assistance if

deemed inappropriate by WS' personnel using the WS Decision Model. For example, if those requesting assistance have already used nonlethal methods, WS would not likely recommend or continue to employ those particular methods because their use has already been proven ineffective in adequately resolving the damage or threat.

Lethal methods remove individuals or active nests (nests with eggs or chicks present), thereby reducing the presence of cormorants in the area. Lethal methods are often employed or recommended to reinforce nonlethal methods and to remove cormorants that have been identified as causing damage or posing a threat of damage. The number of birds or active nests removed from the population using lethal methods under the proposed action would be dependent on the number of requests for assistance received, the number of individual birds or active nests involved with the associated damage or threat, and the efficacy of methods employed.

#### Depredation Permits

Lethal take of double-crested cormorants can occur through the issuance of depredation permits by the USFWS. Currently, as part of the application process, the USFWS requires that permittees contact WS to obtain a recommendation (technical assistance) for how to address the wildlife damage problem. WS would evaluate the situation and then issue a recommendation that describes the damage, species involved, number of individual birds involved, previous actions taken to address the problem and recommendations for how to address the problem.

Recommendations could include nonlethal actions and when appropriate, the recommendation that USFWS issue a depredation permit for lethal actions. However, the USFWS requires that available nonlethal actions are used where possible and practical and shown ineffective prior to issuing a permit for lethal actions. The USFWS also requires permittees continue long-term nonlethal actions to eliminate or reduce the need for permitted lethal removal. The USFWS then reviews the application completed by the property owner or manager and the recommendation issued by WS and makes a determination to issue or not issue a depredation permit. Upon a receipt of a depredation permit, the property owner or manager or an appropriate designated sub-permittee may then commence the authorized activities. Permittees must submit a written report of their activities upon expiration of the permit. Permits may be renewed annually as needed to resolve continuing damage or threats of damage.

Appendix B contains a thorough discussion of the methods available for use in managing damage and threats associated with double-crested cormorants under this alternative. All of the methods listed in the Appendix would be available under this alternative although not all methods would be available for direct implementation by all persons.

#### **Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

WS could continue to provide those persons requesting assistance with managing damage and threats associated with double-crested cormorants with technical assistance as described in Alternative 1. Additionally, WS could provide direct operational assistance, but would only utilize nonlethal techniques. When the circumstances of a specific damage problem called for the use of lethal methods, WS could recommend those persons requesting assistance: 1) implement lethal methods on their own, 2) use the services of a private nuisance wildlife control agent, 3) use volunteer services of private individuals or organizations, or 4) use the services of local law enforcement or animal control authorities. WS would not provide direct operational assistance utilizing lethal techniques. All methods listed in Appendix B could be available under this alternative.

This alternative would place the immediate burden of lethal operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage associated with double-crested cormorants as permitted by federal, state, and local laws and regulations or those persons could take no action.

### **Alternative 3 –Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

This alternative would preclude any activities by WS to alleviate damage or threats of damage associated with double-crested cormorants. WS would refer all requests for assistance associated with double-crested cormorants to the USFWS, to the ODW and/or to private entities. This alternative would not prevent other federal, state, local agencies, and/or private entities from conducting damage management activities. Therefore, entities seeking assistance could contact WS but WS would immediately refer the requester to other entities. The requester could then contact those entities for information and assistance, could take actions to alleviate damage without contacting any entity, or could take no further action. Those methods listed in Appendix B would be available for use by other agencies and private entities to manage damage and threats associated with double-crested cormorants.

This alternative would place the burden of technical and operational damage management on the resource owner, other governmental agencies, private businesses and/or private individuals. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage associated with cormorants as permitted by federal, state, and local laws and regulations or those persons could take no action.

## **2.6 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE**

In addition to those alternatives analyzed in detail, several alternatives were identified by WS that will not receive detailed analyses for the reasons provided. Those alternatives considered but not analyzed in detail include:

### **Technical Assistance Only**

This alternative would restrict WS to only providing technical assistance (advice) on double-crested cormorant damage management. Producers, property owners, agency personnel, or others could obtain permits from the USFWS and/or the ODW as needed and could conduct cormorant damage management using any of the legally available nonlethal and lethal techniques. Technical assistance information is also readily available from entities other than WS such as the USFWS, ODW, universities, extension agents, FAA, and private individual and organizations. Environmental impacts of this alternative are likely to be similar to Alternative 3. Consequently, the agencies have determined that detailed analysis of this alternative would not contribute substantive new information to the understanding of environmental impacts of damage management alternatives and have chosen to not analyze this alternative in detail.

### **WS Would Implement Nonlethal Methods before Lethal Methods**

This alternative would require that all nonlethal methods or techniques described in Appendix B be applied to all requests for assistance to reduce damage and threats associated with double-crested cormorants. Nonlethal methods would be applied to every request for assistance regardless of severity or intensity of the damage or threat until deemed inadequate to resolve the damage. If the use of all

nonlethal methods failed to resolve the damage or threat, lethal methods would then be employed to resolve the damage.

Those persons experiencing damage or threats often employ nonlethal methods prior to contacting WS for assistance. Verification of the methods used would be the responsibility of WS. No standard exists to determine requester diligence in applying those methods, nor are there any standards to determine how many nonlethal applications are necessary before the initiation of lethal methods. Thus, only the presence or absence of nonlethal methods can be evaluated. The proposed action (Alternative 1) described is similar to a nonlethal before lethal alternative because the use of nonlethal methods must be considered before lethal methods by WS (see WS Directive 2.101). Adding a nonlethal before lethal alternative and the associated analysis would not add additional information to the analyses in the EA.

### **WS would only Use Lethal Methods**

Under this alternative, the only methods available for recommendation and use in resolving damage or threats associated with double-crested cormorants would be the lethal methods described in Appendix B. This is in direct conflict with WS Directive 2.101, which directs that WS must consider the use of nonlethal methods before lethal methods. Therefore, this alternative was not considered in detail.

### **WS Would Use Nonlethal Methods Only**

Under this alternative, the only methods available for recommendation and use in resolving damage or threats associated with double-crested cormorants would be the nonlethal methods described in Appendix B. The nonlethal methods recommended or used under this alternative would be identical to those identified under Alternatives 1, 2 and 3.

In situations where nonlethal methods were impractical or ineffective to alleviate damages, WS would refer requests for information regarding lethal methods to the USFWS, the ODW and/or private entities. Although not recommended or used by WS, lethal methods could continue to be used by others in resolving damage or threats associated with cormorants under this alternative. All lethal methods listed in the Appendix would be available under this alternative.

Resource owners or managers frustrated by a lack of WS' assistance with the full range of management methods may try methods not recommended by WS (e.g., poisons). In some cases, resource owners or managers may misuse methods or use methods in excess of what is necessary. This alternative was not analyzed in detail since the lethal removal of double-crested cormorants could continue at the levels analyzed in Alternative 1, despite the lack of WS' involvement.

## **CHAPTER 3: ENVIRONMENTAL EFFECTS**

This chapter provides the information needed for making an informed selection among the alternatives identified and described in Chapter 2; a selection which not only addresses the need for action identified in Chapter 1 but also addresses the issues identified in Chapter 2. Specifically, this chapter analyzes the environmental consequences of each of the alternatives as those alternatives relate to the issues identified in Chapter 2. Additionally, this chapter compares the environmental consequences of the proposed action / no action alternative to the environmental consequences of the other alternatives.

Environmental consequences can be direct, indirect, and/or cumulative.

Direct Effects: Caused by the action and occur at the same time and place.

Indirect Effects: These are impacts caused by an action that occur later in time or further removed in distance but are still reasonably foreseeable.

Cumulative Effects: As defined by CEQ (40 CFR 1508.7), these 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.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

### **3.1 ISSUES CONSIDERED IN DETAIL AND THEIR ASSOCIATED ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE**

The proposed action/no action alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The analysis also takes into consideration mandates, directives, and the procedures of WS, the USFWS, and the ODW.

#### **Issue 1 - Effects of Damage Management Activities on the Double-crested Cormorant Population**

The issue of the potential direct and cumulative impacts of conducting the alternatives on double-crested cormorant populations is analyzed for each alternative below.

#### **Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

Alternative 1 would not have any significant adverse impact on double-crested cormorant populations. The proposed action / no action alternative would continue the current implementation of an adaptive integrated approach utilizing nonlethal and lethal techniques, as deemed appropriate using the WS Decision Model, to reduce damage and threats associated with double-crested cormorants. WS would continue to assist the cooperating agencies with an adaptive management approach to meeting double-crested cormorant management objectives on the three Lake Erie islands.

The issue of the effects on target species arises from the use of nonlethal and lethal methods to address the need for reducing damage and threats; however, the primary concern would be from the use of lethal methods. Nonlethal methods disperse or otherwise make an area where damage is occurring unattractive or unavailable to the target species, thereby reducing the presence of that species. However, birds responsible for causing damage or threats are moved to other areas with minimal impact on the species' populations. WS would not employ or recommend these methods be employed over large geographic areas or at such intensity that essential resources would be unavailable and that long-term adverse impacts to bird populations would occur. Nonlethal methods are generally regarded as having minimal impacts on overall populations of wildlife because individuals of those species are unharmed. The use of nonlethal methods would not have adverse population impacts under any of the alternatives.

WS would only lethally target an individual double-crested cormorant or a group of double-crested cormorants identified as causing damage and only when authorized by the USFWS at levels stipulated in the permit. The lethal removal of double-crested cormorants would be monitored by comparing the



number of each species lethally removed with that species' overall population trend (when available) and/or the magnitude of lethal removal in comparison to other known lethal removal occurring (when available) to assure the magnitude of lethal removal is maintained below the level that would cause adverse effects to the viability of species' populations.

### ***DOUBLE-CRESTED CORMORANT POPULATION DIRECT, INDIRECT, AND CUMULATIVE EFFECTS ANALYSIS***

Double-crested cormorants are large fish-eating colonial waterbirds widely distributed across North America (Dorr et al. 2014). Their diet consists almost entirely of fish, but they will also eat other aquatic animals (Dorr et al. 2014). Therefore, double-crested cormorants generally occur in areas near bodies of water, such as coastal areas, rivers, ponds, lakes, estuaries, and artificial water impoundments (Dorr et al. 2014). Similarly, they nest near bodies of water with nests generally occurring on the ground on rocky or sandy islands, but they also will nest in trees close to or that survive in water. Double-crested cormorants will also nest on bridges, docks, power line transmission towers, and other man-made structures near water (Dorr et al. 2014). They are highly social birds that not only nest together but also feed, travel, and roost in flocks that can number more than 1,000 birds (Dorr et al. 2014).

Since the late 1970s, the double-crested cormorant population has increased in many regions of North America (Wires et al. 2001). Jackson and Jackson (1995) and Wires et al. (2001) suggested that the double-crested cormorant resurgence might be, at least in part, a population recovery following years of reproductive suppression from organochlorine contaminants and unregulated take prior to protection under the MBTA. Between the late 1970s and early 1990s, the double-crested cormorant population expanded to an estimated 372,000 nesting pairs ((Tyson 1997, Wires et al. 2001). Tyson et al. (1997) found that the double-crested cormorant population increased about 2.6% annually during the early 1990s. The greatest increase was in the Interior region, which was the result of a 22% annual increase in the number of double-crested cormorants in Ontario and those states in the United States bordering the Great Lakes (Tyson et al. 1997). Since 1966, the number of double-crested cormorants observed in all areas surveyed during the BBS has shown an increasing trend estimated at 3.76% annually with a 8.48% annual increase occurring from 2005 through 2015 (Sauer et al. 2017). The increase in the double-crested cormorant population in North America and the subsequent range expansion of double-crested cormorants has been well documented along with concerns of the negative impacts associated with the expanding population (*e.g.*, see (Taylor and Dorr 2003, Hunter et al. 2006).

Based on 2012 data, the Wetlands International (2019) estimated the continental population of double-crested cormorants to be between 1,078,280 and 1,160,590 double-crested cormorants. In Northeast and Central North America, the Wetlands International (2019) estimated the population of double-crested cormorants to be between 947,000 and 1,020,000 double-crested cormorants. The USFWS recently estimated the double-crested cormorant population in the central and eastern United States and Canada to be 731,880 to 752,516 double-crested cormorants (see Table 4-1 and Table A-1 in (USFWS 2017).

