

**ENVIRONMENTAL ASSESSMENT**

**REDUCING DOUBLE-CRESTED CORMORANT  
DAMAGE IN OHIO**

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## SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture's, Animal and Plant Health Inspection Service, Wildlife Services (USDA, APHIS, WS), the Department of Interior's, U.S. Fish and Wildlife Service (USFWS), and the Ohio Division of Wildlife (ODW) propose to implement a double-crested cormorant (DCCO) damage management program in Ohio, including the implementation of the Public Resource Depredation Order (PRDO) (50 CFR 21.48) as promulgated by the USFWS. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce DCCO damage to aquaculture, property, and natural resources, and reduce risks to human health and safety in localized situations when it is deemed necessary. Cormorant damage management (CDM) may be conducted on public and private property in Ohio when the resource owner (property owner) or manager requests assistance and any necessary permits and authorizations are obtained. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of CDM measures on humans, target and non-target species, and the environment. Under this action, the agencies could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods. When appropriate, physical exclusion, habitat modification, or harassment would be recommended and used to reduce damage. In other situations, birds would be humanely removed through shooting, egg addling/destruction, nest destruction, or euthanasia following live capture. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each problem. The most appropriate response could be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. Landowner/resource manager permission would be obtained prior to conducting CDM activities. Management activities would comply with all applicable Federal, State, and local laws. The USFWS would be responsible for ensuring compliance with the regulations at 50 CFR 21.48 and that the long-term sustainability of regional DCCO populations is not threatened by CDM activities.

## ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BCNH	Black-crowned night heron
CCP	Comprehensive Conservation Plan
CDC	Center for Disease Control
CDFG	California Department of Fish and Game
CDM	Cormorant Damage Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DCCO	Double-crested cormorant
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
END	Exotic Newcastle Disease
EPA	Environmental Protection Agency (U.S. or OH)
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBP	Migratory Bird Permit
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NFH	National Fish Hatchery
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NWPS	National Wildlife Preservation System
NWRC	National Wildlife Research Center
OARDC	Ohio Agricultural Research and Development Center
ODA	Ohio Department of Agriculture
ODH	Ohio Department of Health
ODOT	Ohio Department of Transportation
ODW	Ohio Division of Wildlife
ODSW	Ohio Division of Soil and Water
ODNR	Ohio Department of Natural Resources
OMNR	Ontario Ministry of Natural Resources
ONWR	Ottawa National Wildlife Refuge
ORC	Ohio Revised Code
OSUE	Ohio State University Extension
PRDO	Public Resource Depredation Order

ROD	Record of Decision
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
TAC	Total Allowable Catch
TPI	Turning Point Island
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WNV	West Nile Virus
WS	Wildlife Services
WSI	West Sister Island
WSINWR	West Sister Island National Wildlife Refuge

**NOTE:** On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

# CHAPTER 1: PURPOSE AND NEED FOR ACTION

## 1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as the human population expands and more land is used to meet human needs. These human uses often come into conflict with the needs of wildlife and increase the potential for negative human/wildlife interactions. Double-crested cormorants (hereafter, DCCOs; see Appendix B for a list of scientific names) are one of the wildlife species that engage in activities which conflict with human activities and resource uses. Conflicts with DCCOs include but are not limited to DCCO foraging on fish at aquaculture facilities, DCCO foraging on populations of sport fish, negative impacts of increasing DCCO populations on vegetation and habitat used by other wildlife species, damage to private property from DCCO feces, and risks of aircraft collisions with DCCOs at or near airports. Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). In response to persistent conflicts and complaints relating to DCCOs, in 2003 the United States Department of Interior, Fish and Wildlife Service (USFWS) in cooperation with the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) completed a final Environmental Impact Statement (FEIS) on the management of DCCOs in the United States (USFWS 2003). The selected management alternative included the establishment of a depredation order to address conflicts regarding DCCO impacts on public resources.

Public Resource Depredation Order (PRDO): The purpose of this order is to reduce the actual occurrence, and/or minimize the risk, of adverse impacts of DCCOs to public resources. Public resources include fish (both free-swimming fish and stock at Federal, State, and tribal hatcheries that are intended for release in public waters), wildlife, plants, and their habitats. It authorizes WS, State fish and wildlife agencies, and Federally-recognized Tribes to control DCCOs, without a Federal permit, in 24 states (AL, AR, FL, GA, IL, IN, IA, KS, KY, LA, MI, MN, MS, MO, NY, NC, OH, OK, SC, TN, TX, VT, WV, and WI). It authorizes control on “all lands and freshwaters.” This includes private lands, but landowner permission is required. It protects “public resources,” which are natural resources managed and conserved by public agencies, as opposed to private individuals.

Ohio is one of several states experiencing DCCO damage. This Environmental Assessment (EA) evaluates ways by which WS, the USFWS, and the Ohio Division of Wildlife (ODW) may work together to resolve DCCO damage problems in Ohio.

## **1.1 PURPOSE**

The purpose of this EA is to analyze the environmental impacts of alternatives for addressing damage and conflicts involving DCCOs under the USFWS PRDO and Migratory Bird Permits (MBPs) in Ohio. Resources protected by such activities are freshwater aquaculture stocks, fish, wildlife, plants and their habitats, property, and human health and safety. This EA considers the potential environmental effects of conducting cormorant damage management (CDM) throughout the state of Ohio.

## **1.2 OBJECTIVES**

The goal of this action is to reduce DCCO damage in Ohio. In particular, the objectives are:

1. Coordinate agency efforts in reducing negative impacts of expanding DCCO populations on public resources in Ohio, particularly on the Lake Erie islands and near shore vegetation, public fishery resources and other bird species, especially State and federally listed species.
2. Protect habitat for colonial nesting waterbirds on the West Sister Island National Wildlife Refuge (WSINWR) by preventing further damage to vegetation caused by increased numbers of nesting and migrating DCCOs.
3. Minimize potential DCCO damage to private property and risks to human health and safety including damage to boats, buildings, vegetation, and fish (in private ponds and aquaculture facilities), and DCCO hazards at airports.

## **1.3 DECISION TO BE MADE**

Wildlife Services is the lead agency in the preparation of this EA. The USFWS and the Ohio Department of Natural Resources (ODNR) Division of Wildlife (ODW) are cooperating agencies. ODW provides for the control, management, restoration, conservation and regulation of birds, fish, game, forestry and all wildlife resources of the State of Ohio. The lead and cooperating agencies will work together to address the following questions in the EA.

- How can the lead and cooperating agencies best respond to the need to reduce DCCO damage covered under the USFWS' PRDO?
- How can the lead and cooperating agencies best respond to the need to address all other types of DCCO damage not covered by the PRDO?

- What are the environmental impacts of alternatives for dealing with these types of DCCO damage?
- Will the proposed program have significant effects requiring preparation of an EIS?

Although the lead and cooperating agencies have worked together to produce a joint document and intend to collaborate on CDM 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. The USFWS will be making two decisions based on this analysis: 1) the role of the USFWS in overseeing CDM actions; and 2) the type of CDM, if any, that will be conducted at WSINWR.

## **1.4 NEED FOR ACTION**

As stated in the USFWS FEIS (USFWS 2003), the recent increase and range expansion of the North American DCCO population has been well documented along with concerns of negative impacts associated with the expanding DCCO population. The need to protect natural resources, aquaculture, property, and human health and safety from damage and other conflicts associated with DCCOs is described in the USFWS FEIS (USFWS 2003) and is summarized in the following subsections.

### **1.4.1 Potential DCCO Impact on Wildlife and Native Vegetation, Including Threatened and Endangered Species**

DCCOs can have a negative impact on vegetation through both chemical (DCCO guano) and physical means (stripping leaves and breaking tree branches) and are of concern in the Great Lakes region, including Ohio (USFWS 2003). DCCOs can displace colonial species such as black-crowned night herons, egrets, great blue herons, gulls, and Caspian terns through habitat degradation and nest site competition (USFWS 2003). When these situations occur, there may be a need to manage DCCOs to minimize their negative impacts.

### **1.4.2 Potential DCCO Impact on Fishery Resources**

DCCOs are opportunistic feeders that prey on a wide variety of fish species (USFWS 2003). The magnitude of impact of DCCO predation on fish in a given body of water depends on a number of variables, but in select circumstances, DCCOs can have a negative impact on recreational fishing on a localized level (USFWS 2003) resulting in a need to reduce these negative impacts. Nearly any fish species could be affected by DCCO predation in Ohio. Three recreationally and economic important species of current concern are walleye, yellow perch, and smallmouth bass.

### **1.4.3 Potential DCCO Impact on Aquaculture**

DCCOs can feed heavily on fish being raised for human consumption, and on fish raised for other purposes (USFWS 2003). When this occurs, there is a need to protect aquaculture facilities from DCCO feeding. The principal species propagated by the Ohio state fish hatcheries are saugeye, walleye, yellow perch, muskellunge, and bluegill. Additional fish threatened by DCCO predation at private hatcheries include rainbow trout, bass species, catfish species, crappie, and golden shiners.

### **1.4.4 Potential DCCO Impact on Property**

There is also a need to manage DCCO damage to property. To date, property damage in Ohio associated with DCCOs has primarily involved consumption of fish in private ponds. DCCO damage to private property may also include corrosion, caused by the acid in DCCO droppings, that damages boats, marinas and other properties near DCCO breeding or roosting sites; and damage to vegetation on privately-owned land (USFWS 2003).

### **1.4.5 Potential DCCO Impact on Human Health and Safety**

Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnell et al. 1996, Robinson 1996), and erode public confidence in the air transport industry as a whole (Conover et al. 1995). DCCOs are a particular hazard to aircraft because of their body size and mass, slow flight speeds, and their natural tendency to fly in flocks. Where the potential for DCCO and aircraft collisions exists, there is a need to manage DCCO activity.

## **1.5 BACKGROUND**

### **1.5.1 Potential DCCO Impact on Wildlife and Native Vegetation, Including T&E Species**

DCCOs can have a negative effect on vegetation through both chemical (DCCO guano) and physical means (stripping leaves and breaking tree branches) and are of concern in the Great Lakes region, including Ohio (USFWS 2003, Hebert et al. 2005). Accumulation of DCCO droppings (which contain excessive ammonium nitrogen), stripping leaves for nesting material, and the combined weight of the birds and their nests can break branches and kill many trees within 3 to 10 years (Bédard et al. 1995, Korfanty et al. 1999, Lemmon et al. 1994, Lewis 1929, Weseloh et al. 1995, Weseloh and Ewins 1994, Weseloh and Collier 1995, Hebert et al. 2005). Ammonium toxicity may be an important factor contributing to island forest decline (Hebert et al. 2005). Lewis (1929) considered the killing of trees by nesting DCCOs to be very local and limited, with most trees he observed

to have no commercial timber value. However, tree damage may be perceived as a problem if these trees are rare species, or aesthetically valued (Bédard et al. 1999, Hatch and Weseloh 1999). For example, at Presqu'île Provincial Park in Ontario, Canada, DCCOs nesting on Gull Island have killed all of the trees spurring managers to protect the other islands from the same fate. The goal for High Bluff Island was “to protect representative woodland flora and fauna and the aesthetic beauty of High Bluff Island while retaining maximum diversity of nesting colonial bird species” (PDCMSRC 2004). Destruction of nests and culling of adults has taken place on High Bluff Island to protect the natural woodlands which provide important nesting habitat for great egrets, great blue herons, and black-crowned night herons (PDCMSRC 2004).

DCCOs can displace colonial species such as black-crowned night herons, egrets, great blue herons, gulls, common terns, and Caspian terns through habitat degradation and nest site competition (USFWS 2003). DCCOs have been known to take over heron nests. For example, of 81 nest acquisitions observed by Skagen et al (2001), 57 were instances of DCCOs taking over great blue heron nests. However, it should be noted that in the remaining 24 instances, great blue herons took over DCCO nests. Cuthbert et al. (2002) examined potential impacts of DCCOs on great blue herons and black-crowned night-herons in the Great Lakes and found that DCCOs have not negatively influenced breeding distribution or productivity of either species at a regional scale, but did contribute to declines in heron presence and increases in site abandonment in certain site specific circumstances. A study by Weseloh (2005) reviewed current and historical data on 43 breeding colonies of black-crowned night herons on Lakes Huron, Erie and Ontario and the Detroit, Niagara and St. Lawrence Rivers. Eleven of the sites also had nesting great egrets and eight also had nesting great blue herons. Nesting cattle egrets and snowy egrets were present at two and one colonies, respectively. The study assessed trends in each species nesting relative to changes in co-nesting DCCO populations. Thirty-eight percent of black-crowned night heron colonies were not affected, 23% showed potential or probable conflict and 39% showed nest take-overs or colony decline/ abandonment. At least nine black crowned night heron colonies appear to have been abandoned after nest take-overs by DCCOs. More than half of great egret and great blue heron colonies showed probable (or higher) threat from cormorants. All black-crowned night heron colonies under threat were located between Lake Erie and the St. Lawrence River. Weseloh (2005) recommended that managers monitor DCCO nest placement when DCCOs nest with herons and assess if threats occur.

DCCOs can have a negative impact on vegetation that provides nesting habitat for other birds (Jarvie et al. 1999, Shieldcastle and Martin 1999) and wildlife, including State and federally listed threatened and endangered species (Korfanty et al. 1999). Cuthbert et al. (2002) did find that DCCOs have negative effects on normal plant growth and survival on a localized level in the Great Lakes region. Wires and Cuthbert (2001) identified vegetation die off as an important threat to 66% of the colonial waterbird colony sites identified as priority conservation sites

in the U.S. Great Lakes. Of the 29 priority conservation sites reporting vegetation die off as a threat, Wires and Cuthbert (2001) reported DCCOs present at 23. Based on survey information provided by Wires et al. (2001), biologists in the Great Lakes region reported DCCOs as having an impact to herbaceous layers and trees. Damage to trees was mainly caused by guano deposition, and resulted in tree die off at breeding colonies and roost sites. Impacts to the herbaceous layer were also reported due to guano deposition, and often this layer was reduced or eliminated from the colony site. In addition, survey respondents reported that DCCO impacts to avian species were mainly through habitat degradation and competition for nest sites (Wires et al. 2001).

Hebert et al (2005) conducted a study of the relationship between DCCO density and vegetation on East Sister Island and Middle Island in Lake Erie. In 2000, the year prior to their study, there were 5,485 DCCO nests on the 37.5-acre East Sister Island and 5,202 nests on the 45-acre Middle Island. In their study, the spatial use of nesting DCCOs was negatively correlated with forest cover. Whole island tree cover on East Sister Island decreased 15% in six years concurrent with trends in DCCO use of the island. The largest decline in tree cover occurred in one transect in Middle Island that was heavily used by DCCOs. Tree cover at the site declined from 92% in 1995 to 40% in 2001. Although the results of the study were correlational in nature and cannot prove that damage by DCCOs caused the decline in vegetation, review of other potential factors including pests, disease, human disturbance and weather did not provide any trends or data that would explain the observed declines. The authors also observed that DCCOs tended to prefer live trees for nesting and abandoned dead trees. There appeared to be a pattern of expanding habitat loss that developed as trees used by DCCOs died and DCCOs moved on to healthy, more stable nesting sites.

### **1.5.2 Potential DCCO Impact on Fishery Resources**

Outdoor recreation, hunting, and sport fishing make up a large part of Ohio's economy. The tourism and spending generated from sport fishing helps to create an enhanced quality of life and is a substantial portion of the local economies in the State. In 2003, 692,405 resident fishing licenses, 40,763 nonresident fishing licenses and 82,798 temporary fishing licenses were sold in Ohio. License sales alone accounted for almost \$16 million dollars in revenue for the state of Ohio in 2003. Ohio ranks ninth among the top ten states for economic gains resulting from the sport fishing industry (ASA 2002).

The rapid increase in DCCO populations over the last 25 years has led to an increase in conflicts between humans and DCCOs including complaints relating to DCCO impacts on sport fisheries (USFWS 2003). DCCOs feed opportunistically on a variety of fish species, depending on location and prey availability (USFWS 2003). In the Great Lakes, fish species such as the alewife and gizzard shad appear to be the most important prey. Stickleback, sculpin, cyprinids, and yellow perch, and, at some localities, burbot, freshwater drum, and

lake/northern chub are also important prey fish species for DCCOs (Wires et al. 2001). DCCO foraging can have a negative impact on recreational fishing on a localized level (USFWS 2003). Potentially, any species of fish could decrease as a result of DCCO predation in Ohio. Currently, walleye, yellow perch, and smallmouth bass are species of particular concern in Ohio.

The impact of DCCO predation on fish in a given body of water is dependent on a number of variables, including the number of birds present, the time of year when predation occurs, prey species composition and abundance, and physical characteristics of the body of water such as depth, water clarity, vegetation or other prey refuges, and proximity to DCCO colonies, all of which affect prey availability. Environmental and human-induced factors also affect aquatic ecosystems and fish populations. These can be classified as biological/biotic (overfishing, exotic species, etc.), chemical (water quality, nutrient and contaminant loading, etc.) or physical/abiotic (dredging, dam construction, hydropower operation, siltation, etc.). Such activities may lead to changes in fish species density, diversity, and/or composition due to direct effects on year class strength, recruitment, spawning success, spawning or nursery habitat, and/or competition (USFWS 1995).

### **1.5.3 Potential DCCO Impact on Aquaculture**

The frequency of occurrence of DCCOs at a given aquaculture facility can be a function of many interacting factors, including: (1) size of the regional and local DCCO population; (2) the number, size, and distribution of ponds/raceways; (3) the size, distribution, density, health, and species composition of fish populations in the ponds/raceways; (4) the number, size, and distribution of natural wetlands in the immediate area; (5) the size, distribution, density, health, and species composition of natural fish populations in the surrounding landscape; (6) the number, size, and distribution of suitable roosting habitat; and (7) the variety, intensity and distribution of local conflict abatement activities. DCCOs are adept at seeking out the most favorable foraging and roosting sites. As a result, DCCOs rarely are distributed evenly over a given region, but rather tend to be highly clumped or localized. Conflict abatement activities can shift bird activities from one area to another which does not eliminate DCCO conflicts but rather shifts them to a new location (Aderman and Hill 1995; Mott et al. 1998; Reinhold and Sloan 1999; Tobin et al. 2002). It is not uncommon for some aquaculture producers in a region to suffer little or no economic damage from DCCOs, while others experience exceptionally high losses (Glahn and Bruggers 1995, Glahn et al. 2000b, Glahn et al. 1999, Glahn et al. 2002).

There are 45 license holders engaged in commercial fish production with facilities in at least 33 of the 88 Ohio counties (ODNR 2005). Commercial producers in the state raise eight fish species or groups of fish species. Largemouth bass and bluegill are the two most commonly stocked species. The three most common types of fish production are food fish (fish raised for consumption by humans), fry

and fingerling (fish raised for stocking in sport fish lakes), and baitfish (supplies for bait stores). Aquaculture in Ohio is becoming an increasingly important industry with sales of bait fish exceeding 90,000 gallons in 1992 (Meronek et. al 1997). Conservative 1991 estimates of wild harvested and cultured baitfish sales indicated that the industry was worth over \$367 million in nine of the 50 U.S. states including Ohio (Gunderson and Tucker 2000).

The ODW operates six hatcheries in the state that are used to produce stock of 10 fish species. Sport fish are raised for additive stocking to natural populations of rainbow and brown trout, walleye, yellow perch, muskellunge, largemouth bass, channel catfish and bluegill. Hybrid species such as striped bass and saugeye, are also raised for stocking purposes. ODW also raises non-sport species to support threatened and endangered fish populations in the state. Some channel catfish fry are sent to other states for rearing until they reach stocking size and are released in those states. Ohio does not have any national fish hatcheries run by the USFWS within its borders. In 2004, Ohio WS assisted eight separate aquaculture facilities in applying for USFWS MBPs to manage DCCO predation to their fish stocks.

The magnitude of DCCO economic impacts on the aquaculture industry varies depending upon many different factors including, the value of the fish stock, number of depredating birds present, and the time of year the predation is taking place. DCCO depredation has been a concern at some Ohio aquaculture facilities. Since 1990 OH WS has received 15 calls concerning DCCO damage to fish stocks resulting in over \$44,000 in damage or losses. In 2004, OH WS received complaints from eight private aquaculture facilities that requested a USFWS migratory bird depredation permit to control DCCO. WS provided technical assistance on ways to reduce conflicts with DCCOs and, where appropriate, assisted the property owners in applying for USFWS migratory bird depredation permits by providing supporting documentation to the USFWS (WS Form 37<sup>1</sup>). WS has not been involved with operational control of depredating DCCOs at Ohio aquaculture facilities and does not anticipate future involvement in this facet of CDM.

#### **1.5.4 Potential DCCO Impact on Property**

Fecal contamination on public and private facilities is one of the most common complaints relating to bird damage to property. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion of metal structures and painted finishes, including those on automobiles and boats, can occur because of uric acid from bird droppings. Other types of

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<sup>1</sup> WS Form 37s document consultations between WS Specialists and individuals experiencing bird damage. The forms specify the species causing damage, the amount and type of damage, damage management methods that have been tried or are in place, and WS's recommendations for damage management. These forms are used by the USFWS Migratory Bird Management Office in determining the need to issue a MBP for damage management.

property damage that may be caused by DCCOs include foraging on fish in privately-owned ponds; damage to boats and marinas or other properties near DCCO breeding or roosting sites; and damage to vegetation on privately-owned land (USFWS 2003). In some parts of the country conflicts with DCCOs include complaints that large colonies of DCCOs have adverse impacts on aesthetic values of sites because of odor of droppings and fecal contamination of water used for recreational purposes.

Complaints regarding DCCO damage to private property in Ohio have been rare. Property losses in Ohio associated with DCCOs include impacts to fish in both private and state-run hatchery facilities. When DCCO damage to property occurs, WS has assisted the private property owner in applying for a USFWS migratory bird depredation permit by providing supporting documentation to the USFWS (WS Form 37). If the USFWS issues a permit, the property owner may then take DCCOs. WS has not provided operational assistance (implementing CDM techniques) for DCCO damage to private property but, depending upon the alternative selected, could do so if the landowner were to obtain a MBP from the USFWS and request a Cooperative Service Agreement with WS.

### **1.5.5 Potential DCCO Impact on Human Health and Safety**

Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnell et al. 1996, Robinson 1996), and erode public confidence in the air transport industry as a whole (Conover et al. 1995). All birds are potentially hazardous to aircraft and human safety. The magnitude of the hazard depends on the physical, biological, and behavioral characteristics of each bird. DCCOs are a particular hazard to aircraft because of their body size and mass, slow flight speeds, and their natural tendency to fly in flocks. Blockpoel (1976) states that birds with slow flight speeds can create increased hazards to aircraft because they spend relatively greater lengths of time in aircraft movement areas. There is a very strong relationship between bird weight and the probability of plane damage (Anonymous 1992; Dolbeer 2000). For example, there is a 90% probability of plane damage when the bird weighs 70 or more ounces (4 1/3 pounds) versus a 50% probability of plane damage for a six ounce (1/3 pound) bird (Anonymous 1992). Adult DCCOs can weigh up to 96 ounces (six pounds; Terres 1980).

According to the Federal Aviation Administration's (FAA) Bird Strike database there were 16 DCCO strikes to civil aircraft in the United States from 1990-1999 (USFWS 2003). In October 2002, at Logan International Airport (Boston, MA), a B-767 struck a flock of DCCOs, resulting in an engine shut down, precautionary landing, and damage to the engine and landing lights. The aircraft was out of service for three days, and repairs cost \$1.7 million (Wright 2004). In September 2004, at Chicago O'Hare International Airport (Chicago, IL) a MD-80 struck a flock of DCCOs. Several birds struck an engine resulting in an engine fire and

failure, and engine debris falling on a suburban Chicago neighborhood. The aircraft made an emergency landing and repairs cost \$186,000 (Wright 2004). It is estimated that only 20 - 25% of all bird strikes are reported (Conover et al. 1995; Dolbeer et al. 1995; Linnell et al. 1996; Linnell et al. 1999), hence, the number of strikes involving DCCOs is likely greater than FAA records show.

It should be noted that the civil and military airports in Ohio with the greatest risks of aircraft collisions with wildlife have ongoing programs to reduce these risks. One particular Ohio airport reports that during spring and fall migration considerable time is devoted daily to harassing DCCOs away from the airport operations area (C. Hicks, USDA, personal communication).

WS recognizes that the risk to aircraft safety associated with DCCOs is low. To date there have been no reported DCCO strikes to aircraft in Ohio. However, because DCCO roosting and feeding sites may sometimes be found in close proximity to airports and military airbases in Ohio, it is possible that WS may receive additional requests for assistance in the future.

#### **1.5.6 Double-crested Cormorants in Ohio**

Ohio's Lake Erie Islands are popular tourist attractions as well as important areas for wildlife. Ohio's island region is located in the western basin of Lake Erie and includes the larger Bass Islands, Kelley's Island, and several smaller islands (Figure 1-1, Shieldcastle 2005). Tourism and residential development in the island region is centered primarily on the Bass Islands and Kelley's Island. West Sister Island (WSI) is managed by the USFWS for wildlife habitat and is not open to the public. West Sister Island is part of the Ottawa National Wildlife Refuge (ONWR) Complex and is also a Federal wilderness area. Green Island is owned and managed by ODW for wildlife habitat and is also closed to the public. Green Island and WSI have active DCCO nesting colonies. Another island, Turning Point Island (TPI), is a manmade island and also is host to nesting DCCOs.

DCCOs began breeding consistently in Ohio in 1992 when there were 182 pairs on WSI. In 2005, there were 3,813 nesting pairs on WSI and the statewide count of DCCO breeding pairs was 5,164 within five separate colonies (Figure 1-2, ODW 2005). The number of DCCOs at these colonies has grown dramatically in recent years. For example, on Green Island DCCO density increased from no nesting pairs in 2003 to 857 nesting pairs in 2005 (ODW Data 2005). The number of nesting pairs on TPI underwent a similar rapid increase over the period of 1999-2002, but the population has been relatively stable from 2003-2005 with an increase of only eight nesting pairs. (Figure 1-4). These estimates are only for the number of nesting pairs. Immature and non-nesting birds also exist in the rookeries and comprise a substantial proportion of the population on Lake Erie. Furthermore, these nest counts fail to account for the migratory birds that pass through the area during their southern migration in the fall. Similar to the increase of cormorants on Lake Erie, nesting populations in Lakes Huron and

Ontario continue to rise. Thus, the number of cormorants observed during the nesting period on Lake Erie may be minimal compared to the number of individuals present during the spring and fall migration.

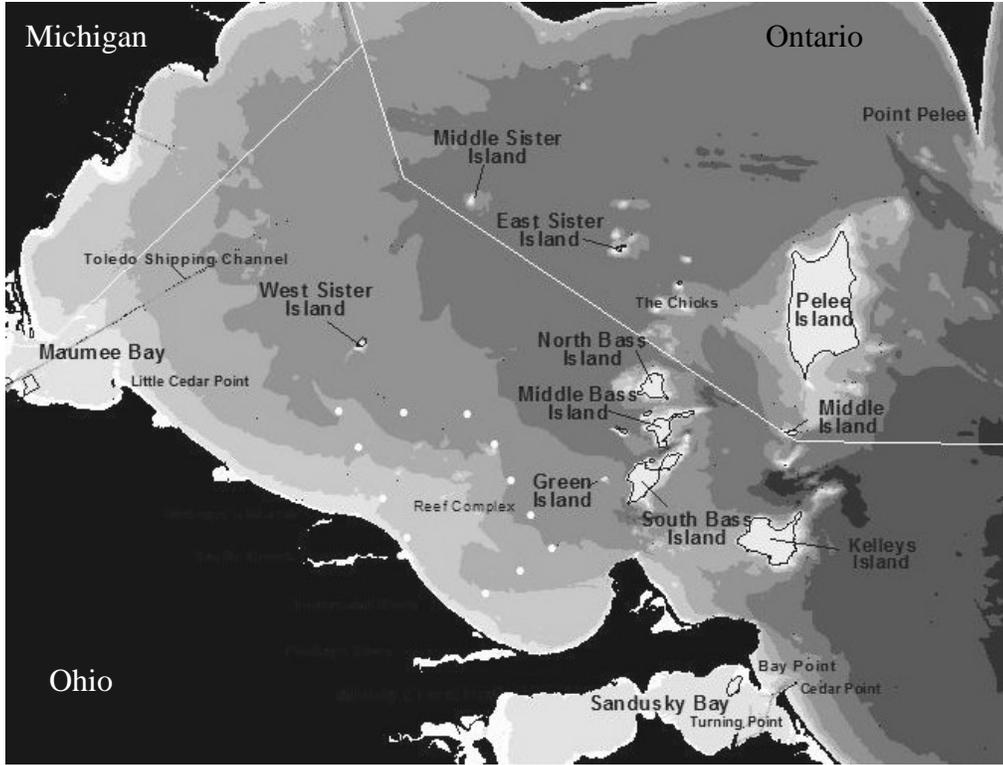


Figure 1-1. The Lake Erie Islands

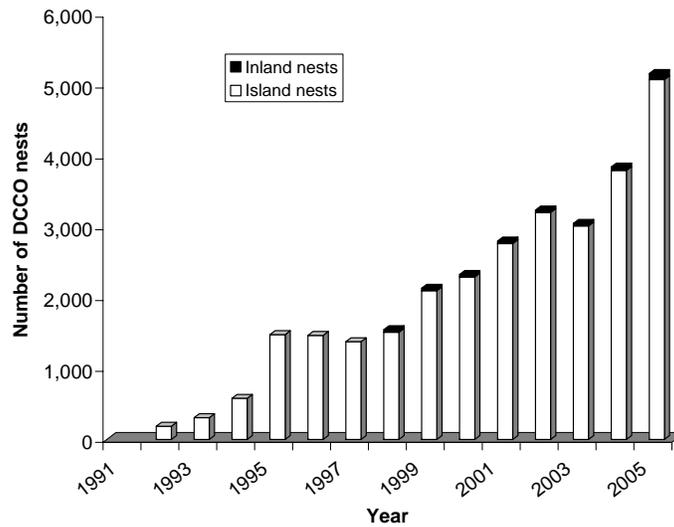


Figure 1-2. Number of DCCO nests in Ohio, 1991-2005 (ODW 2005).

### **1.5.6.1 DCCO Impacts on Birds and Vegetation on Ohio Lake Erie Islands**

The Lake Erie islands in Ohio are important nesting habitat for many bird species. The black-crowned night heron, great egret, snowy egret, little blue heron, and cattle egret nest only on the islands of Lake Erie in Ohio. There have been sporadic attempts by great egrets to nest in the large inland great blue heron colony on Winous Point and Ottawa Shooting Clubs but they have never established a self-sustaining population. The Lake Erie islands area of Ohio is important habitat for several state-listed endangered birds including snowy egrets and cattle egrets. The growth of the DCCO 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.

WSI is an 83-acre island just north of the ONWR and Magee Marsh State Wildlife Area, northeast of Toledo. WSI currently hosts one of the largest remaining nesting colonies of herons and egrets in the U.S. portion of the Great Lakes (Figure 1-3). Additionally, WSI hosts one of two of Ohio's only remaining breeding colonies of black-crowned night herons. Three state-listed birds (black-crowned night heron, snowy egret, and cattle egret) and one bird of special concern (great egret) are found on WSI. The breeding colony of BCNHs experienced a steady population decline during the 1990's, then stabilized between 400 and 500 nesting pairs. Some of the population decline is thought to be due to habitat loss through successional change; as canopy height increases with succession, there appears to be a negative effect on nesting BCNHs (Shieldcastle and Martin 1999). BCNHs appear to be responding well to labor intensive WSINWR efforts to restore vegetation structure preferred by herons (Doug Brewer, ONWR, pers. comm.). However, DCCOs will also likely impact vegetation at the restored sites, so they are still a concern. Snowy egrets have remained fairly steady at 10-14 pairs and the cattle egret is only an occasional nester. Numbers of nesting great egrets decreased over the period of 1993 to 1998 and have been stable to slightly decreasing since that time. Double-crested cormorants began consistently nesting on WSI in 1992 and the number of breeding pairs has increased to 3,813 breeding pairs in 2005.

TPI is a 5.3-acre remnant of a stone breakwall built on the Sandusky Bay and is predominantly covered by 19 to 29 foot tall mulberry trees. TPI hosts Ohio's second nesting colony of black-crowned night herons (Figure 1-4). The black-crowned night heron nesting population on TPI has fluctuated between 47 and 300 pairs with no definitive trend over time. Snowy egrets are occasional nesters on TPI while cattle egret nests peaked in 1996 with 73 pairs and has declined steadily with no pairs observed in 2005 (ODW Data 2005). A nesting survey in 2005 revealed 47 black-crowned night heron nests and 41 great egret nests. The number of nesting DCCOs increased rapidly from 1999 to 2002, and has been

relatively stable from 2003-2005 with an increase of only eight nesting pairs. (Figure 1-4). In 2005, there were 409 nesting pairs of DCCOs on TPI.

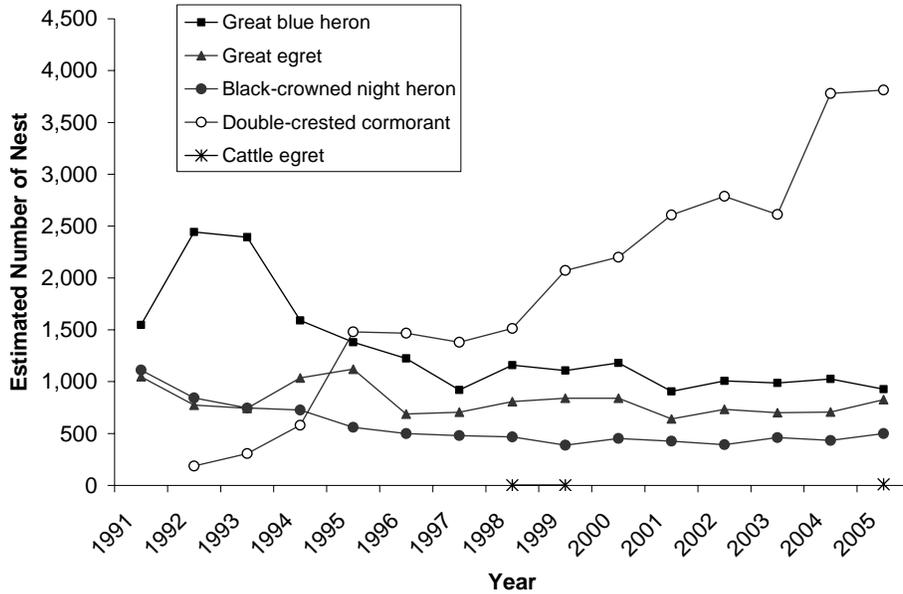


Figure 1-3. West Sister Island colonial bird nesting pair numbers 1991-2005.

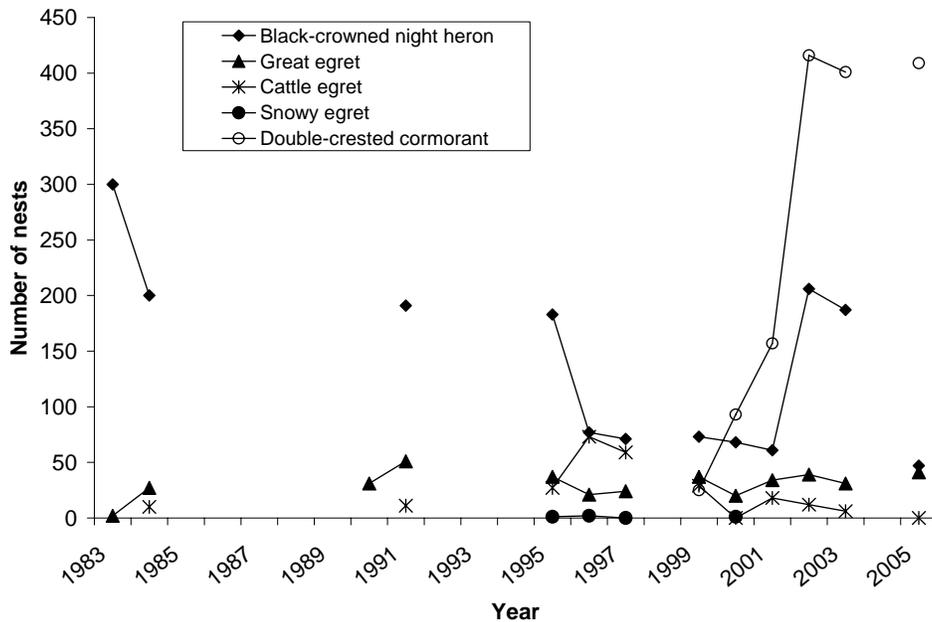


Figure 1-4. Turning Point Island colonial bird nesting pair numbers 1983-2005.

Green Island is a 17.3-acre island located in Ottawa County just west of South Bass Island and northeast of Port Clinton, Ohio. No DCCOs nested on Green Island in 2003. An aerial nesting survey in 2004 gave an approximate count of 15 nesting pairs, and a ground count in 2005 revealed 857 cormorant nests (ODW Data 2005). While no data exist for the number of nesting herons and egrets in previous years, the potential for DCCO impacts on herons and egrets is high especially with the exponential increase of DCCOs on Green Island. Green Island also is important habitat for the federally threatened and State endangered Lake Erie water snake whose numbers have been greatly reduced on the human-inhabited, surrounding islands. It is uncertain whether Lake Erie watersnakes would avoid large groups of DCCOs *per se*. However, Lake Erie watersnakes do prefer ground cover for shelter from predators and for thermoregulation during the hot part of summer days. If large amounts of cormorant feces kill the vegetation then there is likely to be a negative impact on the Lake Erie watersnake. Green Island has 6 state-listed plants which were found on a 2002 vegetative survey of the island: elegant sunburst lichen, northern bog violet, Sprengel's sedge, tufted fescue sedge, harebell and rock elm. The state-threatened rock elm is particularly susceptible to damage from the cormorants since these trees were found along the south side of the island where the cormorant nests were concentrated.