The Ohio population of double-crested cormorants is primarily composed of birds from the Interior population (Tyson et al. 1997). Most double-crested cormorants are found in Ohio during the spring, summer and fall months when the breeding population and migrating birds are present. The current Ohio breeding population of double-crested cormorants started as a consistent breeding colony in 1992 at West Sister Island with 182 pairs. There had been a breeding population of double-crested cormorants in the state prior to that time, but as stated above, the use of organochlorine pesticides (*e.g.*, DDT) caused marked declines in the nationwide cormorant population and contributed to no regularly nesting double-crested cormorants in Ohio. Since the early 1990s, double-crested cormorant populations rapidly

increased in the western basin of Lake Erie and are continuing to grow at a number of inland sites throughout the state.

Double-crested cormorants presently are known to nest on West Sister Island, Turning Point Island, and Green Island. There are also inland nesting colonies at Grand Lake St Marys State Park/Mercer Wildlife Area (Mercer Co.), Meander Reservoir (Trumbull/Mahoning Co.), Big Island Wildlife Area (Marion Co), a quarry in Franklin County, and in and around the Portage Lakes. The statewide breeding population peaked at 5,296 breeding pairs in 2011 but has fluctuated between 2,400 to 4,300 pairs in the last several years. West Sister Island, which makes up the largest colony, housed an estimated 1,906 breeding pairs in 2020. Turning Point Island hosted the second largest colony at 1,049 breeding pairs, and there were eight double-crested cormorant nests on Green Island in 2020. The number of inland breeding colonies has increased around the state, with Meander Reservoir hosting the largest population of 199 breeding pairs in 2020. A total of 3,561 nests were counted in 2020 yielding a breeding population estimate of 7,122 individual double-crested cormorants (ODW Pers. Comm. 2020).

ODW and ONWR nest counts do not estimate the number of non-breeding double-crested cormorants that are also present in the state during the breeding season. As such, these impact analyses represent the effects of management practices on estimated breeding individuals only and exclude juvenile and non-breeding adults. Therefore, the impact analyses are based on a conservative population estimate, and the direct, indirect, and cumulative impacts are likely less.

Several Ohio inland lakes and reservoirs will host non-breeding and migratory cormorants. Since 2005, ODW biologists have conducted an aerial survey of these areas using fixed-wing aircraft in late August. Over the last five years of inland surveys there has been an annual average of 2,077 double-crested cormorants observed on Ohio's inland lakes and reservoirs (ODW Pers. Comm. 2020).

Since 1966, the number of double-crested cormorants observed in all areas surveyed during the BBS has shown an increasing trend estimated at 3.8% (Sauer et al. 2017). Likewise, the number of double-crested cormorants observed in Ohio during the BBS has also shown an increasing trend estimate at 6% annually (Sauer et al. 2017). It should be noted there are factors that likely contribute to some potential deficiencies in the BBS data for double-crested cormorants indicated by Sauer et al. (2017). The survey criteria for the BBS are likely not conducive to surveying for double-crested cormorants because surveys occur along predetermined roadside routes and double-crested cormorants use bodies of water to forage, loaf, roost, and nest (e.g., Lake Erie islands, reservoirs). The number of double-crested cormorants present in Ohio during June when people conduct the BBS is relatively isolated to islands in the western basin of Lake Erie.

Despite previous activities to manage damage caused by double-crested cormorants, including the lethal removal of double-crested cormorants, trend data continues to indicate that the breeding population of double-crested cormorants is stable to generally increasing in Ohio (Sauer et al. 2017). The International Union for Conservation of Nature and Natural Resources ranks the double-crested cormorant as a species of "*least concern*" (BirdLife and International 2016). The International Union for Conservation of Nature and Natural Resources assigned the ranking based on the "*species...extremely large range...*", "*the population trend appears to be increasing*", and "*...the population size is extremely large...*" (BirdLife and International 2016). In the North American Waterbird Conservation Plan, Kushlan et al. (2002) ranked the double-crested cormorant as a species "*not currently at risk.*"

The ONWR and ODW have established double-crested cormorant management objectives for the Lake Erie islands that fall under their authority. The management objective for West Sister Island is to maintain a breeding population of 1,500-2,000 breeding pairs of double-crested cormorants. The

management objective for West Sister Island was based on Habitat Objective 1 in the CCP for West Sister Island (USFWS 2000) which calls for the refuge to maintain nesting habitat for approximately 1,000 pairs of great blue herons, 800 pairs of great egrets, 500 pairs of black-crowned night-herons and 1,500 pairs of double-crested cormorants. It was also based on observations from refuge biologists that damage to vegetation appeared more pronounced when double-crested cormorant numbers at West Sister Island exceeded 2,000 breeding pairs, starting in 1999. The ODW has a double-crested cormorant population management objective of maintaining 400 breeding pairs on Turning Point Island. This population objective was established in 2005. At that time the number of cormorant breeding pairs on the island was at 400 and at that density did not appear to be adversely affecting island vegetation or co-nesting species. However, given the patterns observed on other Lake Erie islands it was likely that adverse impacts would occur if the cormorant population increased much beyond that (ODW pers. comm. 2018). The ODW has a double-crested cormorant population management objective of maintaining zero breeding pairs at Green Island. The objective for Green Island is to return the species composition on the island to what it was in 2002, prior to cormorants nesting on the island. Given the relatively small size of the island and the fact that several state-listed bird and plant species can be found there, the rapid increase in the number of cormorants nesting on the island during 2003-2005 and subsequent habitat degradation was alarming (ODW pers. comm. 2018).

*Direct, Indirect, and Cumulative Effects:*

Under the former PRDO, WS and the cooperating agencies removed an annual average of 1,452 double-crested cormorants from West Sister Island (range of 328-4,230), 859 double-crested cormorants from Green Island (range of 473-1,468), and 2,144 double-crested cormorants from Turning Point Island (range of 80-3,888). WS anticipates the annual take of double-crested cormorants on the three Lake Erie islands would be similar to previous years (range of 2,206-6,535) (Table 1). For the purposes of the analyses in this EA, WS will use a maximum proposed double-crested cormorant take of 6,500 for the three Lake Erie islands. Both the ONWR and the ODW have established double-crested cormorant population objectives for the islands under their authority that would ensure a minimum breeding population of at least 3,800 double-crested cormorants in the state (1,900 breeding pairs). It should be noted that despite previous double-crested damage management efforts, the annual average number of cormorant breeding pairs on two of the Lake Erie islands has remained above the established double-crested cormorant population management objectives (Table 1, Table 2). The ODW has more or less achieved double-crested cormorant management objectives on Green Island. Accordingly, no double-crested cormorant management was performed on Green Island in 2019 and 2020 (Table 2).

**Table 1.** A summary of WS and cooperating agency double-crested cormorant take under the PRDO at West Sister Island, Green Island and Turning Point Island. Double-crested cormorant nest counts are also included for comparison. Nest counts are conducted following management actions in a given year.

	West Sister Island		Green Island		Turning Point Island		Totals	
	Take	Nest Count	Take	Nest Count	Take	Nest Count	Take	Nest Count
2006	4,230	2,693	1,468	517	80	726	5,778	3,936
2007	1,932	1,967	798	686	849	934	3,579	3,587
2008	579	1,924	949	757	1,069	739	2,597	3,420
2009	328	1,832	792	431	1,162	952	2,282	3,215
2010	423	2,397	479	325	1,304	619	2,206	3,341
2011	968	3,112	1,267	628	1,287	1,221	3,522	4,961
2012	1,694	2,382	876	368	3,790	1,163	6,360	3,913
2013	1,928	2,370	881	350	3,726	989	6,535	3,709
2014	1,126	2,189	473	314	3,079	1,163	4,678	3,666
2015	1,352	2,233	647	590	3,888	1,171	5,887	3,994
2016	1,413	2,165	822	488	3,352	517	5,587	3,170
<b>Average</b>	<b>1,452</b>	<b>2,297</b>	<b>859</b>	<b>496</b>	<b>2,144</b>	<b>927</b>	<b>4,445</b>	<b>3,720</b>

In recent years the ONWR and the ODW have received depredation permits from the USFWS pursuant to 50 CFR 21.41. Table 2 below summarizes depredation permit authorizations and resulting double-crested cormorant take to reduce damage on the three Lake Erie islands. WS does provide direct double-crested cormorant damage management assistance on the Lake Erie islands for both the ONWR and ODW, operating as a sub-permittee under their respective depredation permits.

**Table 2.** A summary of WS and cooperating agency double-crested cormorant take under USFWS depredation permits at West Sister Island, Green Island and Turning Point Island. Double-crested cormorant nest counts are also included for comparison. Nest counts are conducted following management actions in a given year.

	West Sister Island			Green Island			Turning Point Island		
	Authorized DCCO Take	DCCOs Removed	DCCO Nests	Authorized DCCO Take	DCCOs Removed	DCCO Nests	DCCOs Removed	DCCO Nests	
2017	0	0	2,719	2,660*	0	532	0	809	
2018	2,000	2,000	1,648	2,660*	503	324	2,157	1,011	
2019	1,500	906	1,287	2,660*	0	0	2,660	681	
2020	1,500	0	1,906	2,660*	0	8	2,660	1,049	
<b>Average</b>	<b>1250</b>	<b>727</b>	<b>1,890</b>	<b>2,660*</b>	<b>126</b>	<b>216</b>	<b>1,869</b>	<b>888</b>	

<sup>a</sup> The USFWS did not authorize and double-crested cormorant take in 2017.

<sup>b</sup> Combined authorized double-crested cormorant take for Green Island and Turning Point Island.

The cooperating agencies use an adaptive management framework when developing annual double-crested cormorant management objectives on the Lake Erie islands. Cormorant take at West Sister Island has been self-limiting when cormorants are within target population objectives (1500-2000 breeding pairs). As such, fewer cormorants have been removed by the cooperating agencies the last two years. For unknown reasons very few cormorants have been observed nesting on Green Island the last two years. No double-crested cormorant take occurred on Green Island during 2019-2020.

In addition to the need to protect natural resources on the Lake Erie islands, WS also receives requests for assistance associated with double-crested cormorant damage to aquaculture, natural resources, aviation safety and property in other areas of the state. Between Calendar Year (CY) 2014 and CY2018 WS lethally removed a total 15 double-crested cormorants. During that same timeframe WS dispersed a total of 1,192 double-crested cormorants. The majority of that take and dispersal occurred at airports to mitigate direct threats to aviation safety. WS has had an increase in the number of requests for assistance with managing double-crested cormorant damage in Ohio and expects the number of requests for assistance to manage damage caused by cormorants will increase based on the increasing number of cormorants observed utilizing inland sites in the state. For the purposes of the analysis in this EA WS will use a maximum proposed take of up to 1,000 double-crested cormorants to address damage to aquaculture, natural resources, aviation safety and property in other areas of the state.

While double-crested cormorants prefer to nest in trees in Ohio there are locations in the state where double-crested cormorants will nest on man-made structures and other locations where nest destruction or removal may be a management option. According to the Migratory Bird Treaty Act, the removal of eggs and nests with eggs is lethal take. WS will account for the removal/destruction of nests by reporting these numbers annually to USFWS. For the purposes of the analysis in this EA WS will use a maximum proposed take of up to 100 double-crested cormorant nests to address damage to aquaculture, natural resources, aviation safety and property.

The destruction of nests by WS would occur in localized areas where nesting takes place. Nest destruction would have no significant adverse impact on the population of these bird species. Although there may be reduced fecundity for the individuals affected by nest destruction, these birds may relocate and nest elsewhere when confronted with repeated nest failures. However, this activity would have no long-term effect on populations of these breeding birds. The removal of nests can only legally occur as authorized by the USFWS through the issuance of a depredation permit, and only at levels specified in the permit. WS proposed removal of 100 double-crested cormorant nests will have no direct adverse effects on double-crested cormorant populations.

### **Summary of double-crested cormorant population impact analysis**

Many natural processes and human generated changes would be occurring simultaneously during the implementation of Alternative 1 that could cumulatively affect the double-crested cormorant population. Those natural processes and human generated changes could include:

- Natural mortality of double-crested cormorants
- Human-induced mortality through aircraft strikes and illegal take
- Human-induced mortality of double-crested cormorants through damage management activities
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

The USFWS can issue depredation permits that allow people and entities to take, possess, and/or transport migratory birds to manage the damage those birds cause (see 50 CFR 21.41), including damage caused by double-crested cormorants. In addition, the USFWS can authorize the take of birds, including double-crested cormorants, pursuant to additional permits and orders (see 50 CFR 21).