#### **1.5.6.2 DCCO Consumption of Fish on Lake Erie**

Sport fishers, the tourism community, charter boat captains, commercial fishers, and fisheries managers have expressed concern that the DCCO colonies on Lake Erie are having an adverse effect on the fish populations of Lake Erie, especially on walleye, yellow perch, and smallmouth bass. Walleye supports the most important sport fishery in Ohio as indicated by the 2004 harvest of 2,665,209 pounds, which is about 50% of the Ohio sport harvest in Lake Erie. Yellow perch also supports important fisheries in Ohio waters, providing nearly 4,000,000 pounds to sport and commercial fishers in 2004 (ODNR, DOW Lake Erie Status Report 2004). Smallmouth bass is the third most targeted species by anglers in Ohio waters of Lake Erie, with most fish being released (about 28,000 pounds were harvested in 2004; ODNR, DOW Lake Erie Status Report 2004). While there are insufficient data to fully characterize DCCO diets in Lake Erie and their predatory impacts on these important fish species, the potential exists for adverse effects at some scale given research results from other large lakes.

Data collected from Lake Ontario can provide insight regarding fish population impacts that may also be occurring in Lake Erie. In Lake Ontario, where cormorant diets have been monitored since 1992, Johnson et al. (2002) estimated that 32.8 million fish or 3.1 million pounds are consumed annually by nesting cormorants. Of the fish consumed, the biomass of smallmouth bass and yellow perch taken by cormorants exceeded that of the commercial and recreational harvest of these fish. In addition to consuming smallmouth bass and yellow perch, forage fish species such as alewives and assorted minnow species

comprised a large proportion of the cormorant diet. Similar observations have been noted on Lake Huron where the cormorant population is the largest on the Great Lakes (Dr. Mark Ridgway, Ontario Ministry of Natural Resources (OMNR), personal communication). Thus, the potential exists for cormorants to consume a considerable number of fish from Lake Erie. However, none of the studies thus far have determined if the mortality pressures exerted by cormorants are compensatory (cormorants are taking fish that would have died of other natural causes) or additive (foraging by cormorants increases the total mortality rate for the population). Previous research on Lake Erie (Bur et al. 1999) indicates that walleye, yellow perch, and smallmouth bass were not common food items, but the study covered only one year. More recently, cormorant regurgitant data collected by the United States Geological Survey (USGS) suggests that consumption of walleye and yellow perch may be quite high, perhaps approaching 50% of the diet in some areas (Mike Bur, Sandusky Biological Station USGS, unpublished data). At high population densities, DCCOs can have adverse impacts on populations of fish that represent a small percentage of the cormorant's overall diet, because the small number of fish consumed per DCCO is multiplied by the high number of DCCOs present. This may be especially important for fish with low population densities, or those whose habitat lies in proximity to dense DCCO colonies and in years with low recruitment and/or a poor year class.

#### Model Using Lake Erie Data

On Lake Erie, data on DCCO predation impacts on fish are available, however, more pieces of information that are needed to address whether cormorants are having a local or population level effect on sport/commercially important species or forage species, and whether cormorant induced mortality is compensatory or additive. Results of Bur et al. 1999 generally agree with those of other studies in that cormorants appear to be generalists, feeding on the most available species. However, they did not assess inter-annual variability in the fish community. The potential for significant predation on yellow perch and walleye exists because these fish species have produced larger year classes over the last several years while alternative fish prey (e.g., gizzard shad) have not. Smallmouth bass are vulnerable to predation in Lake Erie because they spend a large portion of the year in shallow water habitats. DCCO predation on percids (e.g., walleye and yellow perch), smallmouth bass and assorted forage fish species has been documented in several systems in the Great Lakes basin (Burnett et al. 2002; Johnson et al. 2002; Rudstam et al. 2004; Van DeValk et al. 2002).

The most recent cormorant population census (2001) on Lake Erie estimated 13,600 cormorant nests (27,200 birds), with nest numbers likely higher in 2004 with the addition of Green and Middle Sister Islands as nesting colonies. Nest counts only provide an estimate of the number of nesting pairs. Immature and non-nesting birds also exist in the rookeries and comprise a substantial portion of the population on Lake Erie. Hebert and Morrison (2003) estimated the number

of non-breeding birds in Lake Erie at nearly 6,200 birds bringing the total number of resident adult cormorants in Lake Erie to more than 33,000 individuals with the majority (29,000) nesting or residing in the western basin. This estimate is based upon a non-breeder to breeder ratio of 0.23 as generated on Lake Champlain (Fowle 1997). The estimate of non-breeding birds seems relatively low, given the number of cormorants loafing on Big Chicken Island throughout the summer. In addition to resident birds, Madenjian and Gabrey (1995) estimated the number of migrant cormorants at 6,500, however due to the increases in abundance of cormorants at locations north of Lake Erie, this number is likely higher (M. Ridgway, OMNR, personal communication). Nonetheless, given this information, a conservative estimate of the number of resident and migrant cormorants on Lake Erie could exceed 39,000 birds.

Hebert and Morrison (2003) estimated cormorant consumption on Lake Erie using the bioenergetics model developed by Madenjian and Gabrey (1995) and found that cormorants consumed approximately 6,270 tons of fish annually in the western basin, with the majority (62%) consumed by breeding birds, followed by hatch-year birds (28%), followed by non-breeding and migrant birds (10%). Based upon diet composition data from Bur et al. (1999), the majority of fish consumed were gizzard shad and freshwater drum; however, this is based solely on a snapshot of diets from 1999. In addition to gizzard shad and freshwater drum, biologists estimated 63.1 tons of yellow perch and 56.8 tons on walleye were consumed by DCCOs in the western basin in 2000. Bur et al. (1999) found that the mean length of yellow perch consumed by cormorants was 5.8 inches, a length typical of two-year old yellow perch. Mean length of walleye consumed by cormorants was 10.5 inches, which generally corresponds to a yearling walleye. Based upon this information, and applying a weight-length regression for Lake Erie yellow perch and walleye, we can estimate that cormorants consumed approximately 1.5 million two-year old yellow perch and approximately 310,000 one-year old walleye. In 2000, the consumption of 1.5 million perch by cormorants was approximately 5% of the standing stock of age-2 yellow perch in the western basin.

Is cormorant consumption of yellow perch and walleye biologically significant? Using the model of Hebert and Morrison (2003) and applying information from Bur et al. (1999) we get a sense of the magnitude of sport fish consumption by cormorants. In 2000, sport and commercial fisheries harvested 891 tons of yellow perch from Lake Erie, relative to the 63 tons consumed by cormorants. In 2000, approximately 110,000 yearling walleye were harvested by sport and commercial fisheries lakewide, relative to the 310,000 yearling walleye consumed by cormorants. These are rough calculations, but they indicate that in some years, the cumulative impacts of perch and walleye consumption by DCCOs and fishery harvest could be significant relative to production. At present, Total Allowable Catches (TACs) for lakewide walleye and yellow perch fisheries are established by the Great Lakes Fishery Commission, Lake Erie Committee, and any mortality from DCCO predation on these species is presumed to be a component of

assumed natural mortality rates by the Committee. In other words, if DCCO consumption amounts are additive, instead of compensatory, to the assumed levels of natural mortality, the TACs could be excessive.

Additional information on potential impacts of cormorant predation on smallmouth bass can be gleaned from the Stapanian et al. (2002) telemetry study. Approximately 80-85% of foraging cormorant flocks were observed within 1.8 miles of shore and average foraging distance from colonies was 6 miles, therefore, we can plot likely impact areas based upon existing nesting colonies on West, Middle, and East Sister, Green, Hen, Middle, and TPI (Figure 1-5).

Despite the fact that no smallmouth bass were found in the diets of cormorants during the diet study, the potential exists for significant impacts on smallmouth bass (Lantry et al. 2002) for several reasons. First, smallmouth bass show very localized distributions (i.e., they aren't prone to large scale migration or movements). Second, smallmouth bass habitat overlaps significantly with predicted locations of intense cormorant foraging (Figure 1-6) (Stapanian et al. 2002). In fact, more than 50% of predicted smallmouth bass habitat in the west basin is within areas predicted to be subject to intense cormorant predation. Because of low resolution reporting for fishery harvest and effort data, we do not have the ability to overlay smallmouth catch rates with the higher resolution smallmouth bass habitat. However, we can use some of the tagging data to partially validate the smallmouth bass habitat maps (Figure 1-7). In fact, 70 % of tagged smallmouth bass were tagged in areas identified as smallmouth habitat, and 80% were tagged in areas subject to intense cormorant predation. These figures indicate that there is significant overlap in cormorant foraging and smallmouth bass distribution, and the potential exists for cormorants to exert pressure on the smallmouth resource, particularly during May and June when bass are spawning and DCCO colonies are highly active.

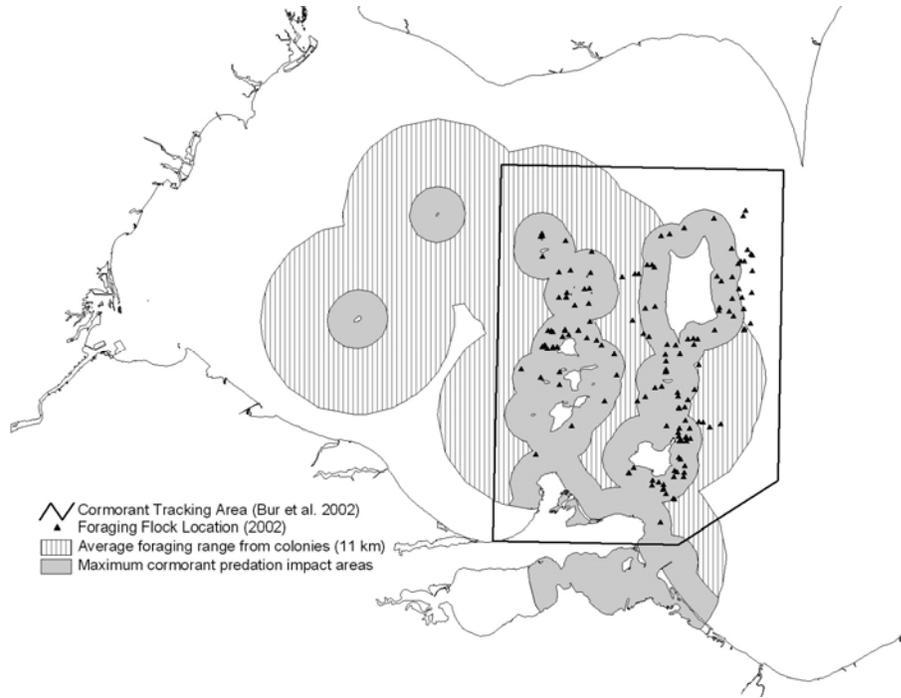


Figure 1-5. Predicted cormorant foraging areas in 2002, and foraging flock locations, 2002 (Stapanian et al. 2002).

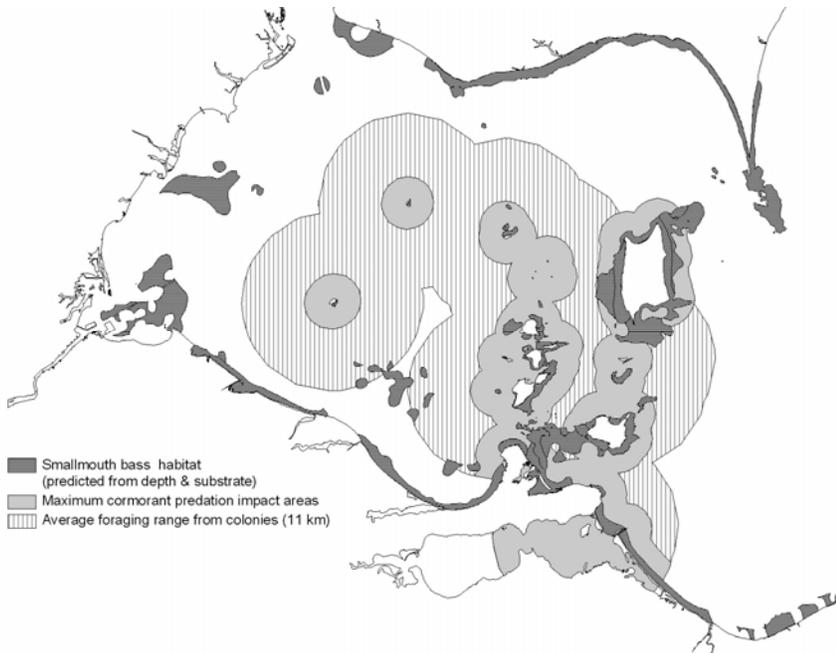


Figure 1-6. Predicted cormorant foraging areas and smallmouth bass habitat in western Lake Erie. Maps are based upon substrate distribution and depth information.

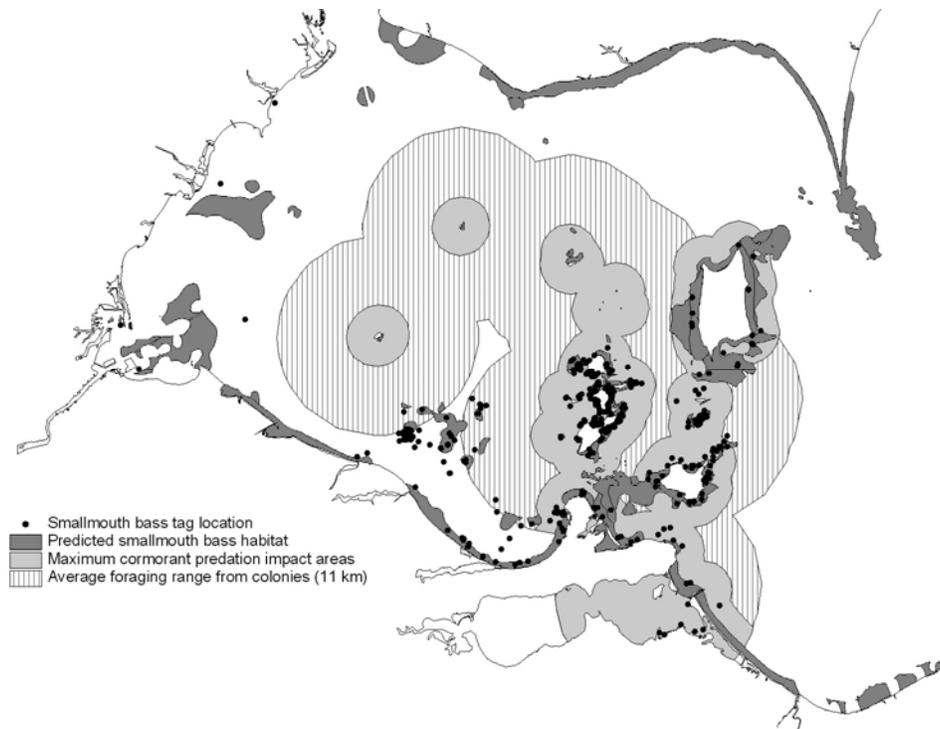


Figure 1-7. Predicted cormorant foraging areas and smallmouth bass habitat in western Lake Erie. Points are actual smallmouth bass tagging locations.

Direct predation is not the only means by which DCCO foraging can impact fish populations. DCCO predation may alter the prey base available to predatory fish, some of which have more facultative than opportunistic feeding preferences (hence, could be adversely affected by prey base shifts). If prey resources are limiting, then any additional predation may be important and could affect any of the predators, fish or DCCOs, in ways that are not well-understood at present. Prey fish numbers are relatively low in Lake Erie, as compared to years prior to DCCO establishment (ODNR, DOW Lake Erie Status Report 2004).

Several studies have estimated DCCO consume 20% of their body weight in fish per day (Dunn 1975; Glahn and Brugger 1995; Gremillet et al. 2000). Adult DCCO are reported to weigh five pounds (Rudstam et al. 2004), equating to a consumption rate of one pound of fish per adult per day. Daily fish consumption for an individual chick consumes is 73% of that of an adult (Rudstam et al. 2004).

Several DCCO diet studies have attempted to examine the effects of DCCO predation on fish in the Great Lakes (Ludwig et al. 1989; Belyea et al. 1999; Craven and Lev 1987). Although most diet studies of DCCOs have found that they do not have a significant adverse effect on game fish populations (Wires et al. 2001), at least one recent study, from Oneida Lake, NY, suggests that DCCOs may have detrimental effects on game fish populations (Rudstam et al. 2004). Rudstam et al. (2004) found that walleye and yellow perch were a major portion of DCCO diets at Oneida Lake, a smaller system than Lake Erie but one with a

similar fish community. They concluded that walleye and yellow perch mortality rate increases coincided with the increase in DCCO on Oneida Lake, and that the nature of this new mortality signal suggested that it was coming from predation, rather than changes in the ecosystem due to new species, primarily zebra mussel and gizzard shad. While any number of factors preclude a direct comparison of DCCO impacts on the fish community between Lake Erie and Oneida Lake, the findings of Rudstam et al. suggest that additional research is necessary to re-examine the potential for recent effects of predation on game fish in regions of Lake Erie.

DCCOs were first observed nesting at Oneida Lake in 1984 and increased to over 360 nesting pair in 2000. Since 1993, 1,000 to 2,000 migrating DCCO have arrived in mid-August and departed in mid-October. DCCO fish consumption on Oneida Lake (breeding and migrating birds) was estimated at 3.46 pounds per acre in 1997, prior to DCCO control efforts. Higher walleye and yellow perch mortality rates for sub-adults in the 1990s have been attributed to DCCO predation (Rudstam et al. 2004). Studies conducted from 1995 to 2000 found walleye and yellow perch comprised a large percentage of DCCO diets (40% to 82 % by number). Rudstam et al. (2004) indicated that DCCOs could have an additive effect on fish mortality as the size of prey eaten, most importantly sub-adults, was larger than the size range where compensatory mechanisms were important. Van DeValk et al. (2002) estimated that predation by DCCOs on sub-adult walleye and yellow perch in 1997 significantly decreased future angler harvest.

### **1.5.6.3 Proposed Initial DCCO Management Objective for Ohio's Lake Erie Island colonies.**

Historically, when colonial waterbird breeding colonies reached sufficient density that damage to the vegetation occurred and the site was no longer attractive to some species, the birds could move to new locations. Unfortunately, human population expansion and land use have limited the number of alternative sites available to colonial waterbirds and have placed sociological and biological constraints on the number of birds that can be supported at the remaining locations. The primary biological constraint is that many sites supporting colonial waterbirds must be managed to sustain a wide variety of plant and animal species indefinitely. This may make it necessary to manage bird populations at breeding sites at lower densities to prevent habitat damage and loss that historically would not have been a problem. Sociological considerations also limit the number of birds that will be tolerated in recreational areas and/or in close proximity to human habitation. Both of these constraints appear to be particularly applicable for Ohio, where most of the sites suitable for colonial waterbirds appear to already be in use and where there are high concentrations of human development and recreational activity near some colonies. Some of the colonial waterbird colonies appear to be close to or exceeding the number of birds that the habitat can sustain over time. Other sites are close to reaching their sociological carrying capacity.

The challenge for managers is to maintain healthy wildlife populations and their habitats within the constraints posed by human land uses and tolerance for wildlife.

The number of DCCOs in Ohio has increased from no breeding pairs in 1991 to 5,164 pairs in 2005. Data and observations by the biologists working at Green Island, TPI and WSI indicate that there did not appear to be major impacts on vegetation or potential adverse impacts on co-nesting birds prior to 2000. At that time virtually all DCCOs in the state were located on the Lake Erie islands and near shore areas. Today DCCOs have established two inland colonies both approximately 100 miles from Lake Erie in addition to 3 colonies on Lake Erie islands. Vegetation damage or potential for damage has been observed at all of the five Ohio DCCO colonies.

To protect vegetation and wildlife, the lead and cooperating agencies are proposing to reduce the number of DCCOs that nest on the islands or forage around them during migration. Maintaining a viable DCCO population is also an objective for the proposed program. Cumulative impacts of the proposed action in Ohio and all other DCCO damage management programs will be monitored by the USFWS and ODW to ensure that the long-term sustainability of DCCO populations is not jeopardized at the state, regional, or national level.

Because of damage to important habitat and decreasing numbers of co-nesting colonial waterbirds, the lead and cooperating agencies have proposed the following management objectives:

### **Lake Erie Islands**

The pattern of DCCO colonization, rapid population expansion and associated adverse impacts on vegetation and risks to co-nesting species has been observed on several Lake Erie islands including Middle Island and East Sister Island (Hebert et al. 2005). Therefore, efforts would be made to confine DCCO nesting colonies on the Ohio portion of the Lake Erie islands and associated near shore areas to two sites (WSI and TPI). Efforts would be made to discourage formation of new DCCO colonies in this area.

- West Sister Island. Management Objective - 1,500 to 2,000 breeding pairs. The management objective for WSI is based on Habitat Objective 1 in the Comprehensive Conservation Plan (CCP) for WSI (USFWS 2000a) which calls for the refuge to maintain nesting habitat for approximately 1,000 pairs great blue herons, 800 pairs great egrets, 500 pairs black-crowned night herons and 1,500 pairs of DCCOs and observations from refuge biologists that damage to vegetation appeared more pronounced when DCCO numbers at WSI exceeded 2,000 breeding pairs. Density of nesting DCCOs on the Island reached this level in 1999 (Figure 1- 3).
- Turning Point Island. Management Objective - 400 breeding pairs. This goal would involve maintaining the current density of breeding pairs. The

current DCCO density does not appear to be adversely affecting vegetation or co-nesting species on the island. However, given patterns observed on Middle Island in Canada and WSI, it is likely that adverse impacts could occur if the population increases much beyond current levels. This management objective is the *minimum* number of birds to be maintained at the island. In all likelihood, the number of breeding pairs at the site would be at or slightly above this level.

- Green Island. Management Objective – no breeding pairs. Green Island is used as a nesting site by great egrets and great blue herons. The state and federally listed Lake Erie water snake also uses the island. Additionally six state-listed plants including the rock elm are located on the island and in close proximity to nesting DCCOs. The rate of DCCO population increase over the last two years (0-857 pairs from 2003-2005) has been alarming, especially given the relatively small size of the island (17.3 acres). ODW is concerned that DCCO population increases and associated vegetation damage will be similar to that observed on other islands like Middle Sister. Given that Green Island is less than a quarter of the size of WSI, biologists are concerned that the island will be more easily overrun and degraded by DCCOs than the larger islands. If DCCOs are removed from the island, it can serve as a control site against which vegetation conditions at other islands can be compared. The management objective for Green Island would return the species composition of the community of breeding birds on the Island to that observed in 2002.

### **Inland Colonies**

Ohio's two small inland DCCO colonies are located approximately 195 miles apart and consist of 86 DCCO pairs total. Both colonies are 100 miles or more from the Lake Erie island colonies. Data from states like MN (USDA 2005) indicate that some inland colonies appear to exist without causing problems, but in other areas, the pattern of rapid population increases and associated damage management concerns can be similar to those noted for the Lake Erie islands. At present, there is little evidence of conflicts with DCCOs at these sites. However, ODW is concerned that rapid population increases observed on the Lake Erie islands may also occur at inland sites and will result in similar or more pronounced damage problems. There is concern that the potential for adverse impacts on fish populations is higher for smaller inland lakes than the Great Lakes. If large DCCO colonies become established at inland sites, they may become a continual source population for the Lake Erie islands and complicate damage management efforts at these locations. Additionally, it may be easier and less costly to prevent problems from occurring than to let them go until there is a documented problem and a much higher number of DCCOs to remove.

- Grand Lakes-St. Mary. Management Objective - 15 breeding pairs. Grand Lakes-St. Mary is a 5,463 ha lake and important for recreation and walleye fishing. The colony occupies a small island about 25 yards off shore and cottonwood trees along the shoreline. The colony contained 80

DCCO breeding pairs in 2005. The state-owned land is also home to a pair of nesting bald eagles and a great blue heron rookery. The site contains only a limited number of mature trees and there are concerns that that the growing DCCO colony could eliminate the vegetation upon which the bald eagles and herons depend. This management objective is the *minimum* number of birds to be maintained at the island. In all likelihood, the number of breeding pairs at the site would be at or slightly above this level.

- Portage Lakes. Management Objective - six breeding pairs. The Portage Lakes (478 ha) consist of a string of 10 lakes in northeast Ohio. DCCOs have established a small colony (six pairs) on a 0.1 ha island in the West Reservoir. ODW would like to maintain DCCO populations at the same level in this area. During spring 2006, ODW will monitor migrant activity in the Portage Lakes in response to public complaints regarding large flocks of migrating DCCOs utilizing this area. This management objective is the *minimum* number of birds to be maintained at the site. In all likelihood, the number of breeding pairs at the site would be at or slightly above this level.

The lead and cooperating agencies propose to reduce DCCO numbers to target levels over the next 1-3 years using a variety of techniques. These methods may include, but are not limited to, hazing, habitat modification, exclusion fencing or grids, egg and nest removal, egg oiling, and lethal removal of adults. These methods should reduce the number of birds utilizing the sites and associated adverse impacts on public resources.

Several research projects and monitoring programs would be run concurrently with the CDM efforts to collect data on what DCCOs are eating and feeding their chicks, and the effect this predation has on selected game fish populations. Impacts of DCCOs and DCCO removal on vegetation will also be monitored. Findings from these projects will be used to refine DCCO management objectives.

### **1.5.7 Ohio DCCO Coordination Group**

Decisions about DCCO control under the PRDO would be made on a case by case basis after consultation with the involved action agencies (USFWS, ODNR, and WS). These Federal and State entities have established an informal DCCO Coordination Group to exchange information on DCCO management and discuss sites where there may be a potential need to apply the DCCO PRDO in Ohio. The agencies comprising the Ohio DCCO Coordination Group have agreed that they will strive to work cooperatively together, rather than independently on DCCO management issues in Ohio. However each agency retains its own authority to make management decisions. The lead and cooperating agencies have agreed that decisions on future PRDO CDM projects will be made only after consulting with the DCCO coordination group.

### **1.5.8 Examples of CDM efforts in Ohio**

Management of Damage to Aquaculture: WS currently provides CDM assistance primarily in the form of technical assistance via site visits or phone consultations. Issues are addressed through an integrated program for conducting CDM activities, which includes the use of non-lethal methods by aquaculturists. If DCCO damage is substantial and recurring, WS works with the property owner to obtain a USFWS Migratory Bird Depredation Permit under which the property owner or manager is authorized to lethally control a designated number of DCCOs.

Management of Damage at Airports: WS provides technical assistance to operations personnel at airports on how to identify and manage wildlife hazards to aircraft. Airport operations also have the option of participating in a one-day training seminar lead by WS personnel that teaches wildlife identification, laws and regulations, and methods for wildlife hazard management at airports. All certificated airports are also provided a copy of the Wildlife Hazard Management at Airports manual (Cleary and Dolbeer, 2005).

Currently, two airports in Ohio employ full time WS biologists who provide technical and direct (operational) assistance with wildlife issues surrounding their particular airport environment. One of these airports is in close proximity to Lake Erie and the WS biologist responds to the threat of DCCO-aircraft collision by harassing DCCO when they occur at the airport. Harassment of DCCOs at this airport has been limited to the use of pyrotechnics. To date there have been no incidents involving DCCOs and aircraft in Ohio.

Management of Damage to Natural Resources : In 2005, WS entered into a cooperative project with the USFWS and ODW to examine DCCOs' potential damage to trees and vegetation and impact on other colonial nesting birds on WSI and Green Islands in Lake Erie. Five hundred DCCOs were removed from Green Island and WSI under a scientific collecting permit. Rifles without silencers were used to cull the DCCOs and observers accompanied shooters to record any disturbance to other nesting birds. Only one great egret was seen to flush off of the nest during the removal operation. Trees from which the DCCOs were shot were marked, and the number of DCCO nests were counted in each tree.

A total of 363 DCCOs were removed from WSI in 2005 (197 DCCOs on May 4 and 166 DCCOs on May 16). The DCCOs were removed from 8 test plots (25 meter radius). A nesting survey conducted on July 6, 2005 showed a net reduction of two DCCO nests from the time the DCCOs were removed until the nesting survey. The number of DCCOs allowed to be removed under the study design and collection permit was inadequate to reduce overall numbers of nesting DCCOs on WSI.

One hundred thirty-seven DCCOs were removed from Green Island on May 11, 2005. The initial reason for removing DCCOs from Green Island was to test the feasibility of eliminating the colony, how quickly the DCCOs would attempt to reestablish the colony, and to determine how quickly herbaceous plants could recover once the DCCOs were removed. A survey conducted on May 24, 2005, showed 857 DCCO nests on Green Island. The number of DCCOs allowed to be removed under the collection permit was inadequate to meet the study objective.

Management of Damage to Property: WS provides information on how to minimize the impacts of DCCOs on private property. Property owners who contact WS are provided with information on general species biology, damage identification, and techniques for exclusion or harassment. WS personnel explain techniques and resources for handling DCCO damage. If DCCO damage to private property (i.e. trees) is substantial and recurring, WS works with the property owner to obtain a USFWS Migratory Bird Depredation Permit under which the property owner is authorized to lethally control a designated number of DCCOs. WS receives less than six of these types of requests annually.

#### **1.6 WS RECORD KEEPING REGARDING REQUESTS FOR CDM ASSISTANCE**

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information collected from people who have requested services or information from WS. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exist.

The database includes, but is not limited to, the following information: species of wildlife involved; the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1-1 provides a summary of DCCO Technical Assistance projects completed by the Ohio WS program for Fiscal Year 1998 to 2003. Wildlife Services Direct Control and Technical Assistance programs are described in Chapter 3 of this EA.

Table 1-1. Number of independent incidents for DCCO technical assistance for Ohio Wildlife Services (MIS Database, 2005).

Species	Damage	Resource	# Incidents	Dollar Value
DCCO	Predation	Food Fish	1	\$3,000
DCCO	Predation	Bait Fish	1	4,000
DCCO	Predation	Catfish Fingerling	2	4,000
DCCO	Consumption/ Contamination	Rainbow Trout	1	600
DCCO	Predation	Bass	1	500
DCCO	Predation	Catfish Adult	3	7,800
DCCO	Predation	Rainbow Trout	7	9,700
DCCO	Predation	Bait Fish	1	150
DCCO	Predation	Catfish Fingerling	1	2,500
DCCO	Predation	Catfish Adult	1	0
DCCO	Predation	Rainbow Trout	1	0
DCCO	Predation	Food Fish	1	0
DCCO	Predation	Catfish Fingerling	1	8,000
DCCO	Predation	Food Fish	1	0
DCCO	Predation	Food Fish	1	3,800

## 1.7 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS has issued a Final EIS (FEIS) on the national APHIS/WS program (USDA 1997, Revised). Pertinent and current information available in the EIS has been incorporated by reference into this EA. The FEIS may be obtained by contacting the USDA, APHIS, WS Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

Final Environmental Impact Statement: Double-crested Cormorant Management in the United States. The USFWS issued a Final EIS (FEIS) and Record of Decision (ROD) (68 Federal Register 58022) on the management of DCCOs (USFWS 2003). WS was a formal cooperating agency in the preparation of the FEIS and has adopted it to support WS' program decisions for its involvement in the management of DCCO damage throughout the United States. WS completed a ROD on November 18, 2003 (68 Federal Register 68020). This EA is tiered to that FEIS. Pertinent and current information available in the EIS has been incorporated by reference into this EA. The FEIS, final ruling and PRDO (see Appendix E) may be obtained by contacting the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, MBSP-4107, Arlington, Virginia 22203 or by downloading it from the USFWS website

at <http://www.fws.gov/migratorybirds/issues/cormorant/cormorant.html>. The WS ROD may be viewed at <http://www.aphis.usda.gov/ws/pubs.html>.

WSINWR Comprehensive Conservation Plan (CCP) 2000. 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 WSINWR 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 WSINWR 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 DCCOs. The CCP for WSINWR can be found at <http://www.fws.gov/midwest/planning/ottawa/index.html#CCP>.

## **1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT**

### **1.8.1 Actions Analyzed**

This EA evaluates the impacts of alternatives for CDM by the USFWS, WS and the cooperating agencies to protect aquaculture, property, natural resources, and human health and safety on private and public land or facilities within the State wherever such management is requested or deemed necessary.

### **1.8.2 Period for which this EA is Valid**

If it is determined that an additional EIS is not needed, this EA would remain valid until WS, USFWS and ODW along with other appropriate agencies, determine that new needs for action, changed conditions, and/or new alternatives having different environmental effects must be analyzed. At that time, this analysis and associated decision would be supplemented pursuant to NEPA. See also discussion in section 1.8.4 of criteria which would trigger a supplement for specific CDM actions. Review of the EA would be conducted each year to ensure that the need for action, actions taken and environmental impacts are within parameters analyzed in the EA.

### **1.8.3 American Indian Tribes and Land**

Currently, there are no DCCO management MOUs with any American Indian tribe in Ohio.

#### 1.8.4 Site Specificity

The geographic scope of the proposed action includes areas in and around public and private facilities and properties and at other sites where DCCOs may roost, loaf, feed, nest or otherwise occur. Examples of areas where CDM activities could be conducted include, but are not necessarily limited to: aquaculture facilities; fish hatcheries; lakes; ponds; rivers; swamps; marshes; islands; communally-owned homeowner/property owner association properties; boat marinas; natural areas; wildlife refuges; wildlife management areas; and airports and surrounding areas. The proposed action may be conducted on properties held in private, local government, state or Federal ownership once landowner permission has been obtained. With landowner permission, the lead and cooperating agencies could conduct CDM at any of the areas where DCCOs cause damage or risks to health and safety in the state including any of the five breeding colonies currently identified throughout the state (Appendix D). As discussed above, the lead and cooperating agencies are specifically intending to conduct work at Green, WSI, TPI and the inland colonies at Portage Lakes and Grand Lakes, St. Mary. Because DCCO breeding sites are mixed species colonies where control measures may negatively affect other colonial nesting waterbirds, such as great egrets, great blue herons and black-crowned night herons, mixed species colonies will be assessed very carefully before any control measures are recommended.

This EA analyzes potential effects of WS and cooperating agency CDM activities that will occur or could occur at private and public property sites or facilities within Ohio with specific analysis of activities proposed for Lake Erie and two inland colonies. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested and considered necessary, within the constraints of available funding and workforce, it is conceivable that additional CDM efforts could occur. Thus, with the exception of certain CDM projects conducted under the PRDO this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

With the exception noted below, planning for CDM must be viewed as being conceptually similar to Federal or other agency actions whose missions are to prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Although some of the sites where DCCO damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. For the most part, the issues that pertain to the various types of DCCO damage and resulting management are the same wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) is the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS and the cooperating agencies (see USDA

1997, Revised) and Chapter 2 for a more complete description of the WS Decision Model as well as examples of its application). All projects covered by this EA will be in accordance with any mitigation measures and standard operating procedures (SOPs) described herein and adopted or established as part of the final agency decisions.

Projects like the ones proposed for TPI, WSI, Green Island and the inland colonies are not undertaken without considerable planning and deliberation on the part of the lead and cooperating agencies. Any future projects would likely be dependent upon findings of the studies and projects proposed for Ohio. At present, none of the management objectives were established for the purpose of protecting public fishery resources. Any benefits to fish resources are incidental to achieving the primary objectives of protecting wildlife and vegetation. Actions to protect public fishery resources are permitted under the PRDO and such projects could be considered at a later time. If these projects would result in cumulative impacts greater than those analyzed in this EA (e.g., they would result in increased cumulative take of DCCOs or increased risks to non-target species) the EA would be amended and public comment would be solicited prior to initiating any management efforts. However, the fundamental issues relating to new projects are unlikely to differ from those addressed 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 and by the lead and cooperating agencies and their authorized agents within Ohio. In this way, WS and USFWS believe they meet the intent of NEPA with regard to site-specific analysis and that this is the only practical way to comply with NEPA and still be able to accomplish its mission.

### **1.8.5 Summary of Public Involvement**

Issues related to the proposed action were initially identified by natural resource staff within WS, USFWS, and ODW. The USFWS DCCO FEIS (2003) was used to further define the issues and identify preliminary alternatives. As part of this process, and as required by the Council on Environmental Quality (CEQ), APHIS-NEPA, and DOI implementing regulations, this document and the subsequent Decision will be made available to the public through “Notices of Availability” (NOA) published in local media, direct mailings of NOA to parties that have specifically requested to be notified, and through agency news releases and web sites. New issues or alternatives raised during public involvement periods will be used in determining whether the EA should be revised and in the final determination of the alternative to be selected and its associated impacts.

## **1.9 AUTHORITY AND COMPLIANCE**

Each of the cooperating agencies has specific roles and responsibilities relative to the management of DCCO damage in the state of Ohio. The degree and nature of each agency’s involvement varies depending on the location and nature of the damage

problem. The following table summarizes agency roles in addressing DCCO damage in OH and provides information on the ability of others to address DCCO damage.