Because of the cumulative activities associated with managing damage caused by double-crested cormorants, the USFWS has developed a Potential Take Limit model to evaluate the cumulative annual take of double-crested cormorants in the central and eastern United States (see Appendix 1 in USFWS (2017) for a description of the model). The Potential Take Limit model developed by the USFWS

estimates the maximum allowable cumulative take of double-crested cormorants in three subpopulations found in the central and eastern United States and Canada. The USFWS distinguished those three subpopulations primarily on the migratory corridors those double-crested cormorants use as they move between areas where they nest and areas where they spend the winter.

The USFWS designated those three subpopulations of double-crested cormorants that occur in the central and eastern United States and Canada as the Atlantic Flyway subpopulation, the Mississippi/Central Flyway subpopulation, and the Florida subpopulation. The Florida subpopulation is generally non-migratory and occurs in southern Florida. The Atlantic Flyway subpopulation nests primarily along Lake Ontario, the St. Lawrence River, the northeastern United States, and corresponding areas in Canada. The Atlantic Flyway subpopulation generally follows the Atlantic Flyway migratory path during the spring and fall. The Mississippi/Central Flyway subpopulation nests in the central and western portion of the Great Lakes and the north-central plains and generally migrates along the Mississippi Flyway and/or the Central Flyway corridor. The double-crested cormorants that occur in Ohio would primarily be a part of the Mississippi/Central Flyway subpopulation (Dolbeer 1991, Scherr et al. 2010, Guillaumet et al. 2011, Chastant et al. 2014).

The lower limit of the Potential Take Limit model developed by the USFWS estimated an allowable take of 74,396 double-crested cormorants per year in the central and eastern United States would maintain the current double-crested cormorant population (see Section 5.2 in USFWS (2017) and Appendix 1 in USFWS (2017)), which would include the cumulative take of double-crested cormorants in Ohio. However, the USFWS chose to limit the allowable take in the central and eastern United States to 51,571 double-crested cormorants per year based on the cumulative take of double-crested cormorants reported by all entities issued depredation permits from 2010 through 2015, which is below the lower limit of allowable take predicted by the Potential Take Limit model. In 2019, the USFWS increased the threshold of cumulative take to 74,396 double-crested cormorants in the central and eastern United States. This was the result of increased requests for assistance to manage cormorant damage. The Potential Take Limit model developed by the USFWS predicts the cumulative take of double-crested cormorants at this level would maintain the current population.

The Potential Take Limit model developed by the USFWS estimates the maximum allowable take of double-crested cormorants; however, the maximum allowable take is not a prescribed take level for double-crested cormorants. The Potential Take Limit model predicts the maximum allowable annual take that corresponds with a biologically sustainable level of annual take. The take of double-crested cormorants by WS would occur as allowed by the USFWS. The USFWS determined the allowed cumulative take levels authorized in the central and eastern United States, including allowed cumulative take in Ohio, would maintain the current double-crested cormorant population (see Section 5.4 in USFWS (2017), Table 5-2 in USFWS (2017), and Appendix 1 in USFWS (2017)).

With management authority over bird populations, the USFWS could adjust take levels, including the take by WS and the cooperating agencies, to achieve population objectives for double-crested cormorants. Consultation and reporting of take by WS and the cooperating agencies would ensure the USFWS had the opportunity to consider the impacts of cormorant management in Ohio. The annual take of double-crested cormorants by WS and the cooperating agencies would not exceed the levels authorized by the USFWS. WS and the cooperating agencies would submit annual reports to the USFWS listing the number of double-crested cormorants lethally removed so the USFWS had the opportunity to evaluate WS' activities and the cumulative take occurring for double-crested cormorants. In addition, WS and the cooperating agencies would monitor activities to ensure those activities remained within the impact parameters analyzed in this EA.

The USFWS developed a Potential Take Limit model to ensure the authorized cumulative take of double-crested cormorants in the central and eastern United States would maintain double-crested cormorant populations. If the USFWS continues to use the Potential Take Limit model and continues to authorize cumulative take within the allowable take limits predicted by the model, the cumulative take of double-crested cormorants should maintain current population levels. For a detailed discussion of the Potential Take Limit model and its application, please see Appendix 1 in the EA developed by the USFWS for issuing depredation permits to manage damage caused by double-crested cormorants (USFWS 2017).

### **Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

WS could continue to provide those persons requesting assistance with managing damage and threats associated with double-crested cormorants with technical assistance as described in Alternative 1. Additionally, WS could provide direct operational assistance, but would only utilize nonlethal techniques. Persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods.

This alternative would place the immediate burden of lethal direct operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Those persons experiencing damage or threats could take action using legally available methods. The provision of technical assistance and nonlethal direct operational assistance by WS is unlikely to increase the number of animals addressed because those individuals experiencing damage likely would employ both lethal and nonlethal methods in the absence of WS' assistance.

#### *Direct, Indirect, and Cumulative Effects:*

Although impacts depend greatly upon the experience, training, and methods available to the individuals conducting the double-crested cormorant damage management, direct and indirect impacts on target bird populations would likely be the same regardless of who is conducting them. Impacts to target bird populations could be less than Alternative 1 if less experienced individuals are not able to lethally remove or disperse as many birds as trained WS biologists/technicians. However, less skilled individuals could lethally remove more individual birds than necessary to mitigate damage if they do not fully understand the species' biology or behavior. It is still unlikely that significant direct or indirect effects would occur to target species by implementation of this alternative. Risks of cumulative impacts to target bird populations from actions by non-WS entities are potentially lower than with Alternative 3 because WS would be able to provide assistance with nonlethal BDM. However, impacts from actions are likely similar among all alternatives.

Both the ONWR and ODW could still lethally remove double-crested cormorants on the Lake Erie islands without assistance from WS under this alternative. Therefore, WS anticipates the lethal take of double-crested cormorants to continue to occur by other entities if WS implements Alternative 2 and expects the cumulative effects to be similar to those discussed for Alternative 1.

### **Alternative 3 – Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

WS would not conduct technical or direct operational assistance to reduce threats or alleviate damage associated with double-crested cormorants. WS would not be involved with any aspect of managing damage associated with cormorants and therefore would have no direct impact on cormorant populations.

All requests for assistance received by WS to resolve damage caused by double-crested cormorants would be referred to the USFWS and the ODW.

Despite no involvement by WS in resolving damage and threats associated with double-crested cormorants, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods.

This alternative would place the immediate burden of operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Persons experiencing damage or threats could take action using legally available methods to resolve or prevent damage as permitted by federal, state, and local laws and regulations.

*Direct, Indirect, and Cumulative Effects:*

Local cormorant populations could decline, stay the same, or increase depending on actions taken by persons experiencing double-crested cormorant damage. While WS would provide no assistance under this alternative, other individuals or entities could conduct lethal damage management resulting in direct or indirect impacts similar to the proposed action. Both the ONWR and ODW could still lethally remove double-crested cormorants on the Lake Erie islands without assistance from WS. Since cormorants would still be removed under this alternative, the potential direct, indirect, and cumulative effects on the populations of cormorants would be similar among all the alternatives for this issue. However, without WS's expertise in guiding individual efforts, the risk of direct, indirect, or cumulative impacts has the potential to be greater in this alternative.

Similar to Alternative 2, WS would have no direct effect on the double-crested cormorant population because no take of double-crested cormorants would occur by WS. WS anticipates the lethal take of double-crested cormorants would continue to 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 the other alternative approaches. Therefore, WS anticipates the direct effects associated with implementing Alternative 3 would be similar to those direct effects discussed for Alternative 1 because the lethal take of double-crested cormorants in the state would continue to occur by other entities.

**Issue 2 - Effects on the populations of nontarget wildlife species, including threatened and endangered species**

A concern is often raised about the potential impacts to nontarget animal populations, including threatened and endangered species, from the use of methods to resolve damage associated with double-crested cormorants. The potential effects are analyzed below.

**Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

The potential adverse effects to nontargets occur from the employment of methods to address damage associated with double-crested cormorants. Standard Operating Procedures discussed in Chapter 2 ensure risks to nontarget animals, including threatened and endangered species, would be reduced or prevented under the proposed action / no action alternative. Pertinent SOPs include not only the WS Decision Model (WS Directive 2.201) but also several other SOPs including the following: WS personnel are trained and experienced in the identification of animal damage, the identification of animals responsible for the damage, and in the selection of and implementation of methods which are as species-specific as possible, thus reducing the risks to nontarget animals including threatened and endangered species. Management actions are directed towards specific animals or groups of animals responsible for causing



damage or posing threats. WS consults with the USFWS and the ODW to determine the potential risks to federally and state listed threatened and endangered species in accordance with the ESA and state laws. Nonlethal methods are given priority when addressing requests for assistance (WS Directive 2.101).

WS could also use firearms if WS implements Alternative 1. Although WS could use firearms to take double-crested cormorants, the noise produced when using a firearm can also elicit a fright response in double-crested cormorants and nontarget animals. Some nonlethal methods mimic the noise produced by a firearm, such as propane cannons, and the noise produced by nonlethal methods (e.g., pyrotechnics) would likely cause a similar flight response to the noise produced by a firearm. Therefore, if WS implements Alternative 1, the use of a firearm by WS' personnel would elicit a similar flight response to the response from using other nonlethal methods that use noise as a negative stimulus. To limit redundancy, a discussion on the potential direct effects associated with the noise produced when using a firearm does not occur for Alternative 1 because those potential effects would be similar to those effects discussed for Alternative 2 but those potential effects could possibly occur if WS' implemented Alternative 1.

#### *Nonlethal Methods*

Nonlethal methods have the potential to cause adverse effects to nontargets primarily through physical exclusion, frightening devices, deterrents or repellants (see Appendix B). The use of frightening devices, deterrents or repellants may also disperse nontarget species from the immediate area where they are employed. However, the potential impacts to nontargets, like the impacts to target species, are expected to be temporary. WS would not employ or recommend these methods be employed over large geographic areas or at such intensity that essential resources would be unavailable and that long-term adverse impacts to nontarget populations would occur. When employing nest destruction, WS would identify the species of birds responsible for building the nest prior to destruction which would eliminate impacts to nontargets.

Nonlethal methods are generally regarded as having minimal impacts on populations because individuals are unharmed. Therefore, nonlethal methods would not have any significant adverse impacts on nontarget populations of wildlife including threatened and endangered species under this alternative.

#### *Lethal Methods*

In situations where shooting was selected as an appropriate method, identification of an individual target would occur prior to application, minimizing risks to nontargets. Additionally, suppressed firearms would be used when appropriate to minimize noise impacts to nontargets. WS' recommendation that shooting be used would not increase risks to nontargets. Shooting would be selective for target species and the unintentional lethal removal of nontargets would not likely increase based on WS' recommendation of the method.

Nontarget species captured during the implementation of nonlethal capture methods can usually be released prior to euthanasia which occurs subsequent to live-capture. Therefore, no adverse effects to nontargets would occur from the use of euthanasia methods by WS under this alternative. Similarly, WS' recommendation of euthanasia methods would not increase risks to nontargets because these methods are selective for target species and the unintentional euthanasia of nontargets would not likely increase based on WS' recommendation of the method.

### *Sensitive Species*

Eagles may occur in or near areas where damage management activities are conducted. Routine activities conducted by WS' personnel under the proposed action / no action alternative could occur in areas where eagles are present, which could disrupt the current behavior of an eagle or eagles that are nearby during those activities. As discussed previously, "take" as defined by the Bald and Golden Eagle Protection Act, includes those actions that "disturb" eagles. Disturb has been defined under 50 CFR 22.3 as those actions that cause or are likely to cause injury to an eagle, a decrease in productivity, or nest abandonment by substantially interfering with their normal breeding, feeding, or sheltering behavior.

WS has reviewed those methods available under the proposed action / no action alternative and the use patterns of those methods. The routine measures that WS conducts would not meet the definition of disturb requiring a permit for the take of eagles. The USFWS states, "Eagles are unlikely to be disturbed by routine use of roads, homes, or other facilities where such use was present before an eagle pair nesting in a given area. For instance, if eagles build a nest near your existing home, cabin, or place of business you do not need a permit." (United States Fish and Wildlife Service 2007). Therefore, activities that are species specific and are not of a duration and intensity that would result in disturbance as defined by the Act would not result in non-purposeful take (e.g., unintentional disturbance of an eagle). Activities, such as walking to a site, discharging a firearm, riding an all-terrain vehicle or driving a boat, generally represent short-term disturbances to sites where those activities take place. WS would conduct activities that are located near eagle nests using the National Bald Eagle Management Guidelines (United States Fish and Wildlife Service 2007). The categories that encompass most of these activities are Category D (off-road vehicle use), Category F (non-motorized recreation and human entry), and Category H (blasting and other loud, intermittent noises). These categories generally call for a buffer of 330 to 660 feet for category D and F, and a ½-mile buffer for category H. WS would take active measures to avoid disturbance of bald eagle nests by following the National Bald Eagle Management Guidelines. However, other routine activities conducted by WS do not meet the definition of "disturb" as defined under 50 CFR 22.3. Those methods and activities would not cause injuries to eagles and would not substantially interfere with the normal breeding, feeding, or sheltering behavior of eagles. The number of bald eagles observed in the eastern U.S. along routes surveyed during the Breeding Bird Survey has shown an increasing trend estimated at 8.6% since 1966 and 13.0% from 2003–2013 (Sauer et al. 2017). The ODW recently completed a statewide bald eagle nest census that documented over 700 nests in Ohio. This was a 150% increase over the last eagle nest census in 2012. Eagle nests can now be found in 85 of Ohio's 88 counties (ODW pers. Comm. 2020).

Eagles may occur in or near areas where lethal methods outlined under the proposed action/no action alternative are used. WS has reviewed those methods and the use patterns of those methods and determined that SOPs that WS uses while conducting damage management activities makes it nearly impossible that eagles could be lethally removed. However, it is possible that lethal methods could "disturb" eagles as outlined above.

Another common concern would be the direct effects of WS' personnel conducting activities within a colony of nesting double-crested cormorants, which could disturb other co-nesting colonial waterbirds. Activities within a nesting colony of double-crested cormorants would primarily be associated with requests for assistance with discouraging double-crested cormorants from nesting at a location to prevent or limit the loss of vegetation from accumulations of fecal droppings and the nesting behavior of double-crested cormorants. If other colonial waterbirds are also nesting at the location or nearby, WS' personnel could disturb those waterbirds while conducting activities within the nesting colony of double-crested cormorants or as personnel approach a nesting colony of double-crested cormorants.

If adults of co-nesting species are startled from their nest for too long or at the wrong time of day, there is the potential for increased mortality rates of eggs and chicks. However, in most instances, co-nesting birds may temporarily leave the immediate vicinity of scaring, but usually return after conclusion of the action. Moore (2005) evaluated the impact on co-nesting great blue herons and great egrets on Lake Ontario from activities to remove double-crested cormorants. For both great blue herons and great egrets, there was no impact on the proportion of time that great blue herons and great egrets spent attending nests between control and treatment sites for the interval prior to the removal of double-crested cormorants, the intervals between double-crested cormorant removal efforts, and the period after double-crested cormorant removal was completed. However, nest attendance by great blue herons and great egrets declined for both species during double-crested cormorant removal periods ( $35 \pm 20$  min). Great blue herons disturbed during the removal of double-crested cormorants returned to the nest in 11 to 14 minutes (longest unattended= $50 \pm 30$  min) and all egrets returned to nests before the removal of double-crested cormorants had ended (longest unattended= $6 \pm 4$  min). In addition, there was no difference in the nest success of great blue herons or great egrets between treated and untreated sites.

In the Great Lakes, Wyman et al. (2018) found that colony growth of great blue herons co-nesting with double-crested cormorants showed little response to double-crested cormorant abundance and activities to manage co-nesting double-crested cormorants. However, Wyman et al. (2018) found the growth of black-crowned night-herons colonies responded negatively to both increasing double-crested cormorants co-nesting at a location and from activities associated with managing double-crested cormorants at a location.

Similar findings have been reported in Ohio from studies conducted on West Sister Island (ODW unpublished data). Shooters were paired with observers who studied the co-nesting species and recorded disturbance behavior (or lack thereof) during 2006-2010. Observations were used to improve management operations in order to reduce disturbance to co-nesting species. Data from the observers showed that approximately 60% of observed waterbirds did not leave their nests during cormorant removal and waterbirds that did leave were only away for an average of approximately 8 minutes (ODW unpublished data). Based on data collected additional management standards were implemented for minimizing risks to nesting waterbirds. These standards included minimizing the number of trips to the colony during the nesting season and conducting management visits only when temperatures were warm enough to protect eggs if an incubating bird was flushed from the nest. Other standards included staying more than 30m from colonial wader nests whenever possible and conducting research and management trips as quickly and efficiently as possible. Finally, in general, the area used by the nesting population of black-crowned night-herons is avoided.

#### *Direct, Indirect, and Cumulative Effects:*

The analysis to determine the impacts on nontargets from the use of both lethal and nonlethal methods is based on a measure of the number of individuals lethally removed. The lethal removal of nontarget species is expected to be infrequent and not at levels that would cause significant adverse effects to those species' populations.

WS continually monitors, evaluates and makes modifications as necessary to methods or strategy when providing direct operational assistance, to not only reduce damage but also to minimize potentially harmful effects to nontargets. Additionally, WS would annually report lethal removal to the USFWS or ODW, which ensures cumulative impacts are considered as part of population management objectives. Unintentional lethal removal could result in declines in the number of individuals in a population;

however, the lethal removal of nontarget animals by WS under the proposed action would not likely reach a magnitude where adverse effects would occur to the population of any species.

*Threatened and Endangered Species:*

Special efforts are made to avoid jeopardizing threatened and endangered species. Threatened and endangered species listed by the USFWS under the ESA for Ohio can be found in Appendix C. These lists were obtained and reviewed during the development of this EA.

***Federally Listed Species*** - 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 Ohio under the sole jurisdiction of the National Marine Fisheries Service, including any designated critical habitat. In addition, WS has made a no effect determination for several species currently listed in the state based on those methods currently available and based on current life history information for those species. For several species listed within the state, 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.

The USFWS concurred with WS’ determination that activities conducted pursuant to the proposed action would not likely adversely affect those species (USFWS Ecological Services concurrence letter on February 10, 2020)).

***State Listed Species*** - Appendix C shows those species designated by the ODW as threatened or endangered within the state. The WS program in Ohio has also reviewed the list of species the ODW has designated as threatened or endangered. Based on the review of species listed in the state, WS has determined that the proposed activities may affect but are not likely to adversely affect those species currently listed as threatened or endangered by the ODW. WS would continue to review the species listed as threatened or endangered by the ODW. As appropriate, the WS program would consult with the ODW when WS determines activities may affect a threatened or endangered species designated by the ODW.

Because double-crested cormorant damage management is intended to protect vegetation on the Ohio Lake Erie islands, this action is likely to have a beneficial impact on State-listed bird species by virtue of protecting their habitat and is also likely to benefit the State-listed plant species, especially the rock elm which is located in the portion of Green Island that is currently being used by nesting double-crested cormorants. Vegetation surveys and monitoring at West Sister Island have occurred in an effort to determine the effects of double-crested cormorant damage management on the regrowth of herbaceous vegetation and canopy cover. Baseline canopy and understory herbaceous data were gathered in 2006 and subsequent surveys were conducted in 2007, 2008 and 2010. While no statistically significant conclusions can be made from the data, there does seem to be an overall, positive vegetation response to double-crested cormorant management on an island-wide scale (ONWR pers. Communications 2018) (Figure 1).



**Figure 2.** Perimeter photographs of the same point on West Sister Island documenting vegetative change due to tree mortality in a double-crested cormorant (*Phalacrocorax auritus*) nesting area from before management actions 2002 (top left) and 2005 (top right) and after management began 2007 (bottom left) and 2015 (bottom right). Photos courtesy of the USFWS Ottawa National Wildlife Refuge.

The black-crowned night-heron is listed as threatened in Ohio by the ODW. Black-crowned night-herons historically nested at 19 colonies in Ohio but currently occupy only five of those sites. The largest colony, West Sister Island, represents an important breeding area for many species of wading birds and currently hosts most of the night heron breeding population in Ohio. In a recent report to the ODW, researchers with The Ohio State University, School of Environment and Natural Resources, analyzed colonial waterbird nest numbers on West Sister Island for population trends. Over the past 26 years, black-crowned night-heron and great blue heron nest numbers have declined, while double-crested cormorants have increased at West Sister Island. However, the trends in night-heron and cormorant populations appear to have stabilized over time and coincides with the initiation of double-crested cormorant damage management in 2006 (Tonra 2019).

### **Summary of nontarget animal impact analysis**

Based on WS' determination, the employment of methods by WS would not likely adversely directly or cumulatively affect any nontargets, including federally or state threatened and endangered species. No potential indirect effects were identified. WS continually monitors, evaluates and makes modifications as necessary to methods or strategy when providing direct operational assistance, to not only reduce damage but also to minimize potentially harmful effects to nontargets. Additionally, WS consults with the USFWS and the ODW to determine the potential risks to eagles and federally and state listed threatened and endangered species in accordance with the Bald and Golden Eagle Protection Act, ESA and state laws and annually reports to these entities to ensure that any nontarget lethal removal by WS is considered as part of management objectives. Potential direct and cumulative impacts to nontargets, including threatened and endangered species, from the recommendation of methods by WS under this alternative would be expected to be insignificant.

## **Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

WS could continue to provide assistance with managing double-crested cormorants via technical assistance as described in Alternative 1. Additionally, WS could provide direct operational assistance, but would only utilize nonlethal techniques. Despite this, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods.

This alternative would place the immediate burden of lethal direct operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action. The provision of technical assistance and nonlethal direct operational assistance by WS is unlikely to increase the number of animals addressed because those individuals experiencing damage likely would employ both lethal and nonlethal methods in the absence of WS' assistance.

### *Direct, Indirect, and Cumulative Effects:*

It is possible that implementation of damage management methods by non-WS entities could lead to unknown direct or indirect effects to nontarget species populations, including T&E species. Hazards to T&E species could be more variable under this alternative than Alternative 1. Direct effects on nontarget wildlife from nonlethal methods of cormorant damage management conducted by WS would be similar to Alternative 1. Indirect effects on nontarget species could occur when implementing exclusionary devices if the area is large enough, but these indirect effects are expected to be minimal. Additionally, WS would not be conducting work in sensitive habitats unless requested, and in conjunction with the appropriate regulatory agency. The ability to reduce negative effects caused by double-crested cormorants to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing double-crested cormorant damage management techniques. While cumulative impacts would be variable, WS does not anticipate any significant cumulative impacts from this alternative.

## **Alternative 3 – Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

WS would not be involved with any aspect of managing damage associated with double-crested cormorants. Therefore, WS would have no direct impact to nontargets or threatened and endangered species under this alternative. All requests for assistance received by WS to resolve damage associated with cormorants would be referred to the USFWS and the ODW.

Despite no involvement by WS in resolving damage and threats associated with cormorants, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods. This alternative would place the immediate burden of operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action.

*Direct, Indirect, and Cumulative Effects:*

No direct or indirect impacts to nontarget wildlife or T&E species would occur by WS under this alternative. The ability to reduce damage and threats of damage caused by double-crested cormorants to other wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing damage management actions under this alternative. The risks to nontarget species and T&E species would be similar across the alternatives since most of those methods described in Appendix B would be available across the alternatives. If those methods available were applied as intended, direct, indirect, and cumulative effects to nontarget species would be minimal to non-existent. If methods available were applied incorrectly or applied without knowledge of bird behavior, risks to nontarget wildlife would be higher under this alternative. Therefore, adverse direct, indirect, or cumulative impacts to nontarget species, including T&E species, could occur under this alternative; however, WS does not anticipate any significant cumulative impacts.

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

Both chemical and non-chemical methods have the potential to have adverse direct, indirect or cumulative effects on human health and safety. Risks can occur both to persons employing methods and persons coming into contact with methods. Risks can be inherent to the method itself or related to the misuse of the method. Potential effects of damage management activities on human health and safety under each of the three alternatives are analyzed below.

**Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

Standard Operating Procedures discussed in Chapter 2 ensure risks to human health and safety would be reduced or prevented. Pertinent SOPs include not only the WS Decision Model (WS Directive 2.201), an evaluation process for the appropriateness of methods (WS Directive 2.101) and the use of integrated management (WS Directive 2.105), but also several other precautions including the following. WS identifies hazards in advance of work assignments and provides employees with personal protective equipment (PPE). WS employees must adhere to safety requirements and use appropriate PPE. WS employees are required to work cooperatively to minimize hazards and immediately report unsafe working conditions (WS Directive 2.601). Damage management activities would be conducted away from areas of high human activity (e.g., in areas closed to the public) or during periods when human activity is low (e.g., early mornings, at night) to the extent possible. WS would only conduct cormorant damage management activities on a given property in response to a request for assistance after the property owner or manager has signed a document agreeing to allow the use of specific methods on property they own and/or manage. Although hazards to human health and safety from both nonlethal and lethal methods exist, those methods would generally be regarded as safe when used by individuals trained and experienced in their use and with regard and consideration of possible risks to human health and safety.