Table 1-2. Roles and responsibilities for DCCO damage management in Ohio

<b>Agency/Action</b>	<b><u>Need for Action</u></b> <b>Protect Public Resources</b>	<b><u>Need for Action</u></b> <b>Protect Aquaculture, Property and Health and Safety; Conduct Research with Scientific Collecting Permits)</b>
<b>WS</b>	<p>Take birds at request of landowners/ managers.</p> <p>Provide technical assistance</p> <p>Take birds (less than 10% of local colony) after notifying USFWS</p> <p>Take birds (more than 10% of local colony) with approval of USFWS</p> <p>Monitor state/local DCCO population.</p>	<p>Take birds under permits issued to WS or cooperators</p> <p>Provide technical assistance</p> <p>Provide site analysis and review required for USFWS to issue permits</p>
<b>USFWS Migratory Bird Office</b>	<p>Has authority to not approve take of more than 10% of local colony</p> <p>Provide limited technical assistance</p> <p>Monitor impacts of local, regional and national DCCO damage management efforts.</p> <p>Provide oversight to ensure action agency compliance with the PRDO regulations</p>	<p>Issue permits</p> <p>Monitor impacts of local, regional and national DCCO conflict management efforts.</p>

<b>Agency/Action</b>	<b><u>Need for Action</u></b>  <b>Protect Public Resources</b>	<b><u>Need for Action</u></b>  <b>Protect Aquaculture, Property and Health and Safety; Conduct Research with Scientific Collecting Permits)</b>
<b>USFWS Refuge</b>	Approve/authorize take of birds on USFWS property  Take birds as agents of ODW or Wildlife Services  Monitor state local DCCO population	N/A
<b>ODW</b>	Take birds (less than 10% of local colony) after notifying USFWS  Take birds (more than 10% of local colony) with approval of USFWS  Monitor state and local DCCO population	Take birds for aquaculture damage and research with permits  Provide limited technical assistance

**1.9.1 Authority of Each Lead and Cooperating Agency in CDM in Ohio**

USDA, APHIS, Wildlife Services. The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767), which provide that:

*“The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001.”*

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing “bringing (damage) under control”, rather than “eradication” and “suppression” of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

*“That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.”*

WS is a cooperatively funded, service-oriented program. Before any operational wildlife damage management is conducted, an Agreement for Control or similar document must be completed by WS and the landowner/administrator. WS cooperates with other Federal, State, tribal, and local government entities, educational institutions, private property owners and managers, and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable Federal, State, and local laws.

USDI Fish and Wildlife Service (USFWS). The primary responsibility of the USFWS is conserving fish, wildlife, plants and their habitats. While some of the USFWS’s responsibilities are shared with other Federal, State, tribal, and local entities, the USFWS has special authorities in managing the National Wildlife Refuge System; conserving migratory birds, endangered species, certain marine mammals, and nationally significant fisheries; and enforcing Federal wildlife laws. The Migratory Bird Treaty Act (MBTA) gives the USFWS primary statutory authority to manage migratory bird populations in the United States. The USFWS is also charged with implementation and enforcement of the Endangered Species Act of 1973, as amended and with developing recovery plans for listed species.

Ohio Division of Wildlife (ODW). As authorized by Ohio Revised Code (ORC) 1531.04, “the division of wildlife, at the direction of the chief of the division, shall do all of the following: (A) Plan, develop, and institute programs and policies based on the best available information, including biological information derived from professionally accepted practices in wildlife and fisheries management, with the approval of the director of natural resources; (B) Have and take the general care, protection, and supervision of the wildlife in the state parks known as Lake St. Marys, The Portage Lakes, Lake Loramie, Indian Lake,

Buckeye Lake, Guilford Lake, such part of Pymatuning reservoir as lies in this state, and all other state parks and lands owned by the state or in which it is interested or may acquire or become interested, except lands and lakes the care and supervision of which are vested in some other officer, body, board, association, or organization; (C) Enforce by proper legal action or proceeding the laws of the state and division rules for the protection, preservation, propagation, and management of wild animals and sanctuaries and refuges for the propagation of those wild animals, and adopt and carry into effect such measures as it considers necessary in the performance of its duties” (ORC §1531.04).

WS is in the process of updating the current MOU that defines USDA-APHIS-WS participation in a cooperative wildlife damage management program in Ohio. The MOU establishes a cooperative relationship between WS, Ohio Department of Agriculture, Ohio Department of Health (ODH), Ohio Department of Natural Resources (ODNR), Ohio Department of Transportation (ODOT), The Ohio State University Extension (OSUE), and Ohio Agricultural Research and Development Center (OARDC), for planning, coordinating and implementing wildlife damage management policies to prevent or minimize damage caused by wild animal species (including threatened and endangered species) to agriculture, horticulture, aquaculture, animal husbandry, forestry, wildlife, public health/safety, property, natural resources and to facilitate the exchange of information among the cooperating agencies.

ODW wild animal permit No. 193 authorizes Ohio WS, on an annual basis to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the following conditions and restrictions set forth by the chief of the ODW: (1) Permittee must collect non-endangered species as needed to fulfill requirements of USDA, (2) Permittee must consult with Crane Creek Research Station or the appropriate Wildlife District Office prior to moving any waterfowl, (3) All traps and devices must be tagged or marked identifying them as USDA property, (4) The use of chemical agents to control wild animals is prohibited without explicit permission from the Chief of the Division of Wildlife, and (5) All nuisance wildlife species collected shall be immediately released at the site of capture or euthanized within 24 hours of collection. The permittee (WS) must also obtain all applicable Federal permits. State hunting and trapping regulations do not apply provided that the permittee is in full compliance with Federal laws, rules, and regulations.

Ottawa National Wildlife Refuge Complex (USFWS, WSINWR). 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 (WSINWR) 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 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.

### **1.9.2 Compliance with Other Laws, Executive Orders, Treaties, and Court Decisions**

A number of other Federal laws, treaties, and court decisions authorize, regulate, or otherwise affect WS wildlife damage management. The cooperating agencies comply with all applicable laws, and consult and cooperate with other agencies as appropriate.

National Environmental Policy Act (NEPA). All Federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). NEPA sets forth the requirement that Federal actions with the potential to significantly affect the human environment be evaluated in terms of their impacts for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. WS and USFWS prepare analyses of the environmental effects of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in Ohio for both WS and USFWS.

Ordinarily, individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000, 6,003 (1995)). However, WS, the USFWS, and ODW have decided to prepare this EA to assist in planning CDM activities and to clearly communicate with the public the analysis of cumulative effects for a number of issues of concern in relation to alternative means of meeting needs for such management in the State, including the potential cumulative impacts on DCCOs and other wildlife species. With the exception for certain projects covered by the PRDO described in Sections 1.8.2 and 1.8.4, this analysis covers

current and future CDM actions by the USFWS, WS and the cooperating agencies wherever they might be requested or needed within the State of Ohio.

Endangered Species Act (ESA). It is Federal policy, under the ESA, that all Federal agencies shall seek to conserve threatened and endangered (T&E) species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available" (Sec.7 (a)(2)).

As part of the DCCO FEIS (USFWS 2003), the USFWS completed an intra-Service biological evaluation and informal Section 7 consultation on the management of DCCOs in the U.S. and this resulted in specific provisions for T&E species protection in the regulations implementing the PRDO at 50 CFR 21.48 (see section 4.1.2).

Wilderness Act of 1964 (16 U.S.C. 1131-1136). This Act establishes a National Wilderness Preservation System (NWPS) which is composed of federally owned areas designated by Congress as "wilderness areas." The Act directs each agency administering designated wilderness to preserve the wilderness character of areas within the NWPS, and to administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness. Wilderness is defined in section 2(c) of the Wilderness Act: "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man substantially unnoticeable, (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

Fish and Wildlife Coordination Act (16 U.S.C. 661-667e). The Fish and Wildlife Coordination Act obligates all Federal agencies to consult with State resource agencies on actions related to wildlife conservation, including but not limited to actions "minimizing damages from overabundant species".

Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33; P.L. 92-583, October 27, 1972; 86 Stat. 1280). This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to Federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for Federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated by the state, the mechanism (criteria, standards or regulations) for controlling such uses, and 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.

The lead and cooperating agencies have determined that the proposed action would be consistent with the State's Coastal Zone Management Program. The Ohio Department of Natural Resources, Office of Coastal Management has concurred with this determination.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 03-711; 40 Stat. 755), as Amended. The Migratory Bird Treaty Act (MBTA) provides the USFWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any “take” of these species by any entities, except as permitted or authorized by the USFWS. The Migratory Bird Treaty Reform Act of 2004 clarifies the original purpose of the MBTA as pertaining to the conservation and protection of migratory birds native to North America and directs the USFWS to establish a list of bird species found in the United States which are non-native, human-introduced species and therefore not federally protected under the MBTA.

The USFWS issues permits to requesters for reducing migratory bird damage in certain situations. WS provides on-site assessments for persons experiencing migratory bird damage to obtain information needed to make damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. In severe cases of migratory bird damage, WS provides recommendations to the USFWS for the issuance of depredation permits to private entities or other agencies. The ultimate responsibility for issuing such permits rests with the USFWS.

Executive Order 13186 of January 10, 2001 “Responsibilities of Federal Agencies to Protect Migratory Birds.” This Order states that 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.

WS has developed a draft MOU with the USFWS as required by this Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is finalized and signed by both parties.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act require Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires Federal agencies to: 1) determine whether activities they propose constitute "undertakings" that have the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers) as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

The CDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve 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 are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action 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 is planned under an alternative selected as a result of a decision on this EA, site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing birds. 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 or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of 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 Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

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 (EJ) 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. EJ is a priority within the USDA (WS) and DOI (USFWS). Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS and USFWS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. Both agencies' personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons. CDM as proposed in this EA would only involve legally available and approved damage management methods in situations or under circumstances where it is highly unlikely that children would be adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children.

## **CHAPTER 2: ISSUES**

### **2.0 INTRODUCTION**

Chapter 2 contains a discussion of the issues relevant to the analysis, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or standard operating procedures, and issues that will not be considered in detail, with rationale.

### **2.1 SUMMARY OF ISSUES**

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on DCCO populations
- Effects on other wildlife (and plant) species, including T&E species
- Effects on human health and safety
- Effects on aesthetic values
- Humaneness and animal welfare concerns of the methods used
- Impacts on recreation

#### **2.1.1 Effects on DCCO Populations**

A common concern among members of the public is whether wildlife damage management actions, in particular the use of lethal control and techniques like egg oiling that affect reproduction, will adversely affect the viability of DCCO populations. The NEPA requires that Federal agencies consider the cumulative impacts of their proposed actions and other known impacts on the affected environment. Cumulative impacts on the regional DCCO population are addressed in the USFWS FEIS and impacts on DCCO populations in Ohio will be addressed in Chapter 4 of this EA. One impact on DCCO populations common to all the alternatives is the impact of disease.

##### Impacts of West Nile Virus and Newcastle Disease on bird populations

West Nile Virus (WNV) has emerged in recent years in temperate regions of North America, with the first appearance of the virus in North America occurring in New York City in 1999 (MMWR 2002, Rappole et al. 2000). Since 1999 the virus has spread across the United States and was reported to occur in 44 states and the District of Columbia in 2002 (MMWR 2002). WNV is typically transmitted between birds and mosquitoes. The most serious manifestation of WNV is fatal encephalitis in humans, horses, and birds. WNV has been detected in at least 138 species, including DCCOs (CDC 2003). Although birds infected with WNV can die or become ill, most

infected birds survive and may subsequently develop immunity to the virus (CDC 2003, Cornell University 2003). In some bird species, particularly Corvids (crows, blue jays, ravens, magpies), the virus causes disease (often fatal) in a large percentage of infected birds (Audubon 2003, CDC 2003, Cornell University 2003, MMWR 2002). In 2003, Ohio reported WNV in 79 of 88 counties, either in birds, mosquitoes, humans, or horses. Of the reports, 107 human and 106 horse cases were identified (OSU Extension Fact Sheet WNV-1000-04). Current data from the Center for Disease Control (CDC) indicates that birds have tested positive for WNV in 31 of 88 Ohio counties in 2005. Although DCCOs can be infected with WNV, they likely are not a major reservoir for the virus in Ohio and, at present, the ODH does not test DCCOs for WNV.

### Exotic Newcastle Disease

Exotic Newcastle Disease (END) is a contagious and fatal viral disease affecting all species of birds, including domestic poultry and wild birds. END is spread primarily through direct contact between healthy birds and the bodily discharges of infected birds. The disease is transmitted through infected birds' droppings and secretions from the nose, mouth, and eyes. Following an outbreak of END on Lake of the Woods, Minnesota in the early 1990s, the DCCO population on the lake declined from approximately 4,800 pairs in 1989 to approximately 2,800 in 1997, but subsequently increased to just over 4,300 nesting pairs in 2004. This demonstrates the ability of DCCO populations to rebound from disease outbreaks such as END. At this time there have been no reports of END in Ohio.

#### **2.1.2 Effects on other Wildlife and Fish Species, Including Threatened and Endangered Species**

A common concern among members of the public and wildlife professionals, including the lead and cooperating agencies, is the impact of CDM methods and activities on non-target species, including T&E species. Of particular concern are the potential impacts on co-nesting colonial waterbirds (ie. great egrets, great blue herons, and black-crowned night herons; Appendix D). Impacts of the proposed action on co-nesting colonial waterbirds may be positive because they reduce DCCO competition for nesting sites, or they may adversely affect other species. The number of species nesting in each colony, their longevity and the stability of their populations are among the factors that are important to consider in assessing their overall contribution to waterbird conservation efforts in Ohio and the Great Lakes. Standard operating procedures (SOPs) for the EA (Chapter 3) include measures intended to mitigate or reduce the effects of CDM on non-target species populations. To reduce the risks of adverse effects to non-target species, the lead and cooperating agencies would select damage management methods that are as target-selective as practicable and apply CDM methods in ways which reduce the likelihood of disturbing, capturing or killing non-target species. The lead and cooperating agencies have agreed to consult with one another before undertaking DCCO control activities at any of the sites in Ohio where DCCOs co-nest with other colonial waterbirds.

As part of the DCCO FEIS (USFWS 2003), the USFWS completed an Intra-Service Section 7 Biological Evaluation on the management of DCCOs in the United States. Of the federally listed bird species in Ohio, only the piping plover and bald eagle are of potential concern as both are known to occur at or near potential control sites. However, the occurrence of piping plover in Ohio is rare due to low availability of suitable habitat. An Intra-Service Section 7 Biological Evaluation is also being conducted for CDM activities in Ohio. All conservation measures recommended by the USFWS for the protection of T&E species in the Ohio Intra-Service Section 7 Biological Evaluation will be incorporated into the final EA as needed depending upon the alternative selected. State listed species in the area where CDM activities could be conducted, include the snowy egret, and cattle egret.

### **2.1.3 Effects on Human Health and Safety**

#### **2.1.3.1 Effects on Human Health and Safety from CDM Methods**

Some people may be concerned that use of CDM methods, such as firearms and pyrotechnic scaring devices, could cause injuries to people. WS and ODW personnel occasionally use rifles and shotguns to remove or scare DCCOs that are causing damage. Shotguns may also be used on airports to scare or remove birds which pose a threat to aircraft or air passenger safety. WS frequently uses pyrotechnics in noise harassment programs to disperse or move birds away from an area. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive issue and a concern because of issues relating to the safety and potential misuse of firearms. To ensure safe use and firearms awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards. Similarly, state wildlife officials will require their personnel to be properly trained in firearm safety before participating in CDM activities. WS employees who carry firearms as a condition of employment are required to sign a form certifying that they meet the criteria as stated in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

#### **2.1.3.2 Effects on Human Health and Safety from Not Conducting CDM**

The concern stated here is that the absence of adequate CDM would result in adverse effects on human health and safety, because DCCO damage would not be curtailed or reduced to the minimum levels possible and

practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives. These potential adverse effects are discussed in Section 1.5.5.

#### **2.1.4 Effects on Aesthetic Values**

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and depends on what an observer regards as beautiful. The human attraction to animals has been well documented throughout history and began when humans domesticated animals. The American public is no exception, and some people may consider individual wild animals and birds as “pets” or exhibit affection toward these animals, especially people who enjoy coming into contact with or viewing wildlife. Conversely, others may see the same species as a detriment to aesthetic values (e.g. droppings and damage to vegetation associated with large groups of DCCOs). Therefore, the public reaction to wildlife damage management is variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the aesthetic value of wildlife and the best ways to reduce conflicts/problems between humans and wildlife.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user’s personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

There is likely to be concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Potential impacts of the proposed action on aesthetic values include potential reductions in opportunities to view and enjoy DCCOs at specific sites where CDM is conducted, the potential that CDM might adversely affect co-nesting colonial waterbirds and opportunities to view and enjoy these species, the risk that if left unmanaged, expanding DCCO populations may result in the elimination of some co-nesting colonial waterbirds from certain sites and

adversely affect bird viewing opportunities, and impact of CDM activities on opportunities to enjoy certain fishery resources.

There is also the possibility that increased volumes of DCCO droppings in water and on vegetation could decrease the aesthetic value of recreational areas. The highly acidic feces of DCCOs is detrimental to the survival of trees and other plant life. Based upon survey information provided by Wires et al. (2001), biologists in the Great Lakes region reported that DCCOs have an impact on herbaceous layers and trees. Impacts to trees were reported mainly due to guano deposition, and resulted in tree die off at breeding colonies and roost sites. The loss of trees and ground vegetation at the island and inland sites may be displeasing to many people.

Additionally all of the DCCO colonies within the state are surrounded by public waters which receive significant recreational use. Boaters, swimmers and fisherman may all be affected by heightened levels of guano in the water.

#### **2.1.5 Humaneness and Animal Welfare Concerns of Methods Used by WS**

DCCO control methods, especially lethal control, may raise issues about humaneness and animal welfare. The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest 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 is described as a " . . . highly unpleasant emotional response usually associated with pain and distress." However, suffering " . . . can occur without pain . . .," and ". . . pain can occur without suffering . . ." (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for " . . . little or no suffering where death comes immediately . . ." (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would " . . . probably be causes for pain in other animals . . ." (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since " . . .

neither medical [n]or veterinary curricula explicitly address suffering or its relief’ (CDFG 1991).

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 within the constraints imposed by current technology and funding.

#### **2.1.6 Effects of Carcass Disposal**

Some individuals may be concerned about the fate of DCCO carcasses and about the impacts of carcass disposal on soil, water and air (odor) quality.

#### **2.1.7 Effects of CDM on Recreation**

Both Green Island and WSI are closed to public access, but sport fishing and pleasure boating are popular activities in the surrounding area. CDM on and around the islands could affect boaters with noise from firearms or pyrotechnics. Additionally, boat traffic could be temporarily prohibited near the islands during shooting operations. USFWS, ODW, and WS could plan for operations to occur at dates and times when recreational watercraft numbers are lowest on the lake.

It is also possible that increased volumes of DCCO droppings in water and on vegetation could decrease the aesthetic value of recreational areas. The highly acidic feces of DCCOs is detrimental to the survival of trees and other plant life. Based upon survey information provided by Wires et al. (2001), biologists in the Great Lakes region reported DCCOs as having an impact to herbaceous layers and trees. Impacts to trees were reported mainly from guano deposition, and resulted in tree die off at breeding colonies and roost sites. The loss of trees and ground vegetation at the island and inland sites may be displeasing to many people.

Additionally, all of the DCCO colonies within the state are surrounded by public waters which receive significant recreational use. Boaters, swimmers and anglers may all be affected by heightened levels of guano in the water.

If no control is conducted, boaters may observe fewer species and numbers of colonial waterbirds and/or increased degradation of island vegetation. The potential aesthetic loss of colonial waterbird species is discussed in section 2.1.4.

## **2.2 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE**

### **2.2.1 Impacts on Biodiversity**

The proposed program does not attempt to eradicate any native species of wildlife. Any CDM actions would be conducted in accordance with international, Federal and State laws, and regulations enacted to ensure species viability. Effects on target and non-target species populations because of WS' lethal CDM activities are minor, as shown in Section 4.1.1 and 4.1.2, and therefore will not result in significant nationwide or statewide impacts on biodiversity (USDA 1997, Revised).

### **2.2.2 A "Threshold of Loss" Should Be Established Before Allowing Any Lethal CDM**

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach an arbitrary predetermined threshold. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, resource owners and situations differ widely and a set of wildlife damage thresholds would be difficult to determine or justify. WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

### **2.2.3 Cormorant Conflict Management as proposed in the preferred alternative is contrary to the purpose and mission of a National Wildlife Refuge and Wilderness area.**

WSI is a Federal Wilderness Area and National Wildlife Refuge. Some individuals may be concerned that the CDM allowed under 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 DCCOs.

WSI 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 2000*b*). 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 (2000).

The CCP for the Refuge 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*a*). 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).

The WSI population of breeding DCCOs exceeded the CCP management goal in 1999 and has continued to increase (Figure 1-3). However, as discussed in Sections 1.5.1 and 1.5.6.1, the increasing DCCO population appears to be having a negative effect on the vegetation at WSI which is essential habitat for the great blue herons, great egrets and black-crowned night herons on the refuge. Observations of vegetation damage on WSI, and the results of high DCCO nesting populations on Middle Island and East Sister Island, have led the lead and cooperating agencies to conclude that allowing current high or increasing numbers of DCCOs to persist on the refuge without some level of management will 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 DCCOs at WSI to between 1,500 and 2,000 pairs will meet the CCP objectives for the DCCO population and allow 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 (6 RM 8).

WSI is closed to the public, so the proposed action will not adversely impact the public's recreational use of the site.

**2.2.4 There are effective mechanisms in place to address DCCO damage to property and aquaculture facilities and to reduce risks from DCCOs at airports. There is no need to expand DCCO removals for these issues.**

CDM activities were been conducted in the state prior to the completion of this EA. The anticipated level of take for management of DCCO damage to property, aquaculture and DCCO related risks to human health and safety is not anticipated to change from the current level if the preferred Alternative is adopted (See description of alternatives in Chapter 3 and anticipated DCCO take in Section 4.1.1). The EA analyzes the environmental impacts of alternatives for managing all types of DCCO damage to provide a cumulative impact analysis for all CDM in Ohio and to allow the agencies to review and reconsider alternatives for existing CDM programs. CDM activities are only conducted when a need for action has been confirmed and only at the location where the damage is occurring. The EA does not propose or anticipate broad-scale statewide reductions in DCCO numbers.

## **CHAPTER 3: ALTERNATIVES**

### **3.0 INTRODUCTION**

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992); Appendix J (“Methods of Control”), Appendix N (“Examples of WS Decision Model”), and Appendix P (“Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program”) of the WS FEIS (USDA 1997, Revised); and Appendix 4 (“Management Techniques”) of the USFWS DCCO FEIS (USFWS 2003).

#### **Agency Decisions**

These alternatives describe the actions available to the USFWS Migratory Bird Office (issuing permits and oversight of the PRDO), the USFWS WSI National Wilderness Area and Wildlife Refuge (DCCO management at WSI) and WS (involvement in CDM). Although the lead and cooperating agencies have worked together to produce a joint document and intend to collaborate on CDM in Ohio, each of the lead agencies will be making its own decision on the alternative to be selected in accordance with the standard practices and legal requirements pertaining to each agency’s decision making process.

Although, the agencies make independent decisions, the decisions made by one agency can restrict the actions taken by the other agencies. For example, if the USFWS Migratory Bird Office and WS selected an alternative that allowed for non-lethal and lethal CDM techniques, but WSI selected an alternative that only allowed for non-lethal methods, then WS would only use non-lethal methods at WSI but could use non-lethal and lethal techniques at other locations in the state. Alternatively, if the USFWS Migratory Bird Office and WSI chose an alternative that allowed for non-lethal and lethal CDM techniques, but WS selected a non-lethal only alternative, then WS could help with non-lethal CDM, but lethal CDM could only be conducted at WSI with the assistance of ODW. Selection of a non-lethal only alternative by WS would also prevent WS from conducting the consultations and completing the forms required by the USFWS before issuing a MBP. Therefore it would not be possible to obtain a MBP for CDM. Details on the relationships among agency decisions are provided in Appendix E.

For simplicity and clarity of analysis, each of the alternatives below is described and its impacts are analyzed as if the lead agencies had selected the same alternative.

### **3.1 ALTERNATIVES ANALYZED IN DETAIL**

Alternatives analyzed in detail are:

- Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action).
- Alternative 2 – Only Non-lethal CDM by Federal Agencies

- Alternative 3 – Only Technical Assistance by Federal Agencies
- Alternative 4 – No CDM by Federal Agencies.
- Alternative 5 – Integrated CDM Program, Excluding Implementation of the PRDO (No Action). This is the “No Action” alternative as defined by the Council on Environmental Quality

## 3.2 DESCRIPTION OF THE ALTERNATIVES

### 3.2.1 Alternative 1. Integrated CDM Including Implementation of the PRDO (Proposed Action)

The lead and cooperating agencies propose to implement an integrated CDM program in the State of Ohio, including working under the PRDO and MBPs. An integrated wildlife damage management (IWDM) approach would be implemented to reduce DCCO damage to and conflicts with public resources, aquaculture, property, and human health and safety. The IWDM strategy would encompass the use and recommendation of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, the lead and cooperating agencies could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, nest destruction, or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed through use of shooting, egg oiling/addling/destruction, or euthanasia following live capture. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. The primary strength of this alternative and the IWDM approach is that it allows for access to the full range of CDM techniques when developing site specific management plans. However, under this alternative, the lead and cooperating agencies could decide to only use a subset of the possible CDM methods for the management of DCCO damage at a specific site. For example, it would be possible to use only non-lethal techniques at specific sites.

Double-crested cormorant conflict management activities would be conducted in the State, when requested and funded, on private or public property, after receiving permission from the landowner/land manager. All management activities would comply with appropriate Federal, State, and local laws. The USFWS would be responsible for ensuring compliance with the PRDO and MBPs and that the long-term sustainability of regional DCCO populations is not

threatened. Selection of this alternative by any of the agencies would not restrict the management options available to the other agencies.

Lake Erie: If this alternative is selected, the agencies would work to meet the management objectives set in Section 1.5.6.3 as quickly as possible (likely a one to three year period). Preference would be given to non-lethal techniques such as hazing to encourage the DCCOs to move to other areas (not on Lake Erie islands). However, experience of the cooperating agencies indicates that lethal techniques would also be needed to adequately reduce the number of birds nesting on Lake Erie. Carcasses of DCCOs killed at WSI would be disposed of in a composting facility on WSI. Carcasses of DCCOs killed for reduction of damage to public resources on the other Lake Erie islands and near shore areas would be disposed of in a composting facility built on Green Island. Both composting facilities would be built and maintained in accordance with Ohio Division of Soil and Water (ODSW) requirements. Personnel from ODW and ONWR would be specifically trained in the design and maintenance of these facilities by the OSUE. Carcasses from other CDM activities would be disposed of in landfills or State EPA approved incinerators in accordance with State and Federal regulations.

### **3.2.2 Alternative 2. Only Non-lethal CDM by Federal Agencies**

Under this alternative, the Federal agencies would only use and permit non-lethal techniques for DCCO management. WS would not assist with the site evaluations and completion of WS Form 37 required by the USFWS for a MBP. The USFWS would not issue MBPs for lethal techniques to resolve conflicts with DCCOs. Permits are not required from the USFWS for non-lethal CDM techniques. Entities requesting CDM assistance for damage concerns from the lead and cooperating agencies would only be provided information and assistance with non-lethal methods such as harassment, empty nest destruction, resource management, exclusionary devices, or habitat alteration. Depending upon which agency(ies) select this alternative, information on lethal CDM methods could still be available through sources such as USDA Agricultural Extension Service offices, USFWS, ODW, universities, or pest control organizations.

The USFWS FEIS on DCCO management permits PRDO actions that will result in the take of less than 10% of the local DCCO population (USFWS 2003). Decisions made by the USFWS in this EA cannot affect this type of CDM action on non-Federal land. The ODW would use lethal methods to take up to 10% of local DCCO in combination with non-lethal methods to try and meet management goals (Section 1.5.6.3) at all sites under its jurisdiction (i.e., not at WSINWR). Only non-lethal methods could be used for CDM at WSINWR because Federal agency (USFWS) approval would be needed to work there. Overall management goals for the Lake Erie islands and near shore areas would be as described for Alternative 1.

### **3.2.3 Alternative 3. Only Technical Assistance by Federal Agencies**

The lead and cooperating agencies considered two ways to design this alternative. In one design, the Federal agencies would not conduct operational CDM, but all permitting including giving other agencies (ODW) permission to work on Federal lands would be considered a form of technical assistance and would be allowed. Impacts of this alternative would have been similar to Alternative 1 and would have provided little new information. In the second design, the Federal agencies would not conduct operational CDM and would not permit CDM on Federal lands. The agencies selected this design for the EA because it allowed consideration of the impacts of an intermediate level of CDM not analyzed in any of the other alternatives and also allowed the agencies to consider the impacts of having CDM conducted at some but not all sites that were under consideration in Alternative 1. Analysis of the second design of this alternative also gave the agencies the opportunity to address concerns of individuals opposed to CDM on a National Wildlife Refuge (See Section 2.2.3).

Under this alternative, the Federal agencies would not be able to conduct operational CDM in Ohio, and would only provide technical assistance. WS would be able assist with site evaluations and completion of WS Form 37 required by the USFWS for a MBP. Issuing permits is a type of technical assistance, so the USFWS would still be able to issue MBPs and grant approval for PRDO projects anticipated to take more than 10% of local DCCO population. However, operational CDM would not be conducted on Federal lands (e.g., WSINWR). Cormorant conflict management for the protection of public resources on the remaining Lake Erie islands and near shore areas and the inland colonies could only be conducted by ODW, and would be the same as described for Alternative 1. WS would not be involved in operational CDM.

### **3.2.4 Alternative 4. No CDM by Federal Agencies**

Under this alternative, the Federal agencies would not participate in CDM. WS would not conduct the consultations or complete the forms required by the USFWS to issue MBPs and the USFWS would not issue MBPs. Non-lethal CDM techniques could still be used without a permit. Depending upon the agency(ies) to select this alternative, information on CDM methods would still be available through other sources such as USDA Agricultural Extension Service offices, USFWS, ODW, universities, or pest control organizations.

As with Alternative 2, the USFWS would not grant approval for actions conducted under the PRDO that propose the take of more than 10% of the local DCCO population. The selection of this alternative by the USFWS would not affect ODW's use of lethal CDM methods under the PRDO that would result in the take of less than 10% of the local population. The ODW has made it clear that it would use lethal methods to take less than 10% of local DCCO in combination with non-lethal methods to try and meet management goals (Section 1.5.6.3) at all

sites under its jurisdiction (i.e., not at WSINWR). No CDM would be conducted at WSINWR because Federal agency (USFWS) approval would be needed to work there.

### **3.2.5 Alternative 5. - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

As defined by the CEQ, the no action alternative can be interpreted as the continuation of current CDM practices. None of the action agencies have taken action under the PRDO, so the USFWS would not conduct/authorize CDM under the PRDO. CDM could still be conducted under MBPs and WS could provide technical and operational assistance with CDM conducted under MBPs. Migratory Bird Permits could be requested and issued for the reduction of DCCO impacts on sensitive species or their habitats (e.g., vegetation), but, with the exception of research projects, would generally not be issued for birds taking free-swimming fish from public waters. MBPs would be issued for damage to private property and for alleviation of human health and safety issues.

The management goals set for this EA were established to protect vegetation and co-nesting birds, so overall objectives for the Lake Erie islands and near shore areas will be the same as described for Alternative 1. WSINWR could grant approval for CDM conducted under MBPs.

## **3.3 CDM STRATEGIES AND METHODOLOGIES**

### **3.3.1 Integrated Wildlife Damage Management (IWDM)**

The most effective approach to resolve 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 a cost-effective manner while minimizing the potentially harmful effects on DCCO populations, humans, non-target species, and the environment. IWDM may incorporate cultural practices (e.g., fish husbandry), habitat modification (e.g., exclusion, vegetation management), animal behavior modification (e.g., scaring, roost dispersal), and removal of individual offending animals (e.g., shooting, live capture and euthanasia), local population reduction (e.g., shooting and nest and egg destruction), or any combination of these.

The IWDM approach proposed by the lead and cooperating agencies involves the use of four general strategies for addressing DCCO damage:

- Technical Assistance Recommendations  
“Technical assistance” as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of

the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. 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.

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 DCCO damage problems.

- Direct Damage Management Assistance  
This is the implementation or supervision of CDM activities. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone. When conducted by WS direct damage management assistance is not conducted until Agreements for Control or other comparable documents are completed which detail the type of CDM assistance to be provided and the methods to be used. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of trained damage management personnel are often required to effectively resolve problems, especially if restricted-use chemicals are necessary, or if the problems are complex.
- Educational Efforts  
Education is an important element of CDM because wildlife damage management is about finding balance and coexistence between the needs of people and wildlife. This is extremely challenging as nature has no balance, but rather, is continually in flux. In addition to the routine dissemination of recommendations and information to individuals or organizations with DCCO damage, lectures, courses, and demonstrations are provided to aquaculture producers, homeowners, state and county agents, colleges and universities, and other interested groups. The lead and cooperating agencies frequently work together in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that wildlife professionals, and the public are updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

- Research and Development

The lead and all cooperating agencies are all involved in research efforts relating to DCCO biology, the impact of DCCOs on fisheries, wildlife and other natural resources, and CDM techniques. The lead and cooperating agencies also cooperate and exchange information with universities and other agencies and entities conducting DCCO research. Research findings are used to clarify the need for action, refine management objectives and improve the methods used to address DCCO damage.

### 3.3.2 Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). The Decision Model is not a written documented process, but a mental problem-solving process similar to that used by all wildlife management professionals including those in the lead and cooperating agencies when addressing a wildlife damage problem. Trained personnel assess the problem; and evaluate the appropriateness and availability (legal and administrative) of damage management strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy.

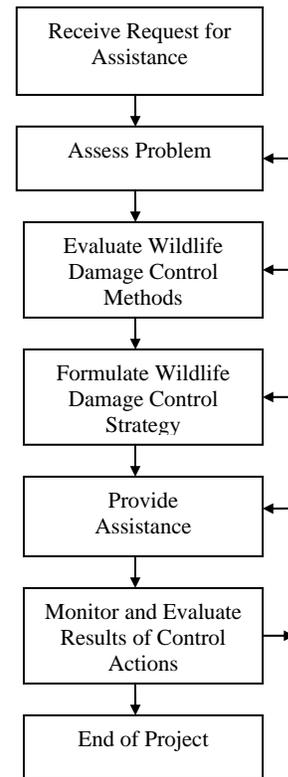


Figure 3-1. WS decision Model

### 3.3.3 Cormorant Conflict Management Methods Available for Use (See Appendix 4 of USFWS FEIS (USFWS 2003) for detailed description of methods)

#### 3.2.3.1 Non-lethal Methods

Agricultural producer and property owner practices consist primarily of non-lethal preventative methods such as cultural methods and habitat

modification. Examples of habitat modification include the removal of nesting trees or nesting materials.

Animal behavior modification refers to tactics that alter the behavior of birds or disperse birds to reduce damages. Some, but not all, of these tactics include:

- Exclusion methods such as netting,
- Propane exploders (to scare birds),
- Pyrotechnics (to scare birds),
- Distress calls and sound producing devices (to scare birds),
- Visual repellents and scaring tactics (to scare birds),
- Lasers (to scare birds),
- Scarecrows, and
- Nest destruction before eggs or young are in the nest.

Dispersal of DCCOs from day/night roosts or from breeding/nesting sites utilizing propane exploders, pyrotechnics, distress calls/sound producing devices, visual repellents or scarecrows may help to limit or reduce DCCO activity in the area where damage is occurring.

Lasers are a non-lethal technique recently evaluated by USDA's National Wildlife Research Center (NWRC) (Blackwell et al. 2002, Glahn et al. 2000a). The low-powered laser has proven to be effective in dispersing a variety of bird species in a number of different environments. The low-powered laser is most effective before dawn or after dusk when the red beam of the laser is clearly visible. Bright sunlight will "wash out" the laser light, rendering it ineffective. Although researchers are not sure whether birds see the same red spot as people, it is clear that certain bird species elicit an avoidance response in reaction to the laser. The birds appear to view the light as a physical object or predator coming toward them and generally fly away to escape. Research, however, has shown that the effectiveness of low-powered lasers varies depending on the bird species and the context of the application. Lasers have been used to startle DCCOs under low-light conditions (Wires et al 2001, Hatch and Weseloh 1999, and McKay et. al 1999).

### **3.2.3.2 Lethal Methods**

Egg addling/destruction is the practice of destroying the embryo in the egg prior to hatching; physically breaking eggs; or directly removing eggs from a nest and destroying them.

Egg oiling is a method for suppressing reproduction of birds by spraying a small quantity of food grade vegetable/corn oil on eggs in nests. This method has an advantage over egg destruction in that birds generally

continue incubating the eggs and do not re-nest. The EPA has ruled that the use of corn oil for this purpose is exempt from registration requirements under the Federal Insecticide, Fungicide and Rodenticide Act.

Live traps/nets are various types of traps designed to capture birds alive. Cormorants captured in live traps, nets, or by hand would be humanely euthanized.