*Direct, Indirect, and Cumulative Effects:*

Non-chemical methods available for use under any of the alternatives are live-capture devices (e.g., drive traps, cannon/rocket nets), frightening devices (e.g., pyrotechnics, paintballs) or shooting (see Appendix B). The risk most live-capture devices pose to human health and safety are small to non-existent. These types of devices can only be triggered through direct activation of the device. Therefore, if left undisturbed, these devices would pose no risk. WS would use these devices in compliance with applicable federal, state and local laws and regulations (WS Directive 2.210) as well as WS Directives.

WS would not implement these methods in locations or in such a manner that they would pose hazards to WS staff or the public. When recommending these methods, WS would caution against their misuse. The risks to human health and safety would be similar among all the alternatives because the use of these methods would be available under any of the alternatives, and their use could occur whether WS was consulted or not.

WS personnel are trained and experienced in the use of cannon/rocket nets, net guns, pyrotechnics, paintball markers, and firearms. WS employees who use these methods must comply with WS Directive 2.615 and all standards described in the WS Firearms Safety Training Manual. Directive 2.615 requires that personnel undergo regular training, adhere to a set of safety standards, submit to drug testing, and are subject to the Lautenberg Amendment. WS' recommendation that cannon/rocket nets, net guns, pyrotechnics, paintball markers, or shooting be used would not increase risks to human health and safety above those already inherent. Risks associated with these methods are minimal when used appropriately and with consideration of human safety. WS would caution against their improper use when recommending that these methods be used. The risks to human health and safety would be similar among all the alternatives because the use of these methods would be available under any of the alternatives and their use could occur whether WS was consulted or not.

The direct, indirect or cumulative risks to human safety from the use of chemical and non-chemical methods, when used appropriately and by trained personnel, is considered insignificant. The amount of chemicals used or stored by WS and cooperating agencies would be minimal to ensure human safety. Based on potential use patterns, the chemical and physical characteristics of the above mentioned chemical methods, and factors related to the environmental fate, no significant direct, indirect or cumulative impacts are expected from the chemical components used or recommended by the WS program. No significant impacts to human safety occurred from WS' use of methods to alleviate damage associated with double-crested cormorants in Ohio.

### **Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

This alternative would place the immediate burden of lethal direct operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action. The provision of technical assistance and nonlethal direct operational assistance by WS is unlikely to increase the number of animals addressed or limit the ability to lethally remove birds because those individuals experiencing damage likely would employ both lethal and nonlethal methods in the absence of WS' assistance.

#### *Direct, Indirect, and Cumulative Effects:*

Risks to human health and safety from WS use of or recommendation of nonlethal methods under this alternative would be similar to the proposed action / no action alternative. Private use of lethal methods would be expected to increase under this alternative. This may result in less experienced persons implementing lethal damage management methods which may result in greater risks to human health and safety than the proposed action/no action alternative. Potential impacts to human health and safety from the recommendation of lethal methods by WS under this alternative would be variable. If lethal methods were employed as recommended by WS and according to label requirements, in the case of chemical methods, impacts to human health and safety would likely similar to the proposed action / no action



alternative. However, if lethal methods were not employed as recommended or methods that are not recommended were employed, impacts could increase. However, impacts would not be expected to be significant.

### **Alternative 3 – Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

WS would have no direct impact on human health and safety under this alternative. All requests for assistance received by WS to resolve damage caused by cormorants would be referred to the USFWS and the ODW. Despite no involvement by WS in resolving damage and threats associated with cormorants, those persons experiencing damage could continue to alleviate damage by employing both non-chemical and chemical methods. This alternative would place the immediate burden of lethal operational damage management work on the resource owner, other government agencies, private businesses and/or private individuals. Persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action.

#### *Direct, Indirect, and Cumulative Effects:*

Potential impacts to human health and safety would be variable under this alternative. If direct operational assistance and technical assistance is not provided by WS or other entities, it is possible that frustration caused by the inability to reduce damage and threats along with ignorance on how best to reduce damage and threats could lead to the inappropriate use of legal methods and the use of illegal methods. Illegal, unsafe, and environmentally unfriendly actions could lead to higher risk to health and safety. However, if appropriate direct operational assistance and technical assistance was provided by persons knowledgeable and experienced in managing damage caused by cormorants (e.g. ODW or USFWS), the risks would be similar to the other alternatives. Additionally, impacts would not be expected to be significant.

### **Issue 4 - Humaneness and Animal Welfare Concerns of Methods**

Humaneness and animal welfare concerns associated with methods available to reduce damage associated with double-crested cormorants has been identified as an issue. The humaneness and animal welfare concerns of the methods as they relate to the alternatives are discussed below.

### **Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

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. The challenge in coping with this issue is how to achieve the least amount of animal suffering. WS could employ or recommend methods viewed as inhumane by some persons. This could include WS killing, capturing and subsequently killing, or immobilizing and subsequently killing target animals using the best and most appropriate method(s) available. WS’ use of methods under the proposed action / no action alternative would adhere to applicable state and local laws and regulations as well as WS’ Directives (see Appendix B for WS Directives specific to methods). WS would caution against their misuse when recommending methods.

The AVMA states “... euthanasia is the act of inducing humane death in an animal” and that “... if an animal’s life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible” (American Veterinary Medical Association 2013). Additionally, euthanasia methods should minimize any stress and anxiety experienced by the animal prior

to unconsciousness.” Although use of euthanasia methods to end an animal’s life is desirable, as noted by the AVMA, 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 use terms such as killing, collecting, or harvesting, recognizing that a distress-free death may not be possible (American Veterinary Medical Association 2013).

American Veterinary Medical Association (2013) notes, “While recommendations are made, it is important for those utilizing these recommendations to understand that, in some instances, agents and methods of euthanasia identified as appropriate for a particular species may not be available or may become less than an ideal choice due to differences in circumstances. Conversely, when settings are atypical, methods normally not considered appropriate may become the method of choice. Under such conditions, the humaneness (or perceived lack thereof) of the method used to bring about the death of an animal may be distinguished from the intent or outcome associated with an act of killing. Following this reasoning, it may still be an act of euthanasia to kill an animal in a manner that is not perfectly humane or that would not be considered appropriate in other contexts. For example, due to lack of control over free-ranging wildlife and the stress associated with close human contact, use of a firearm may be the most appropriate means of euthanasia. Also, shooting a suffering animal that is in extremis, instead of catching and transporting it to a clinic to euthanize it using a method normally considered to be appropriate (e.g., barbiturates), is consistent with one interpretation of a good death. The former method promotes the animal’s overall interests by ending its misery quickly, even though the latter technique may be considered to be more acceptable under normal conditions (Yeates 2010). Neither of these examples, however, absolves the individual from her or his responsibility to ensure that recommended methods and agents of euthanasia are preferentially used.”

American Veterinary Medical Association (2013) recognizes that there is “an inherent lack of control over free-ranging wildlife,” accepting that firearms may be the most appropriate approach to their euthanasia, and acknowledging that the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia (i.e., distinguishes between euthanasia and methods that are more accurately characterized as humane killing). Because of the variety of situations that may be encountered, it is difficult to strictly classify methods for termination of free-ranging wildlife as acceptable, acceptable with conditions, or unacceptable. Furthermore, classification of a given method as a means of euthanasia or humane killing may vary by circumstances. These acknowledgments are not intended to condone a lower standard for the humane termination of wildlife. The best methods possible under the circumstances must be applied, and new technology and methods demonstrated to be superior to previously used methods must be embraced.

#### *Direct, Indirect, and Cumulative Effects:*

The efficacy and therefore, the humaneness of methods would be based on the skill and knowledge of the person employing methods. WS personnel are experienced professionals skilled in their use of methods. When selecting methods, WS evaluates all potential tools for their humaneness, effectiveness, ability to target specific species and individuals, as well as other factors. Consequently, management methods would be implemented by WS in the most humane manner possible. The issue of humaneness associated with methods and any direct impacts would be similar across any of the alternatives since those methods could be employed in the absence of WS’ involvement. 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. SOPs that would be incorporated into WS’ activities to ensure methods were used by WS as humanely as possible are listed in Chapter 2.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations where nonlethal damage management methods are not practical or effective. No indirect adverse impacts were identified for this issue.

### **Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

This alternative would place the immediate burden of lethal direct operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action. The provision of technical assistance and nonlethal direct operational assistance by WS is unlikely to increase the number of animals addressed because those individuals experiencing damage likely would employ both lethal and nonlethal methods in the absence of WS' assistance.

Despite no direct involvement by WS in the application of lethal methods, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods. The issue of humaneness of methods under this alternative is likely to be perceived as similar to humaneness issues discussed under the proposed action / no action alternative. This perceived similarity is derived from WS' recommendation of lethal methods that some consider inhumane. WS would not directly be involved with lethal damage management activities under this alternative. However, the recommendation of the use of lethal methods would likely result in the requester employing those methods. Therefore, by recommending methods and thus a requester employing those methods, the issue of humaneness would be similar to the proposed action / no action alternative.

#### *Direct, Indirect, and Cumulative Effects:*

Private use of lethal methods would be expected to increase under this alternative. WS could instruct and demonstrate the proper use of lethal methodologies to ensure methods are used in such a way as to minimize pain and suffering. However, the efficacy of methods employed by an individual would be based on the skill and knowledge of the requester in resolving the damage despite WS' demonstration. Therefore, a lack of understanding of the behavior of cormorants or the improper identification of the animal causing damage along with inadequate knowledge and skill in using lethal methodologies to alleviate the damage or threats could lead to incidents with a greater probability of being perceived as inhumane. In those situations, the pain and suffering are likely to be regarded as greater than those discussed in the proposed action / no action alternative. However, if those persons requesting assistance from WS apply lethal methods recommended by WS as intended, with skill and knowledge similar to that of WS, then those methods would be applied as humanely as possible to minimize pain and distress and the issue of humaneness would be similar to the proposed action / no action alternative. Additionally, if those persons provided technical assistance by WS apply lethal methods not recommended by WS or do not employ methods as intended or without regard for humaneness, then the issue of method humaneness would be of greater concern since pain and distress of animals would likely be higher.

### **Alternative 3 – Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

Despite no involvement by WS in resolving damage and threats associated with cormorants, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods. Those methods would likely be considered inhumane by those persons who would consider methods proposed under any alternative as inhumane. The issue of humaneness would likely be directly linked to the methods legally available to the public since methods are often labeled as inhumane by segments of society no matter the entity employing those methods. A method considered inhumane would still be perceived as inhumane regardless of the person or entity applying the method. However, even methods generally regarded as being humane could be employed in inhumane ways. Methods could be employed inhumanely by those people inexperienced in the use of those methods or if those people were not as diligent in attending to those methods.

#### *Direct, Indirect, and Cumulative Effects:*

The efficacy and therefore, the humaneness of methods would be based on the skill and knowledge of the person employing those methods. A lack of understanding of the target species or methods used could lead to an increase in situations perceived as being inhumane 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 alleviate damage and threats associated with cormorants. Therefore, those methods considered inhumane would continue to be available for use under this alternative. If those people experiencing damage apply those methods considered humane methods as intended and in consideration of the humane use of those methods, then the issue of method humaneness would be similar across the alternatives. If those persons experiencing damage were not provided with information and demonstration on the proper use of those methods and employed humane methods in ways that were inhumane, the issue of method humaneness could be greater under this alternative. However, the level at which people would apply humane methods inhumanely under this alternative based on a lack of assistance is difficult to determine and could just as likely be similar across the alternatives.

### **Issue 5 – Effects of Damage Management Activities on the Aesthetic Values of Double-crested Cormorants**

People often enjoy watching double-crested cormorants and take pleasure from knowing they exist as part of the natural environment. Methods available to alleviate damage are intended to disperse and/or remove cormorants in the area where damage is occurring. Therefore, these activities have the potential to affect the aesthetic values of cormorants depending upon the values, philosophies, attitudes and opinions of individuals. The effects on the aesthetic value of cormorants as it relates to the alternatives are discussed below. No indirect effects were identified for this issue.