Shooting is an effective dispersal technique and a way to reduce bird numbers. Shooting with rifles or shotguns is sometimes used to manage DCCO damage problems when lethal methods are determined to be appropriate. At many locations, the use of a .22 caliber rifle equipped with a silencer is the only practical method of removing DCCOs without spooking them or having a negative effect on other birds that are protected under Federal law. This is the situation at Lake Erie. CDM programs in other parts of the United States and Canada have been experimenting with other types of firearms and ammunition as alternatives for minimizing impacts on non-target species near DCCOs. As data become available, new shooting strategies will be incorporated as practical and appropriate (e.g., legal for use in Ohio). Birds are killed as quickly and humanely as possible. Shooting can be helpful in some situations to supplement and reinforce other dispersal techniques. It almost never results in the death of non-target species and may be used in conjunction with the use of spotlights and decoys.

Cervical dislocation is an American Veterinary Medical Association (AVMA) approved euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds which are captured by hand or in live traps/nets. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as a humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and can be quickly accomplished (Beaver et al. 2001).

Carbon dioxide (CO<sub>2</sub>) gas is an AVMA approved euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds captured in live traps/nets or by hand. Live birds are placed in a container or chamber into which CO<sub>2</sub> gas is released. The birds quickly die after inhaling the gas. CO<sub>2</sub> gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO<sub>2</sub> by WS for euthanasia purposes is

exceedingly minor and inconsequential relative to the amounts used for other purposes by society.

### **3.2.3.3 Composting**

The Ohio Environmental Protection Agency (EPA) oversees solid waste disposal in the state. In consultations with the Ohio EPA (A. Shockley 2005) it was determined that, considering the isolation of the composting sites on the islands, and the frequency (or lack thereof) that carcasses would be added, the proposed composting facilities are more like a farm animal composting operation than a solid waste disposal facility regulated by the Ohio EPA. Farm animal composting in Ohio falls under the regulation of the Ohio Division of Soil and Water, and the agency's sole requirement is that the people who do the composting become certified by the Ohio State University Extension Agency. Staff from ODW and the ONWR would be appropriately trained in the construction and maintenance of the composting facilities proposed for use in this EA. The compost would not be distributed off site but remain on the island. The initial plans are for one compost area per island (4.5m long, 2.5m wide and 1.5m tall) sectioned into four sub-areas with each sub-area used every four years.

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

### **3.4.1 Lethal CDM Only**

Agency(ies) selecting this alternative would not use non-lethal techniques for CDM. This alternative was eliminated from further analysis because some DCCO damage problems can be resolved effectively through non-lethal means and at times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms.

### **3.4.2 Compensation for DCCO Damage Losses**

The compensation alternative would require the establishment of a system to reimburse persons affected by DCCO damage. This alternative was eliminated from further analysis because no Federal or State laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the WS FEIS indicated that the concept has many drawbacks (USDA 1997, Revised):

- It would require larger expenditures of money and labor to investigate and validate all damage claims and determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current program.
- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm damage, and certain types of damage could not be conclusively verified.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and lethal control would most likely continue as permitted by Federal and State law.
- Compensation would not be practical for reducing threats to human health and safety or damage to public resources.

### **3.4.3 Non-lethal Methods Implemented Before Lethal Methods**

This alternative is similar to Alternative 1 except that WS personnel would be required to always recommend or use non-lethal methods prior to recommending or using lethal methods to reduce DCCO damage. Both technical assistance and direct damage management would be provided in the context of a modified IWDM approach. The Proposed Action recognizes non-lethal methods as an important dimension of IWDM, gives them first consideration in the formulation of each management strategy, and recommends or uses them when practical before recommending or using lethal methods. The important distinction between the Non-lethal-Methods-First Alternative and the Proposed Alternative is that the former alternative would require that all non-lethal methods be used before any lethal methods are recommended or used.

While the humaneness of the non-lethal management methods under this alternative would be comparable to the Proposed Program Alternative, the extra harassment caused by the required use of methods that may be ineffective could be considered less humane and may unduly disturb co-nesting species. As local bird populations increase, the number of areas negatively affected by birds would likely increase and greater numbers of birds would be expected to congregate at sites where non-lethal management efforts were not effective. This may ultimately result in a greater number of birds being killed to reduce damage than if lethal management were immediately implemented at problem locations (Manuwal 1989). Once lethal measures were implemented, DCCO damage would be expected to drop relative to the reduction in localized populations of birds causing damage.

Since in many situations this alternative would result in greater numbers of DCCOs being killed to reduce damage, at a greater cost to the requester, and result in a delay of reducing damage in comparison to the Proposed Alternative,

the Non-lethal-Methods -First Alternative is removed from further discussion in this document.

### **3.5 STANDARD OPERATING PROCEDURES (SOPs) FOR CDM**

The current WS program, nationwide and in Ohio, uses many SOPs to increase the safety of and decrease or prevent negative impacts from wildlife damage management actions. These measures are discussed in detail in Chapter 5 of the ADC FEIS (USDA 1997, Revised) and Chapter 4 of the DCCO FEIS (USFWS 2003).

#### **3.5.1 Standard Operating Procedures**

Some key SOPs pertinent to the proposed action and the other alternatives that will be incorporated into CDM activities, depending upon the alternative selected, include:

- A Decision Model thought process like the WS Decision Model (USDA 1997, Revised) will be used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives to avoid adverse effects on threatened and endangered species are identified through consultation with the USFWS and implemented to avoid effects to threatened and endangered species.
- Research is being conducted to improve CDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate non-target hazards and environmental effects.
- When used in accordance with WS procedures and policies, the risk of adverse impacts on public safety and hazard to the environment from the proposed CDM methods have been determined to be low according to a formal risk assessment (USDA 1997 Revised, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.
- Agents acting under the authority of the lead and cooperating agencies (50 CFR 21.48(c)(2)) will be informed and trained in the safe and proper use of CDM methods including applicable laws and regulations authorizing use of these methods.

#### **3.5.2 Standard Operating Procedures Specific to the Issues**

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

### Effects on Target Species Populations

- CDM activities are directed at resolving DCCO damage problems by taking action against individual problem birds, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- DCCO take is monitored by comparing numbers of birds killed with overall populations or trends in populations to assure that the magnitude of take is maintained below the level that would threaten the long-term sustainability of regional DCCO populations (See Chapter 4).
- To avoid adverse impacts on DCCO populations, the lead and cooperating agencies will abide by the terms and conditions of the PRDO (50 CFR 21.48) and USFWS migratory bird permits issued for the management and control of DCCO damage and conflicts, including, but not limited to, reporting on an annual basis the number of nests in which eggs were oiled or destroyed and the number of DCCOs killed.
- In certain circumstances when conducting control activities in DCCO breeding colonies, WS and ODW is required to notify the USFWS prior to conducting control activities with the approximate number of DCCOs that may be killed under the proposed project (50 CFR 21.48(d)(9)). The USFWS will review this advanced notification to determine if the proposed project would threaten the long-term sustainability of regional DCCO populations.
- When shooting nesting DCCOs, WS and ODW will attempt to remove both breeding adults from a specific nest to prevent the possibility of renesting.
- Every attempt will be made to cease killing of breeding adult DCCOs by the time of chick hatching so that young are not left to starve or be preyed upon at the nest.
- If determined practical and effective, egg oiling and shooting of DCCOs will target different nests or areas of a colony to maximize effectiveness and minimize the potential for renesting.

### Effects on Non-target Species Populations Including T&E Species

- WS and ODW personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding non-targets.
- Observations of birds in areas that are associated with DCCO concentrations are made to determine if non-target or threatened and endangered species (Federal or State Listed) would be at risk from CDM activities.
- As appropriate, management actions taken in mixed-species waterbird colonies would be conducted in such a manner to avoid or minimize impacts to non-target species (i.e. visiting sites during early morning and late afternoon hours to avoid thermal stress to eggs/nestlings, conducting

actions as early as possible in the nesting season to reduce nestling abandonment, etc.).

- Egg oiling will only be used for ground and shrub nesting DCCOs to minimize disturbances to co-nesting colonial waterbird species.
- Where appropriate, egg oiling activities will take place during night hours to minimize potential impacts to co-nesting colonial waterbird species. However, WS and ODW will not conduct such activities during night hours if it is determined unsafe to do so.
- When shooting DCCOs in breeding colonies, WS will use the smallest caliber firearm that is effective and will use noise-suppressed firearms (silencers) as deemed appropriate to minimize repeated disturbances to co-nesting colonial waterbird species.
- The retrieval of DCCO carcasses will be completed at such intervals and times of day that will cause the least amount of disturbances to co-nesting colonial waterbird species.
- WS and ODW have consulted with the USFWS regarding potential effects of control methods on threatened and endangered species, and will abide by reasonable and prudent alternatives and/or reasonable and prudent measures established as a result of that consultation (see Section 4.1.2).
- WS and ODW will abide by the conservation measures specified in the USFWS FEIS (USFWS 2003) and in 50 CFR 21.48(d)(8) to avoid adverse effects on Federally listed species.
- Prior to any control action, WS will consult with the ODW to ensure that no actions taken under this plan will adversely affect Ohio's listed species.
- Non-toxic shot will be used when using shotguns to harass or kill DCCOs.
- As applicable, WS and ODW will review the USFWS Final Report (Wires and Cuthbert 2001) – “Prioritization of waterbird colony sites for conservation in the U.S. Great Lakes region” prior to conducting control activities at DCCO breeding colonies. If WS and ODW propose to conduct control activities at any of the sites identified in this report as priority sites for waterbird conservation, they will consult with the USFWS at that time for advice on how to proceed with management actions.
- To avoid adverse impacts on non-target species, WS and ODW will abide by the terms and conditions of the FEIS, PRDO (50 CFR 21.48) and USFWS migratory bird permits issued to WS and ODW for the management and control of DCCO damage and conflicts.
- As specified in the PRDO (50 CFR 21.48(d)(10)), on an annual basis, WS and ODW are required to provide the USFWS with a statement of efforts being made to minimize incidental take of non-target species and also to report the number and species of migratory bird involved in such take, if any. The USFWS will review this information to ensure CDM activities will not adversely impact non-target migratory bird species.
- In certain circumstances when conducting control activities in DCCO breeding colonies, WS and ODW are required to notify the USFWS prior

to conducting control activities including when other (non-target) bird species are present (50 CFR 21.48(d)(9)).

- Compost areas on Green Island and WSI would not be placed over any likely Lake Erie watersnake hibernacula.
- Compost sites will be located > 21 m from the shoreline on to prevent disruption of summer habitat potential used by Lake Erie watersnakes.

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

### 4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions when selecting among the alternatives for meeting the purpose and need of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. Each alternative is analyzed in comparison with the no action alternative (Alternative 5) to determine whether the real or potential effects would be greater, less, or the same. Although each agency has the authority to make its own decision regarding the alternative to be selected, impacts are analyzed for each alternative as if all of the lead and cooperating agencies had selected the same alternative. This allows for analysis of the full range of potential impacts from the proposed alternatives while maintaining clarity and avoiding undue repetition. Impacts of the lead and cooperating agencies selecting differing alternatives will be intermediate to those presented in this chapter.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: geology, minerals, flood plains, wetlands, visual resources, prime and unique farmlands, timber, and range. These resources will not be analyzed further.

**Cumulative Effects:** Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

**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.

**Effects on sites or resources protected under the National Historic Preservation Act:** The actions of the lead and cooperating agencies are not undertakings that could adversely affect historic resources (See Section 1.7.2)

### 4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

#### 4.1.1 Effects on DCCO Populations

The analysis for magnitude of impact on wildlife populations generally follows the process described in Chapter 4 of USDA (1997, Revised). Magnitude is described in USDA (1997, Revised) as “. . . a measure of the number of animals killed in relation to their abundance.” Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable (i.e.,

“sustainable”) harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Measures to avoid adverse impacts on DCCO populations are described in Chapter 3.

### **Alternative 1 – Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

At present, maximum annual take of DCCOs for management of damage to aquaculture, public resources, private property, and risks to human health and safety and DCCO take for research projects would be identical to that described for Alternative 5. This similarity exists because all proposed PRDO projects are for the protection of sensitive vegetation and wildlife species. The USFWS could issue MBPs for this type of CDM. The only difference is that take for the protection of public resources would occur under the authority and procedures established for the PRDO (USFWS 2003). However, at a future time, this alternative would also allow for the lead and cooperating agencies to conduct actions for the protection of fishery resources so long as these projects do not reduce the local DCCO populations below the management objectives described in Section 1.5.6.3 and so long as these projects do not increase cumulative take and other impacts beyond the maximum levels analyzed in this EA. If projects for the protection of fishery resources were to occur, take under this alternative would be greater than Alternative 5, wherein projects for the protection of public fishery resources would be extremely limited. However, maximum annual take would remain the same for both Alternatives and would amount to a 48 to 61% reduction in the number of breeding DCCOs at WSINWR and a 49 to 57% reduction in the statewide population of DCCOs (assuming a conservatively estimated total state population of 13,000 DCCOs – see Tables 4-1, 4-2, and analysis of impacts for Alternative 5). The proposed action would reduce the Ohio breeding DCCO population to a range of between 1,921 and 2,421 breeding pairs. This is similar to the number of breeding birds that were counted in the state in 1999-2000. The density of DCCOs increased from that level to the current density of 5,164 pairs over the period of five to six years. As discussed in Section 1.8.4, the EA would be amended and public comment solicited if the lead and cooperating agencies propose to conduct CDM projects for the protection of fishery resources that would result in impacts greater than those analyzed in this EA. Analysis provided for Alternative 5 indicates that the proposed level of CDM would not adversely impact the viability of the state, regional or national DCCO population.

### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Under this alternative, the Federal agencies would not kill any DCCOs or destroy eggs because no lethal methods would be used. As discussed in Section 3.1, WS would not complete the WS Form 37 consultations needed before USFWS could issue depredation permits, and the USFWS would not issue MBPs. Local

governments, landowners and their designated agents (e.g., private damage management businesses) could only use non-lethal CDM techniques.

Under the PRDO the State does have the authority to take up to 10% of local breeding population of DCCOs, with the consent of the land owner/manager, in order to protect public resources (USFWS 2003). ODW has indicated that it would use this authority on non-Federal lands. The USFWS would not permit lethal CDM techniques on WSINWR but non-lethal methods could be used to try and meet management objectives defined in Section 1.5.6.3. A maximum of 270 DCCOs could be taken by ODW under this alternative (Table 4-1). This is approximately 2% of Ohio's conservatively estimated summer DCCO population (see analysis of impacts for Alternative 5) and is a far lower level of take than would occur under Alternative 5. For reasons noted for Alternatives 5, the lead and cooperating agencies conclude that this alternative would not jeopardize the long-term sustainability of DCCO populations at the state, regional, or national level.

### **Alternative 3 – Only Technical Assistance from Federal Agencies**

Under this alternative, WS would have no impact on DCCO populations in the State because WS would not conduct any operational CDM activities and would be limited to providing advice on CDM. WS would still be able to complete the WS Form 37 consultations needed before USFWS could issue depredation permits. Issuing permits is a kind of technical assistance, so the USFWS could still issue MBPs for research, damage to private property and risks to human health and safety. However operational damage management would have to be conducted by the permittee or their designated agent, ODW, local government, or private wildlife damage management companies because the Federal agencies would be prohibited from providing operational assistance with CDM.

The USFWS could also grant approval for PRDO projects that propose to take more than 10% of the local breeding DCCO population on non-Federal lands. Cormorant conflict management would not occur at WSINWR. The ODW has indicated that it will conduct the same level of CDM on non-Federal lands under this alternative as would occur under Alternatives 1 and 5. A maximum of 2,686 or approximately 21% of Ohio's conservatively estimated summer DCCO population (see analysis of impacts for Alternative 5) would be taken under this Alternative (Table 4-2). DCCOs would not be harassed or taken from WSINWR. This level of take is less than that under the no action and proposed alternatives but greater than that for Alternatives 2 and 4. For reasons noted for Alternatives 1 and 5, the lead and cooperating agencies conclude that this alternative would not jeopardize the long-term sustainability of DCCO populations at the state, regional, or national level.

#### **Alternative 4 - No CDM by Federal Agencies**

Under this alternative, the Federal agencies would have no impact on DCCO populations in the state. As discussed in Section 3.1, WS would not complete the WS Form 37s consultations needed before USFWS could issue depredation permits, and the USFWS would not issue MBPs. However, under the PRDO the state does have the authority to take up to 10% of local breeding population of DCCOs, with the consent of the land owner/manager, in order to protect public resources (USFWS 2003). The ODW has indicated that it would use this authority to take up to 270 DCCOs (2% of Ohio's conservatively estimated summer DCCO population - see analysis of impacts for Alternative 5). DCCOs would not be harassed or taken from WSINWR. Local governments, landowners and their designated agents (e.g., private damage management businesses) could only use non-lethal CDM techniques. Therefore the cumulative impact on DCCOs would be similar to Alternative 2 (Table 4-2) and would not jeopardize the long-term sustainability of DCCO populations at the state, regional, or national level.

#### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

DCCOs range throughout North America, from the Atlantic coast to the Pacific coast (USFWS 2003). During the last 20 years, the DCCO population has expanded to an estimated 372,000 nesting pairs; with the U.S. population (breeding and non-breeding birds) conservatively estimated to be greater than 1 million birds (Tyson et al. 1999). The USFWS estimates the current continental population at approximately 2 million birds (USFWS 2003). Tyson et al. (1999) found that the DCCO population increased approximately 2.6% annually during the early 1990s. The greatest increase was in the Interior region with a 22% annual increase in the number of DCCOs in Ontario and the U.S. States bordering the Great Lakes (Tyson et al. 1999). The number of breeding pairs of DCCOs in the Atlantic and Interior population is estimated at over 85,510 and 256,212 nesting pairs, respectively (Tyson et al. 1999). From 1990 to 1997, the annual growth rate in the Interior population was estimated at 6% with the most dramatic increases occurring on Ontario, Michigan, and Wisconsin waters (Tyson et al. 1999, USFWS 2003). Nest counts in 2000 estimated 115,000 pairs in the Great Lakes (Weseloh et al. 2002). Lake Erie's breeding population increased from 174 to 26,542 breeding individuals from 1979 to 2000 (Hebert et al. 2005).

The Ohio population of DCCOs is primarily composed of birds from the Interior population (USFWS 2003, Tyson et al. 1999). Most DCCOs 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 DCCOs started a consistent breeding colony in 1992 at WSI with 182 pairs. There had been a breeding population of DCCOs in the state prior to that time, but the use of organochlorine pesticides (e.g., DDT) caused marked declines in the nationwide

DCCO population and had temporarily resulted in no regularly nesting DCCOs in Ohio. Since the return of breeding DCCOs to Ohio in 1992, the number of cormorant colonies in the state has increased rapidly. In 2003, when the FEIS (USFWS 2003) was completed, there were 3 breeding colonies with a total of 3,049 breeding pairs (WSI 2,613 - pairs, TPI - 401 pairs, Grand Lakes, St. Mary - 35 pairs) and by 2005 there were 5 breeding colonies with a total of 5,165 breeding pairs (WSI - 3,813 pairs; TPI - 409 pairs; Green Island - 857 pairs; Grand Lakes, St. Mary - 80 pairs; Portage Lakes - 6 pairs; ODW 2005). This population estimate does not include sub-adults and nonbreeding birds. Estimates of 0.6 to 4.0 subadult DCCOs per breeding pair have been used for several populations (Tyson et al. 1999). Assuming 0.6 subadults and non-breeding individuals per breeding pair, the summer DCCO population in Ohio can conservatively be estimated at more than 13,000 birds. During migration, there are many additional DCCOs moving through the State.