### **Alternative 1 – Continue with the Current Integrated Methods Approach to Managing Damage Caused by Double-crested Cormorants in Ohio (Proposed Action/No Action)**

The implementation or recommendation of methods by WS under this alternative would likely result in the dispersal, exclusion, or removal of individual animals to alleviate damage and threats. In some instances when animals were dispersed, excluded or removed, the ability of interested persons to observe and enjoy these animals could temporarily decline. Those animals dispersed or removed by WS under this alternative, would likely be those same animals that could and likely would be dispersed, excluded or removed by those individuals experiencing damage in the absence of assistance from WS. Since those

animals dispersed or removed by WS under this alternative could be removed by other entities, WS' involvement would not likely be additive to the number of animals that could be removed in the absence of WS' involvement. Lethal removal of those species addressed in this EA could occur through the issuance of depredation permits by the USFWS pursuant to the MBTA.

*Direct, Indirect, and Cumulative Effects:*

Since any cormorants removed by WS under this alternative could be removed with a depredation permit issued by the USFWS, WS' involvement in taking those birds would not likely be additive to the number of birds that could be removed in the absence of WS' involvement. WS' double-crested cormorant damage management activities conducted pursuant to the proposed action is not expected to cause adverse direct or indirect effects on the aesthetic value of cormorants. However, direct impacts would be variable based on public perception, and may either include an increase or decrease in aesthetic benefits based on the individual's view. Some may feel that their ability to view and enjoy cormorants decreases with damage management activities. However, WS involvement could lead to the return of additional native bird species that otherwise would not be there, which could increase the enjoyment of viewing the birds. Some aesthetic value would be gained by the removal of cormorants and the return of a more natural environment, including the return of native wildlife and plant species that may be suppressed or displaced by high double-crested cormorant densities. Other people who are exposed to cormorant damage experience a reduction of aesthetic enjoyment of wildlife because they feel that these birds are overabundant or objectionable. Continued increases in numbers of individuals or the continued presence of cormorants causing damage may lead to further degradation of some people's enjoyment of any wildlife or the natural environment. The actions of WS would positively affect the aesthetic enjoyment of wildlife or the environment for those people who were being adversely affected by the specific bird damage.

When damage caused by double-crested cormorants has occurred, any removal of birds by the property or resource owner would likely occur whether WS was involved with taking the birds or not. Therefore, the activities of WS are not expected to have any adverse cumulative impacts on this element of the human environment if occurring at the request of a property owner and/or manager. No significant cumulative impact is expected because the bird populations are a renewable resource and therefore will be replaced with new birds in the following years. The purpose of WS involvement is to alleviate the damage caused by the bird, not to manage populations. The impact on the aesthetic value of cormorants and the ability of the public to view and enjoy cormorants under the proposed action would be similar to the other alternatives and is likely to be minimal or insignificant.

**Alternative 2 – Implement an Integrated Methods Approach to Managing Double-crested Cormorant Damage in Ohio by Providing Technical Assistance and Nonlethal Direct Operational Assistance**

This alternative would place the immediate burden of lethal direct operational damage management work on the resource owner, other governmental agencies, private businesses and/or private individuals. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent damage as permitted by federal, state, and local laws and regulations or those persons could take no action. Despite no direct involvement by WS in the application of lethal methods, persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods. WS would not directly be involved with lethal damage management activities under this alternative. However, the recommendation of the use of lethal methods would likely result in the requester employing those methods. Therefore, by recommending methods and thus a requester employing those methods, the issue of aesthetics would be similar to the proposed action / no action alternative.

*Direct, Indirect, and Cumulative Effects:*

Since animals could continue to be dispersed, excluded or removed under this alternative, despite WS' lack of direct involvement in the application of lethal methods, the aesthetic values associated with cormorants would likely be similar to the other alternatives. The lack of WS' direct involvement in the implementation of lethal methods would not lead to a reduction in the number of animals lethally removed since WS has no authority to regulate the dispersal, exclusion or removal of double-crested cormorants. That authority rests with the USFWS, the ODW, local law enforcement or animal control authorities. Because those individuals experiencing damage could and likely would continue to employ both lethal methods, despite WS' lack of direct involvement under this alternative, the impacts to the aesthetic value of cormorants and any direct, indirect or cumulative impacts would be similar to the other alternatives. Impacts would only be lower than the proposed action / no action alternative if those individuals experiencing damage were not as diligent in employing methods as WS would be if conducting lethal direct operational assistance. If people experiencing damage abandoned the use of those methods then those birds associated with the damage would likely remain in the area and available for observing by those people interested in doing so.

**Alternative 3 – Provide No Assistance with Managing Damage Caused by Double-crested Cormorants in Ohio**

WS would have no direct impact on the aesthetic values of cormorant under this alternative. All requests for assistance received by WS to resolve damage associated with cormorants would be referred to the USFWS and the ODW. Despite no involvement by WS in resolving damage and threats associated with cormorants, those persons experiencing damage could continue to alleviate damage by employing both nonlethal and lethal methods.

*Direct, Indirect, and Cumulative Effects:*

Since animals could continue to be dispersed, excluded or removed under this alternative, despite WS' lack of involvement, the ability to watch or hear these animals would likely be similar to the other alternatives. The lack of WS' involvement would not lead to a reduction in the number of animals dispersed, excluded or removed since WS has no regulatory authority. That authority rests with the USFWS and the ODW. Individuals experiencing damage could and likely would continue to employ both lethal and nonlethal methods, despite WS' lack of involvement. Therefore, the impacts to the aesthetic value of cormorants and any direct, indirect or cumulative impacts would be similar to the other alternatives. Impacts would only be lower than the proposed action / no action alternative if those individuals experiencing damage were not as diligent in employing methods as WS would be if conducting direct operational assistance. If those people experiencing damage abandoned the use of those methods then the cormorants associated with the damage would likely remain in the area and available for observing by those people interested in doing so.

**3.2 ISSUES NOT CONSIDERED FOR COMPARATIVE ANALYSIS**

The following resource values in the state are not expected to be significantly impacted by any of the alternatives analyzed as none of the alternatives cause any significant ground disturbance: soils, geology, minerals, water quality/quantity, flood plains, critical habitats (areas listed in threatened and endangered species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. Therefore, these resources will not be analyzed.

WS and the cooperating agencies identified additional issues during the scoping process of this EA. WS and the cooperating agencies 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 from the Use of Lead Ammunition in Firearms***

The lethal removal of double-crested cormorants with firearms by WS to alleviate damage or threats could occur using a shotgun or rifle, including an air rifle. 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). 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 Migratory Bird Permit Program within the USFWS has implemented the requirement that people receiving depredation permits must use non-lead shot as defined under 50 CFR 20.21(j). In addition, it appears the USFWS may be moving toward incorporating the requirements of using non-lead ammunition in firearms to take migratory birds in most cases. For example, the depredation order for blackbirds was recently amended to include the requirement that entities use non-lead ammunition when using firearms to take depredating blackbirds, except when using an air rifle or an air pistol (see 50 CFR 21.43(d)).

The take of double-crested cormorants by WS in the state could occur from the use of shotguns. WS would only use non-lead shot as defined in 50 CFR 20.21(j) when using shotguns. However, WS' personnel could use rifles and air rifles to disperse or remove double-crested cormorants 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 double-crested cormorants, 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 double-crested cormorants.

However, deposition of lead into soil could occur if, during the use of a rifle or air rifle, the projectile passed through a double-crested cormorant, 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 8 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 double-crested cormorant damage using rifles, as well as most other forms of hunting in general, lead contamination from such sources would be minimal to nonexistent.

Based on current information, the risks associated with lead bullets that WS' activities could deposit into the environment due to misses, the bullet passing through the carcass, or from double-crested cormorant 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 in such a limited area that would result in large accumulations of lead in the soil.

Carcasses of double-crested cormorants killed would be disposed of in accordance with applicable Federal, State, local regulations and applicable permits. Disposal methods could include burial at landfills, incineration, composting or donation for research projects. Composting would be conducted in accordance with applicable state, federal and local laws and regulations. In the past there was concern that composting cormorants from management actions on the Lake Erie islands would concentrate unsafe levels of mercury in the soil that might harm the environment. In response to this concern the ODW and ONWR agreed to test the double-crested cormorant compost sites at West Sister Island, Green Island, and Turning Point Island for mercury. Cormorants taken on West Sister Island were composted within 3 sites on that island. A single compost site has been used at Green Island and at Turning Point Island, though composting has ceased on Turning Point Island in recent years. Cormorants taken at Turning Point Island are now collected and disposed of in a landfill. At each island, samples were collected under 4 different conditions: compost sites, soil adjacent to compost sites, soil at locations of high cormorant nest concentrations, and soil at locations that have a history of little or no colonial bird nesting activity. Compost sites were tested for mercury levels in 2007, 2010 and 2014. Results show mercury levels below the legal threshold of 0.2 mg/L as set by the Ohio Environmental Protection Agency. For double-crested cormorant take outside of the Lake Erie islands, carcasses will be collected and disposed of according to standard conditions for Migratory Bird Depredation Permits (50 CFR 21.41; i.e. burial, incineration, or donation to an approved/permitted institution).

There may be specific situations where the retrieval of double-crested cormorant carcasses is not feasible or would result in considerable disturbance to other nesting nontarget birds, some of which are state-listed species. Risks will be minimized through consultation and coordination with land and resource managers and through the use of non-lead ammunition.

### ***Effects of Double-crested Cormorant Damage Management Activities on Biodiversity***

An issue identified as a concern is that managing cormorant damage could affect biodiversity or the diversity of species. When managing damage, WS does not attempt to eradicate any species of native wildlife. The purpose of damage management is to reduce or alleviate the damage or threats of damage by targeting individuals or groups of animals identified as causing damage or posing a threat of damage. Double-crested cormorants are managed by the USFWS and or the ODW. Lethal removal of these animals can only occur at the discretion of the USFWS and or the ODW, which ensures that removal occurs to achieve desired population objectives for these species. Any reduction of a local population would be temporary because immigration from adjacent areas or reproduction would replace those animals removed. Therefore, damage management activities conducted pursuant to any of the alternatives would not adversely affect biodiversity.



***Double-crested cormorant damage management as described in the Proposed Action is contrary to the purpose and mission of a National Wildlife Refuge and Wilderness Area***

West Sister Island is a Federal Wilderness Area and National Wildlife Refuge. Some individuals may be concerned that the management of double-crested cormorants described in the Proposed Action would compromise the wilderness characteristics of the site. Others may feel that a National Wildlife Refuge should be a sanctuary for all species and that it is inconsistent with the purpose of a "refuge" to allow the killing of double-crested cormorants. West Sister Island was designated a migratory bird refuge in 1937 to protect the heron rookery located there and designated as a Federal wilderness in 1975 primarily because of its value as a heron and egret rookery. The USFWS, National Wildlife Refuge System, draft Wilderness Stewardship Policy Part 610 establishes a Non-degradation Principle (USFWS 2008). This concept specifies that, at the time of wilderness designation, the conditions prevailing in an area establish a benchmark of that area's wilderness values, and that the USFWS will not allow these conditions to be degraded. Securing "an enduring resource of wilderness" by maintaining and restoring, where appropriate, a wilderness area's biological integrity, diversity, environmental health, and wilderness character is one of the key guiding principles for wilderness management established by the USFWS (USFWS 2008).

The CCP establishes a number of wildlife and habitat goals including: 1) a wildlife management goal to preserve and protect the largest wading bird colony within the Great Lakes ecosystem in accordance with the national wilderness designation; and 2) a habitat management goal to provide habitat conditions favorable to colonial nesting wading birds without compromising the wilderness integrity (USFWS 2000). The habitat management goal included an objective of maintaining nesting habitat for approximately 1,000 great blue herons, 800 great egrets, 500 black-crowned night-herons and 1,500 DCCOs (1998 population levels) (USFWS 2000).

The West Sister Island population of breeding double-crested cormorants exceeded the management goal in 1999 and appeared to be having a negative effect on the vegetation at West Sister Island which is essential habitat for the great blue herons, great egrets and black-crowned night-herons on the refuge. Observations of vegetation damage on West Sister Island, and the results of high double-crested cormorant nesting populations on Middle Island and East Sister Island led biologists to conclude that allowing current high or increasing numbers of double-crested cormorants to persist on the refuge without some level of management would ultimately result in decreased habitat quality for herons and egrets and may ultimately result in a decline in the ecological health and biodiversity of the refuge. Reducing the density of breeding double-crested cormorants at West Sister Island to between 1,500 and 2,000 pairs meets the CCP objectives for the double-crested cormorant population and allows the refuge to meet its management goals for herons and egrets. The USFWS Wilderness Area Management Policy allows for the inclusion of wildlife damage management in Wilderness Management Plans (USFWS 2008). West Sister Island is closed to the public, the Proposed Action will not adversely impact the public's recreational use of the site.

**3.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES UNDER THE PROPOSED ACTION / NO ACTION ALTERNATIVE**

No significant cumulative environmental impacts are expected from any of the three Alternatives. Under the proposed action /no action alternative, the lethal removal of double-crested cormorants by WS would not have a significant impact on overall populations, but some short-term local reductions may occur. WS would not have a significant direct, indirect or cumulative impact on nontarget animal populations or

threatened and endangered species. Under the proposed action / no action alternative, direct impacts to human health and safety would be low, and indirect and cumulative impacts would be eliminated when methods are used appropriately in adherence with SOPs and label requirements by trained personnel. Similarly, adherence to SOPs and selection and implementation of methods by trained personnel ensures methods would be implemented in the most humane manner possible under the proposed action / no action alternative. Any direct, indirect or cumulative impacts on humaneness would be in part up to a person's perception of humaneness and similar across the alternatives. Under the proposed action / no action alternative, the aesthetic values of cormorants are not expected to be impacted directly, indirectly or cumulatively. WS' actions taken to minimize or eliminate damage would be constrained in scope, duration and intensity, for the purpose of minimizing or avoiding impacts. WS' SOPs are designed to reduce the potential negative effects of WS' actions by identifying and responding to both anticipated and unanticipated changes in wildlife populations and the environment. WS continually monitors, evaluates and makes modifications as necessary to methods or strategy when providing assistance, to not only reduce damage, but also to identify and minimize potentially harmful effects. This process allows WS to take into consideration other influences in the environment in order to avoid adverse impacts. Although some persons will likely be opposed to WS' participation in damage management activities, the analysis in this EA indicates that WS' integrated damage management program to reduce damage or threats associated with cormorants, as described in the proposed action/ no action alternative, would not result in significant adverse cumulative impacts on the quality of the human environment.

## **CHAPTER 4: LIST OF PREPARERS, REVIEWERS, AND PERSONS CONSULTED**

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## APPENDIX A: LITERATURE CITED

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## **APPENDIX B: DOUBLE-CRESTED CORMORANT DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE IN OHIO**

WS is evaluating the use of an adaptive approach to managing damage associated with double-crested cormorants, 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 would formulate integrated method approaches using the WS Decision Model (Slate et al. 1992; see WS Directive 2.201). 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.

The goal of the proposed action would be to continue the current implementation of an adaptive integrated approach utilizing nonlethal and lethal techniques, as deemed appropriate using the WS Decision Model, to reduce damage and threats caused by double-crested cormorants in Mississippi. To meet this goal, WS would continue to respond to requests for assistance with, at a minimum, technical assistance, or when funding was available, direct operational assistance.

### **Technical Assistance Recommendations**

The WS program in Mississippi regularly provides technical assistance to individuals, organizations, and other federal, state, and local government agencies for managing double-crested cormorant damage. Technical assistance would include collecting information about the number of double-crested cormorants involved, the extent of the damage, and previous methods that the requester had attempted to resolve the damage. WS would then provide information on appropriate methods that the cooperator could consider to resolve the damage themselves.

The implementation of methods and techniques to resolve 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). Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, WS would describe several management strategies to the requester for short and long-term solutions to managing damage. WS would base those strategies on the level of risk, need, and the practicality of their application. WS' personnel would use the WS Decision Model to recommend those methods and techniques available to the requester to manage damage and threats of damage. Those persons 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.

### **Direct Operational Assistance**

Operational damage management assistance would include damage management activities that WS' personnel conduct directly or activities that WS' employees supervise. Initiation of operational damage management assistance could occur when the problem could not be effectively resolved through technical assistance alone and there was a written Memorandum of Understanding, work initiation document, or another comparable document signed between WS and the entity requesting assistance. The initial investigation by WS' personnel would define the nature, history, and extent of the damage or threat; species responsible for the damage or threat; and methods available to resolve the request for assistance.

The most effective approach to resolving wildlife damage problems would be to integrate the use of several methods, either simultaneously or sequentially. An adaptive plan would integrate and apply



practical methods of prevention and reduce damage by double-crested cormorants while minimizing harmful effects of damage reduction measures on people, other species, and the environment. An adaptive plan may incorporate several lethal and nonlethal methods depending on the characteristics of specific damage problems.

In selecting damage management techniques for specific damage situations, WS' personnel would consider the responsible species and the magnitude, geographic extent, duration and frequency, and likelihood of double-crested cormorant damage. WS' personnel would consider the status of target and potential nontarget species, local environmental conditions and impacts, social and legal aspects, 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 the WS program in Mississippi relative to the management or reduction of damage caused by double-crested cormorants. Various federal, state, and local 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 localized population management approaches. Within each approach there may be available a number of specific methods or techniques. WS' personnel in Mississippi could recommend and/or use the following nonlethal and lethal methods.

## **I. NONLETHAL WILDLIFE DAMAGE MANAGEMENT METHODS**

Nonlethal methods consist primarily of tools or devices used to disperse or capture a double-crested cormorant or a local population of double-crested cormorants to alleviate damage or threats. Nonlethal methods available to WS would also be available to other entities within the state and those entities could employ those methods to alleviate damage caused by double-crested cormorants.

**Changes in 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 double-crested cormorant damage (*e.g.*, see Curtis et al. (1996), Dorr et al. (2016)). WS' personnel could be involved during the planning and designing phases of facilities to make recommendations on where to locate facilities to avoid areas with high double-crested cormorant densities. In addition, WS' personnel could make recommendations on facility design or modifications to existing facilities to minimize the attractiveness of the facilities to double-crested cormorants, such as removing or altering areas where double-crested cormorants 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. WS' personnel could make recommendations relating to fisheries management, such as releasing fish stock in the evening or at night so the fish have an opportunity to disperse before double-crested cormorants begin feeding in the morning.

**Alterations to aircraft flight patterns or schedules:** In situations where the presence of double-crested cormorants 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 double-crested cormorants. However, altering operations at airports to decrease the potential for strike hazards involving double-crested cormorants 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.

**Surface coverings:** WS could recommend the use of surface coverings to discourage double-crested cormorants 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 double-crested cormorants. 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 and is generally a method recommended for small water retention ponds.

**Overhead Lines and wires:** Overhead lines and wire 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 double-crested cormorants (Curtis et al. 1996, Dorr et al. 2016). Curtis et al. (1996) indicated that wires with a spacing of 10 inches appeared to exclude most fish-eating birds. The birds apparently fear colliding with the wires and thus avoid flying into areas that use wire grids. The use of overhead wire grids can deter nontarget birds from using areas. Exclusion may be impractical in most settings (*e.g.*, commercial aquaculture); however, wire grids could be practical in small areas (*e.g.*, retention ponds) (Curtis et al. 1996, Dorr et al. 2016).

**Netting:** In some limited situations, WS could recommend or use netting to exclude double-crested cormorants. 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 commercial aquaculture facilities.

**Mylar tape:** Mylar tape has a highly reflective surface that produces flashes of light as sunlight reflects off the surface. In addition, the metallic rattle and quick movement of Mylar tape as it moves in the wind can startle birds. Generally, 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. Using Mylar tape at locations where double-crested cormorants roost and loaf may be effective at preventing double-crested cormorants from using those areas (Dorr et al. 2016).

**Effigies:** Effigies are models or silhouettes of humans (*e.g.*, scarecrows) or predatory animals (*e.g.*, alligators) that applicators can place in areas where double-crested cormorants cause damage or pose a threat of damage. Effigies that pop-up into the air and/or effigies that have moving parts are often more effective at dispersing double-crested cormorants. Effigies are most effective when people move them frequently, when alternating them with other methods, and when people maintain the effigies.

**Alarm or distress calls:** WS’ personnel could also use or recommend the use of electronic devices that mimic the sounds exhibited when double-crested cormorants are alarmed or in distress, which may cause a flight response and disperse double-crested cormorants from an area. Birds often give alarm calls when they detect predators while they give distress calls when captured by a predator (Conover 2002). When other birds hear these calls, they know a predator is present or a predator has captured the bird (Conover 2002). Because birds associate the calls with a predator, the use of alarm and distress calls are often more effective when paired with effigies that look like predators.

**Lasers and lights:** WS’ personnel could use lasers and lights to disperse double-crested cormorants when low-light conditions exist, such as dispersing double-crested cormorants in the evening as they begin arriving at locations to roost for the night. Glahn et al. (2001) demonstrated that low- to moderately-powered lasers could consistently disperse double-crested cormorants from nighttime roost locations. Glahn et al. (2001) stated, “... [double-crested cormorants] *in the field utilized group avoidance behavior to laser light that presented a novel, highly visible stimuli approaching them. Because groups of [double-crested cormorants] moved as the laser light approached them, relatively few birds were contacted with the laser light. In fact, movement of the laser light through the tree branches appeared more likely to elicit avoidance than focusing the light on individual [double-crested cormorants].*”

Similarly, lights may be novel stimuli that double-crested cormorants act to avoid. Lights would primarily consist of high-powered spotlights. Lasers and lights have advantages over other dispersal methods because they are silent and WS' personnel can use those methods directly at double-crested cormorants. Therefore, WS' personnel can use those methods in areas where disturbing other wildlife is a concern.

**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 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 double-crested cormorants.

**Propane cannons:** These small cannons operate using propane gas. 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 set when the cannon operates during a day. 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.

**Bow nets:** Bow nets are suitcase or basket-type traps that people use to primarily live-capture raptors but WS could use bow nets to live-capture double-crested cormorants. 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 stake portion by a trigger or release mechanism (Bloom et al. 2007). The user typically places an attractant near the center of the circle to attract raptors; however, for double-crested cormorants, the user would place the bow net to envelope a nest on the ground. Therefore, the nest would act as the attractant. When a double-crested cormorant 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 double-crested cormorant. WS' personnel would be present on site during the use of bow nets to address double-crested cormorants live-captured in the net.

**Hand nets:** The hand nets that 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 double-crested cormorant. Hand-thrown nets typically have weights on the edges of the net. WS' personnel would primarily use hand nets to live-capture double-crested cormorants at nesting locations and dip nets at roosts similar to those situations described by King et al. (1994) and King et al. (2000).

**Cannon nets:** For purposes of this assessment, the term cannon net will refer 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 tied 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 tested 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 double-crested cormorants 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 along shorelines or other areas where double-crested cormorants routinely congregate or loaf.

**Foothold traps:** Another live-capture method that WS' personnel could consider is a modified foothold trap with padded jaws. WS' personnel would modify foothold traps by using padded foothold traps and by removing or weakening springs on the trap so that when the jaws snap shut on the leg of a double-crested cormorant, the jaws do not injure the double-crested cormorant. WS' personnel would primarily use modified foothold traps at nest locations to capture double-crested cormorants as they approach their nest. WS' personnel would be present on site during the use of foothold traps to address double-crested cormorants live-captured in traps.

**Nest destruction:** The destruction of nests involves the removal of nesting materials during the construction phase of the nesting cycle. Nest destruction could also occur after destroying eggs in the nests or after euthanizing nestlings in the nest.

**Aircraft:** Surveying wildlife from an aircraft is a commonly used tool for evaluating and monitoring damage and establishing population estimates and locations of various species of wildlife. WS could use fixed-winged aircraft and/or helicopters to conduct surveys to locate and/or estimate the number of double-crested cormorants in areas of the state. For example, WS could use fixed-winged aircraft to identify locations where double-crested cormorants roost or conduct roost surveys to estimate the number of double-crested cormorants using a roost. The low-level flights would primarily occur in the fall and during the winter when the number of double-crested cormorants present in the state increases. Surveying could involve circling an area as an observer counts the number of double-crested cormorants present in the area.

WS could also use fixed-winged aircraft and/or helicopters to identify movement patterns of double-crested cormorants. For example, WS' personnel could place radio-transmitting collars on double-crested cormorants and then monitor their movements over a specified period. In general, WS' personnel would then attempt to locate the double-crested cormorant using a hand-held antennae and radio receiver from the ground; however, occasionally double-crested cormorants could travel long distances that would prevent biologists from locating the double-crested cormorant from the ground. In those situations, WS may utilize either fixed wing aircraft or helicopters and elevation to conduct aerial telemetry and locate the specific double-crested cormorant wherever it has moved to.

Unmanned aircraft are receiving increasing attention as a wildlife management tool (Watts et al. 2010, Koh and Wich 2012, Martin et al. 2012). Unmanned aircraft generally produce less noise, use less fuel,

and are generally less expensive to operate than manned aircraft (Watts et al. 2010). As with manned aircraft, WS' personnel could use unmanned aircraft to locate and survey areas for double-crested cormorants. In addition, WS could use unmanned aircraft to haze double-crested cormorants.

## II. LETHAL METHODS WILDLIFE DAMAGE MANAGEMENT METHODS

In addition to the use of nonlethal methods, WS' personnel could also use lethal methods. The only lethal methods WS is considering are egg destruction, the use of a firearm, cervical dislocation, and the release of carbon dioxide inside a chamber. The lethal removal of double-crested cormorants by WS would only occur when authorized by the USFWS and only at levels authorized. In addition, WS would only use those lethal methods authorized by the USFWS.

**Egg destruction:** WS' personnel could make eggs of double-crested cormorants unviable in several different ways. Egg destruction would involve puncturing an egg, breaking an egg, shaking an egg, or oiling an egg. WS' personnel could occasionally puncture eggs to make the egg unviable. When puncturing an egg, a person holds the egg securely in a hand that they brace against the ground and then they insert 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 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 the double-crested cormorants 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 eggs, shaking eggs, or oiling eggs often has advantages over breaking an egg open because the adults generally 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 shotguns or rifles to lethally remove and/or harass double-crested cormorants. Firearms are mechanical methods that WS could use to remove a double-crested cormorant 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 double-crested cormorants. As appropriate, WS' personnel would 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, WS would use non-lead 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 double-crested cormorants 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.

**Cervical Dislocation:** When used by trained personnel, cervical dislocation is a way to euthanize bird species after capturing those birds alive using other methods. The user would stretch the bird and then hyperextend and dorsally twist the neck to separate the first cervical vertebrae from the skull, which may cause the rapid loss of consciousness.

**Carbon dioxide:** Carbon dioxide is another method that WS' personnel may use to euthanize double-crested cormorants after personnel live-capture those double-crested cormorants using other methods. After capture, WS' personnel would place a double-crested cormorant 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.

**APPENDIX C: FEDERAL & STATE LISTED THREATENED AND ENDANGERED SPECIES IN OHIO**

\*E Denotes Federally Endangered \*T Denotes Federally Threatened

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**MAMMALS ENDANGERED**

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Indiana myotis *E	<i>Myotis sodalis</i>
Allegheny woodrat	<i>Neotoma magister</i>
Black bear	<i>Ursus americanus</i>

**BIRDS ENDANGERED**

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American bittern	<i>Botaurus lentiginosus</i>
Northern harrier	<i>Circus cyaneus</i>
King rail	<i>Rallus elegans</i>
Piping plover *E	<i>Charadrius melodus</i>
Common tern	<i>Sterna hirundo</i>
Black tern	<i>Chlidonias niger</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Kirtland's warbler *E	<i>Setophaga kirtlandii</i>
Lark sparrow	<i>Chondestes grammacus</i>
Snowy egret	<i>Egretta thula</i>
Cattle egret	<i>Bubulcus ibis</i>
Upland sandpiper	<i>Bartramia longicauda</i>

**REPTILES ENDANGERED**

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Copperbelly watersnake *T	<i>Nerodia erythrogaster neglecta</i>
Plains gartersnake	<i>Thamnophis radix</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Massasauga	<i>Sistrurus catenatus</i>
Smooth greensnake	<i>Opheodrys vernalis</i>

Spotted gar	<i>Lepisosteus oculatus</i>
Shortnose gar	<i>Lepisosteus platostomus</i>
Cisco (or Lake herring)	<i>Coregonus artedi</i>
Goldeye	<i>Hiodon alosoides</i>
Shoal chub	<i>Macrhybopsis hyostoma</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Popeye shiner	<i>Notropis ariommus</i>
Longnose sucker	<i>Catostomus catostomus</i>
Northern madtom	<i>Noturus stigmosus</i>
Scioto madtom *E	<i>Noturus trautmani</i>
Pirate perch	<i>Aphredoderus sayanus</i>
Western banded killifish	<i>Fundulus diaphanus menona</i>
Spotted darter	<i>Etheostoma maculatum</i>
Iowa darter	<i>Etheostoma exile</i>
Gilt darter	<i>Percina evides</i>
Bigeye shiner	<i>Notropis boops</i>
Tonguetied minnow	<i>Exoglossum laurae</i>

**MOLLUSKS ENDANGERED**

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Snuffbox *E	<i>Epioblasma triquetra</i>
Ebonyshell	<i>Fusconaia ebenas</i>
Fanshell *E	<i>Cyprogenia stegaria</i>
Butterfly	<i>Ellipsaria lineolata</i>
Elephantear	<i>Elliptio crassidens crassidens</i>
Purple catspaw *E	<i>Epioblasma obliquata obliquata</i>
White catspaw *E	<i>Epioblasma obliquata perobliqua</i>

**AMPHIBIANS** ENDANGERED

Eastern hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>
Blue-spotted salamander	<i>Ambystoma laterale</i>
Green salamander	<i>Aneides aeneus</i>
Cave salamander	<i>Eurycea lucifuga</i>
Eastern spadefoot	<i>Scaphiopus holbrookii</i>

**FISHES** ENDANGERED

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Ohio lamprey	<i>Ichthyomyzon bdellium</i>
Northern brook lamprey	<i>Ichthyomyzon fossor</i>
Mountain brook lamprey	<i>Ichthyomyzon greeleyi</i>
Lake sturgeon	<i>Acipenser fulvescens</i>
Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>

**MOLLUSKS (CONT.)** ENDANGERED

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Wartyback	<i>Quadrula nodulata</i>
Purple lilliput	<i>Toxolasma lividum</i>
Rayed bean *E	<i>Villosa fabalis</i>
Little spectaclecase	<i>Villosa lienosa</i>

**DRAGONFLIES** ENDANGERED

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Hine's emerald *E	<i>Somatochlora hineana</i>
Mottled darner	<i>Aeshna clepsydra</i>
Plains clubtail	<i>Gomphus externus</i>
American emerald	<i>Cordulia shurtleffi</i>
Uhler's sundragon	<i>Helocordulia uhleri</i>
Frosted whiteface	<i>Leucorrhinia frigida</i>
Elfin skimmer	<i>Nannothemis bella</i>
Canada darner	<i>Aeshna canadensis</i>

Northern riffleshell \*E

Longsolid

Pink mucket \*E

Pocketbook

Yellow sandshell

Eastern pondmussel

Washboard

Sheepnose \*E

Clubshell \*E

Ohio pigtoe

Pyramid pigtoe

Rabbitsfoot \*T

Monkeyface

Frosted elfin

Karner blue \*E

Purplish copper

Swamp metalmark

Regal fritillary

Mitchell's satyr \*E

Grizzled skipper

*Epioblasma torulosa rangiana**Fusconaia subrotunda**Lampsilis orbiculata**Lampsilis ovata**Lampsilis teres**Ligumia nasuta**Megaloniais nervosa**Plethobasus cyphus**Pleurobema clava**Pleurobema cordatum**Pleurobema rubrum**Quadrula cylindrica cylindrica**Quadrula metanevra**Callophrys irus**Lycaeides melissa samuelis**Lycaena helloides**Calephelis muticum**Speyeria idalia**Neonympha mitchellii**Pyrgus centaureae wyandot***MOTHS** ENDANGERED

Unexpected cycnia

Graceful underwing

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-

*Cycnia inopinatus**Catocala gracilis**Spartiniphaga inops**Hypocoena enervata**Papaipema silphii**Papaipema beeriana*



Racket-tailed emerald	<i>Dorocordulia libera</i>
Brush-tipped emerald	<i>Somatochlora walshii</i>
Blue corporal	<i>Ladona deplanata</i>
Chalk-fronted corporal	<i>Ladona julia</i>
Yellow-sided skimmer	<i>Libellula flavida</i>

### **DAMSELFLIES** ENDANGERED

Lilypad forktail	<i>Ischnura kellicotti</i>
Seepage dancer	<i>Argia bipunctulata</i>
River jewelwing	<i>Calopteryx aequabilis</i>

### **CADDISFLIES** ENDANGERED

–	<i>Chimarra socia</i>
–	<i>Oecetis eddlestoni</i>
–	<i>Brachycentrus nigrosoma</i>

### **MAYFLIES** ENDANGERED

–	<i>Rhithrogena pellucida</i>
–	<i>Litobrancha recurvata</i>

### **MIDGES** ENDANGERED

–	<i>Rheopelopia acra</i>
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### **BUTTERFLIES** ENDANGERED

Persius dusky wing	<i>Erynnis persius</i>
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–	<i>Lithophane semiusta</i>
–	<i>Trichoclea artesta</i>
–	<i>Tricholita notata</i>
–	<i>Melanchra assimilis</i>
Pointed swallow	<i>Epiglaea apiata</i>
–	<i>Ufeus plicatus</i>
–	<i>Ufeus satyricus</i>
Hebard's noctuid moth	<i>Erythroecia hebardii</i>

### **BEETLES** ENDANGERED

Ohio cave beetle	<i>Pseudanophthalmus ohioensis</i>
American burying beetle *E	<i>Nicrophorus americanus</i>
Water penny beetle	<i>Dicranopselapus variegatus</i>

### **BEES** ENDANGERED

Rusty patched bumblebee *E
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### **ISOPODS** ENDANGERED

Fern cave isopod	<i>Caecidotea filicispeluncae</i>
Kindt's cave isopod	<i>Caecidotea insula</i>

### **PSEUDOSCORPIONS** ENDANGERED

Buckskin cave pseudoscorpion	<i>Apochthonius hobbsi</i>
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### **MAMMALS** THREATENED

Eastern harvest mouse	<i>Reithrodontomys humulis</i>
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### **CRAYFISHES** THREATENED

Sloan's crayfish	<i>Orconectes sloanii</i>
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Northern long-eared bat \*T *Myotis septentrionalis*

### **BIRDS THREATENED**

Black-crowned night-heron *Nycticorax nycticorax*

Barn owl *Tyto alba*

Least bittern *Ixobrychus exilis*

Rufa red knot \*T *Calidris canutus rufa*

Trumpeter swan *Cygnus buccinator*

Sandhill crane *Grus canadensis*

### **REPTILES THREATENED**

Kirtland's snake *Clonophis kirtlandii*

Spotted turtle *Clemmys guttata*

Blanding's turtle *Emydoidea blandingii*

Lake Erie watersnake *Nerodia sipedon insularum*

### **AMPHIBIANS THREATENED**

Mud salamander *Pseudotriton montanus*

### **FISHES THREATENED**

Brook trout *Salvelinus fontinalis*

Greater redhorse *Moxostoma valenciennesi*

Channel darter *Percina copelandi*

American eel *Anguilla rostrata*

Paddlefish \*M *Polyodon spathula*

Bigmouth shiner *Notropis dorsalis*

Lake chubsucker *Erimyzon sucetta*

River darter *Percina shumardi*

Tippecanoe darter *Etheostoma tippecanoe*

Cavespring crayfish *Cambarus tenebrosus*

### **DRAGONFLIES THREATENED**

Riffle snaketail *Ophiogomphus carolus*

Harlequin darter *Gomphaeschna furcillata*

Green-faced clubtail *Gomphus viridifrons*

### **DAMSELFLIES THREATENED**

Boreal bluet *Enallagma boreale*

Northern bluet *Enallagma cyathigerum*

Marsh bluet *Enallagma ebrium*

### **CADDISFLIES THREATENED**

– *Psilotreta indecisa*

– *Hydroptila albicornis*

– *Hydroptila artesa*

– *Hydroptila koryaki*

– *Hydroptila talledaga*

– *Hydroptila valhalla*

### **MIDGES THREATENED**

– *Bethbilbeckia floridensis*

– *Apsectrotanypus johnsoni*

– *Radotanypus florens*

### **BUTTERFLIES THREATENED**

Silver-bordered fritillary *Boloria selene*

### **MOTHS THREATENED**

Wayward nymph *Catocala antinympha*

– *Spartiniphaga panatela*

– *Fagitana littera*

Blue sucker *Cycleptus elongatus*

Mountain madtom *Noturus eleutherus*

**MOLLUSKS THREATENED**

Black sandshell *Ligumia recta*

Threehorn wartyback *Obliquaria reflexa*

Fawnsfoot *Truncilla donaciformis*

Pondhorn *Unimerus tetralasmus*

The pink-streak *Faronta rubripennis*

**BETLES THREATENED**

– *Cicindela hirticollis*

Cobblestone tiger beetle *Cicindela marginipennis*

**ISOPODS THREATENED**

Frost cave isopod *Caecidotea rotunda*