Aerial waterfowl surveys of coastal and near shore inland marshes during fall migration (e.g., areas not used for nesting) provide some insight as to the number of DCCOs that may be migrating through the state. ODW conducts eight aerial waterfowl surveys between September 1 and December 15 each year within the coastal and near shore inland marshes of Ohio. From 1997 to 2004 anywhere between 788 and 4,950 DCCOs have been counted in any one survey (ODW data 2005). Similar surveys have not been conducted for the islands, but it is likely that they draw in many more DCCOs than the marshes due to the tendency of migrants to be attracted to the DCCOs already inhabiting the islands.

#### **Estimated DCCO Take - Protection of Public Resources.**

Some CDM activities to protect public resources could be conducted under MBPs. Depredation permits can be issued for the protection of sensitive plants and animals (e.g., co-nesting colonial waterbirds). Permits would probably not be issued for the protection of free-swimming fish populations, but permits could be issued for CDM at the specific sites where hatchery fish are being released (USFWS 2003). All cormorant management objectives proposed in Section 1.5.6.3 were established for the protection of vegetation and wildlife. These activities could be permitted under MBPs. The lead and cooperating agencies anticipate that to meet the management objectives set in Section 1.5.6.3, a maximum of 6,752 DCCOs could be taken in one year for the protection of birds, vegetation and other sensitive wildlife species (this number excludes birds taken for research, reduction of damage to property or aquaculture or reduction of risks to human health and safety; Table 4-1). This would be a 48 to 61% reduction in the number of breeding DCCOs at WSINWR and a 44 to 52% reduction in the statewide population of DCCOs (assuming a conservatively estimated total state population of 13,000 DCCOs). This level of take is unlikely to occur because at least some of the birds are anticipated to respond to non-lethal frightening devices and/or the use of lethal techniques on other DCCOs and leave the site without being shot. Similar projects conducted in other areas have indicated that many

birds will disperse from the damage management site to other breeding colonies throughout the region (USFWS 2003). Additionally, the number of DCCOs to be taken annually is anticipated to be higher during initial years of the project than when DCCO colonies are close to management objectives.

Table 4-1. Number of DCCOs that could be lethally removed annually under each alternative for the protection of vegetation and wildlife in the public domain. DCCO population numbers for each site only include breeding adults and do not include sub-adults and non-breeding birds.

Site	Target Popn. <sup>1</sup>	Annual Maximum Take Alt 1	Annual Maximum Take Alt. 2 <sup>4</sup>	Annual Maximum Take Alt. 3	Annual Maximum Take Alt. 4 <sup>4</sup>	Annual Maximum Take Alt. 5
West Sister Island (7,626 breeding adults in 2005)						
	3,000-4,000	3,626 - 4,626	0	0	0	3,626 - 4,626
Turning Point Island (818 breeding adults in 2005)						
	800	80 <sup>2</sup>	80 <sup>2</sup>	80 <sup>2</sup>	80 <sup>2</sup>	80 <sup>2</sup>
Green Island (1,714 breeding adults in 2005)						
	0	1,714	172.	1,714	172	1,714
Grand Lakes, St. Mary (160 breeding adults in 2005)						
	30	130	16	130	16	130
Portage Lakes (12 breeding adults in 2005)						
	12	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>
Migrants – All Sites <sup>3</sup>						
		200	0 ind. <sup>4</sup>	60 ind <sup>5</sup>	0 ind <sup>4</sup>	200
<b>Total</b>	<b>3,842 – 4,842</b>	<b>5,752 – 6,752</b>	<b>270</b>	<b>1,986</b>	<b>270</b>	<b>5,752 – 6,752</b>

1. Target DCCO numbers based on management objectives defined in Section 1.5.6.3.
2. Maximum take anticipated to maintain current conditions.
3. Estimated number of birds that might be taken to reinforce harassment of migrating birds.
4. The state is allowed to take up to 10% of the breeding DCCO population under the PRDO without having to obtain permission from the USFWS. That level of take is accounted for in the above estimates for the sites where ODW will work during the breeding season.
5. CDM would not be conducted at WSI so the overall need to use shooting to reinforce harassment of migrating birds would be reduced. Estimated take was reduced proportionally to occurrence of breeding pairs.

### **Estimated DCCO Take – All Other Sources**

Over the last three years, fewer than 300 DCCOs have been taken per year under MBPs for the reduction of damage to aquaculture and private property and for

reduction in risks to human health and safety at airports. The highest number of DCCOs requested under scientific collecting permits in recent years was a request for 500 birds in 2005 for projects relating to DCCO damage at WSI and Green Island. (Table 4-2).

Table 4-2. Number of DCCOs that could be lethally removed annually under each alternative through all means.

Type of Take	Annual Take Alt 1	Annual Take Alt. 2	Annual Take Alt. 3	Annual Take Alt. 4	Annual Take Alt. 5
PRDO <sup>1</sup>	5,752 – 6,752	270	1,986	270	
Scientific Collecting Permits <sup>2</sup>	300	0	500	0	300
MBPs – Damage to Property and Aquaculture, Risks to Health and Safety <sup>3</sup>	300	0	300	0	300
MBPs – Damage to Public Resources <sup>1</sup>	0	0	0	0	5,752 – 6,752 ind.
<b>Total (Cumulative) Take</b>	<b>6,352-7,352</b>	<b>270</b>	<b>2,786</b>	<b>270</b>	<b>6,352 – 7,352</b>

<sup>1</sup> Totals are from Table 4-1 above.

<sup>2</sup> Five hundred birds were taken under scientific collecting permits in 2005. This number was reduced for Alternatives 1 and 5 because some of the birds taken for damage management are likely to be used for research.

<sup>3</sup> Estimate based on CDM under MBPs in prior years plus some extra based on anticipated need for CDM in the future

Nationwide, the FEIS predicted that the implementation of the AQDO, PRDO, and issuance of migratory bird permits would affect approximately 8% of the continental DCCO population on an annual basis (USFWS 2003). Assuming an equitable distribution of take among the 24 states in which the PRDO applies, this is an average of about 6,650 birds per State. This would be about 51% of the current estimated summer DCCO population in Ohio of 13,000 birds and a smaller but unknown percentage of all DCCOs (residents and migrants) occurring within the State. The FEIS concluded that the proposed level of take would be sustainable at the State level (USFWS 2003). Take under this alternative would be the same as anticipated if the PRDO were to be implemented because all proposed take is for the protection of sensitive wildlife and plant species and could be permitted under MBPs. However, at a future time, the lead and cooperating agencies could conduct actions for the protection of fishery resources so long as these projects do not increase cumulative take and other impacts

beyond the maximum levels analyzed in this EA and so long as these projects do not reduce the local DCCO populations below the management objectives described in Section 1.5.6.3. In these instances actual take for this alternative would be less than Alternative 1, but the maximum potential take anticipated for each alternative would not change.<sup>2</sup>

Maximum cumulative take in Ohio under this alternative (7,352 birds per year) exceeds the 6,650 birds per year that could be taken per state if the total take predicted in the USFWS EIS is divided evenly among all states covered in the PRDO. However, it is important to note that DCCOs and DCCO damage are not evenly divided among all states. Some states like Iowa, Illinois and Indiana may never have many DCCO problems or take many DCCOs. Other states like Ohio may have higher populations of DCCOs and higher than average predicted DCCO removal without adversely impacting the long-term sustainability of the regional DCCO population or exceeding parameters stipulated by the USFWS EIS (2003). This action would reduce the Ohio breeding DCCO population to 1,921 to 2,421 breeding pairs. This is similar to the number of breeding birds that were counted in the state in 1999-2000. The density of DCCOs increased from that level to the current density of 5,164 pairs over the period of five to six years. Therefore, we conclude that the proposed action would not threaten the long-term sustainability of breeding DCCOs at the state, regional or national level.

DCCOs are protected by the USFWS under the MBTA. Therefore, DCCOs are taken in accordance with applicable Federal laws and regulations authorizing take of migratory birds and their eggs or young, including the USFWS Public Resource Depredation Order (PRDO) (50 CFR 21.48), and the USFWS permitting processes. DCCOs are not a State-protected species in Ohio and the State does not require permits in addition to those that must be received from the USFWS. The USFWS, as the agency with migratory bird management responsibility, will impose restrictions on DCCO management at the State, regional, and national levels as needed to assure cumulative take does not adversely affect the long-term sustainability of populations (USFWS 2003, Appendix G). WS and ODW will report all CDM activities and the USFWS will ensure that cumulative take does not exceed that which can be sustained by the population.

Based upon the above information, the lead and cooperating agencies have determined that the impacts to the Ohio DCCO population from this alternative would not jeopardize the long-term sustainability of DCCO populations at a local, state, regional, or national level.

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<sup>2</sup> The EA would be amended and public comment solicited before the lead and cooperating agencies conduct any future projects under the PRDO that would increase the cumulative impacts of CDM activities.

#### **4.1.2 Effects on Other Fish and Wildlife Species, Including Threatened and Endangered Species**

##### **Alternative 1 - Integrated CDM Program Including Implementation of the PRDO (Proposed Action)**

Adverse Impacts on Non-target Species Including Threatened and Endangered Species Impacts would be similar to the no action alternative. All of the management objectives in Section 1.5.6.3, were established for the purpose of protecting wildlife and vegetation. Under Alternative 5, it would be possible to obtain MBPs for these actions. Therefore the amount of CDM and the methods available are identical to Alternative 5. However, if at a future time, data become available indicating that a new management objective would be beneficial for the protection of public fishery resources, that type of work could be conducted under this alternative. The Federal agencies would not conduct or approve projects for the protection of public fishery resources that would lead to increases in take, decreases in population management goals, or other adverse environmental impacts beyond what is already analyzed in this EA without supplementing the EA (Section 1.8.4). All SOPs in Chapter 3 and other provisions for protecting non-target species, including any recommendations and requirements resulting from Section 7 consultation with the USFWS and consultation with ODW, will be identical to Alternative 5. Therefore, the lead and cooperating agencies conclude that this alternative would not have a cumulative adverse impact on non-target species.

Beneficial Impacts on Non-target Species Including Threatened and Endangered Species. The PRDO was established to allow for CDM activities specifically designed to benefit non-target species including co-nesting birds, vegetation and fisheries. CDM programs can benefit those wildlife species that are adversely impacted by DCCO predation, DCCO competition for habitat, and/or the impact of large DCCO colonies on vegetation (Sections 1.5.1, 1.5.6.1). The proposed action would be conducted to protect great blue herons, state listed black-crowned night herons, great egrets and cattle egrets, the state and Federally listed Lake Erie water snake, and rare plant communities, particularly those occurring on Green Island from adverse impacts associated with high densities of DCCOs. Lead and cooperating agency experience with non-lethal and lethal CDM techniques indicates that an integrated CDM approach that allows access to all legal CDM methods has the greatest likelihood of rapidly achieving DCCO management objectives for the Ohio colonies.

##### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Adverse Impacts on Non-target Species Including Threatened and Endangered Species from CDM. The Federal agencies would be restricted to the use of non-lethal techniques. Consequently, there would be no risks from Federal use of lethal CDM techniques. The USFWS would also not issue MBPs for DCCO

management. However, under the PRDO the state does have the authority to take up to 10% of local breeding population of DCCOs, with the consent of the land owner/manager, in order to protect public resources (USFWS 2003). ODW has indicated that it would use this authority on non-Federal lands. The USFWS would not permit lethal CDM techniques on WSINWR.

The primary risk to non-target species from the use of non-lethal techniques is the risk of disturbing co-nesting species during harassment, nest destruction and other non-lethal CDM activities as described for the no-action alternative. As discussed in Section 1.5.6.3 the lead and cooperating agencies will conduct research on the impacts of DCCO removal on co-nesting species. Given the data available, the SOPs established for the protection of non-target species, and the fact that the agencies will continue to evaluate impacts on non-target species and adjust management techniques accordingly, the use of frightening devices proposed in this alternative will have a low magnitude of impact on non-target species.

Without even the minor use of lethal techniques to reduce habituation to nonlethal CDM methods (DCCOs getting used to and not responding to frightening devices), this alternative will likely require more hours of non-lethal CDM than Alternatives 1 and 5 in order to achieve similar management objectives, therefore the risk of disturbing co-nesting species will be greater for this alternative than for alternatives 1 and 5. Given the tendency of DCCOs to habituate to frightening devices, it may not be possible to achieve the same level of CDM as with Alternatives 1 and 5. Success in achieving management objectives may be more likely on non-Federal lands where ODW would have limited access to lethal CDM techniques. However, it is likely to take longer for ODW to achieve management objectives than under Alternatives 1 and 5.

The lead and cooperating agencies will continue to utilize SOPs for harassment activities as discussed in Chapter 3 and for Alternative 5 in order to reduce potential impacts on listed (Federal and State) and non-listed species. Therefore, risks associated with ODW's use of lethal CDM alternatives under this alternative would be similar to Alternative 5, but overall impact would be lower than Alternative 5 because less lethal CDM would be conducted.

Beneficial Impacts on Non-target Species Including Threatened and Endangered Species. This alternative would allow for the use of non-lethal techniques to protect public resources. Management objectives would remain the same for this alternative as for Alternatives 1 and 5. However, as discussed above the lead and cooperating agencies are concerned that they may not be able to achieve CDM objectives with the exclusive use of non-lethal techniques. This is especially true for the Lake Erie island colonies where the management objective is to rapidly reduce the local DCCO population from 5,070 to 2,950 breeding pairs.

### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Adverse Impacts on Non-target Species Including Threatened and Endangered Species from CDM. Under this alternative, the lead and cooperating agencies would not conduct operational CDM. WS would still be able to complete the WS Form 37 consultations needed before USFWS could issue MBPs. The USFWS would also have the ability to approve CDM projects that propose to take more than 10% of the local breeding DCCO population. Therefore, it would still be possible for ODW to conduct CDM under the PRDO, but it would not receive any operational assistance from the USFWS or WS. Additionally, CDM would not be conducted at WSINWR. The tools that could be used for CDM would not differ from Alternatives 1 and 5. However, because the PRDO will not be implemented on Federal lands, the amount of CDM that could be conducted would be lower than for Alternative 5. Therefore, this alternative is likely to have a lower level of risk to non-target species than the already low level discussed for Alternative 5.

Beneficial Impacts on Non-target Species Including Threatened and Endangered Species. Projects to protect wildlife and plants on non-Federal lands would likely be identical to Alternatives 1 and 5. However, CDM efforts at these sites may be complicated by the lack of CDM at WSINWR. WSINWR may serve as a refuge for birds harassed from the other Lake Erie sites. Birds at WSINWR may also serve as a source population for reinvasion of the non-Federal sites.

In the absence of CDM, DCCO densities and associated damage to habitat and adverse impact on other wildlife species are likely to continue. Given the pattern of DCCOs moving from nesting sites on trees that have died to nearby healthy trees observed by Hebert et al. (2005), even if DCCO densities do not increase beyond current levels, vegetation loss is likely to continue. Cormorant conflict management efforts at non-Federal sites are likely to exacerbate problems on WSI because birds are likely to move to the site with no CDM. Overall beneficial impacts on non-target species would likely be much lower than for Alternatives 1 and 5.

### **Alternative 4 - No CDM by Federal Agencies.**

Adverse Impacts on Non-target Species Including Threatened and Endangered Species from CDM. Under this alternative, the Federal agencies would not participate in CDM. The USFWS would not issue MBPs and would not grant approval for PRDO projects proposing to take more than 10% of a local DCCO population. As with Alternative 2, under the PRDO the state does have the authority to take up to 10% of a local breeding population of DCCOs, with the consent of the land owner/manager, in order to protect public resources (USFWS 2003). ODW has indicated that it would use this authority on non-Federal lands. The USFWS would not permit lethal CDM techniques on WSINWR. The state, local governments, landowners and their designated agents (e.g., private damage

management businesses) could use non-lethal CDM techniques on non-Federal lands. The amount of CDM that could be conducted would be much lower than for Alternative 5. Unlike Alternative 2, non-lethal CDM would not be conducted on Federal lands (e.g., at WSINWR). Therefore, this alternative is likely to have a reduced level of risk to non-target species than the already low level discussed for Alternative 5.

Beneficial Impacts on Non-target Species Including Threatened and Endangered Species. Management objectives for activities to protect wildlife and vegetation on non-Federal lands would be the same as all the other alternatives. The ability to achieve the management objectives will be limited by the restrictions on the number of DCCOs that can be taken using lethal methods, lack of assistance from WS, and further complicated by the lack of CDM on WSINWR (as with Alternative 3). Conversely, like Alternative 3, CDM activities on non-Federal lands and the lack of CDM on WSINWR is likely to exacerbate adverse impacts of DCCOs on vegetation and other species of wildlife using the site. Overall benefits to non-target species are lowest for this alternative.

#### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

Adverse Impacts on Non-target Species (Not Threatened or Endangered Species). Direct impacts on non-target species occur when program personnel inadvertently kill, injure, or harass animals that are not target species, including eggs or young of nesting adults that are disturbed by CDM activities. The most likely negative effect on non-target species from CDM activities in Ohio is disturbance of co-nesting colonial waterbirds. If adults are startled from the nest for too long or at the wrong time of day, there is potential for increased mortality rates for eggs and chicks. However, in most instances, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but usually return after conclusion of the action. Moore et al. (2005) evaluated the impact of DCCO removal on co-nesting great blue herons and great egrets on Lake Ontario. For both species, there was no impact on the proportion of time spent in nest attendance between control and treatment sites for the interval prior to DCCO removal, the intervals between DCCO removal efforts and the period after DCCO removal was completed. Nest attendance declined for both species during the DCCO removal periods ( $35 \pm 20$  min). Herons disturbed during the DCCO removal returned to the nest in 11 - 14 min (longest unattended= $50 \pm 30$  min) and all egrets returned to nests before the cormorant removal had ended (longest unattended= $6 \pm 4$  min). There was no difference in the nest success of herons or egrets between treated and untreated sites. These findings are similar to those of a study conducted on WSI and Green Island in 2005. Take of DCCO from WSI in 2005 under a scientific collecting permit showed little effect on the island's breeding population. Rifles with and without silencers were used to remove a total of 363 double-crested cormorants from 28 test plots (25 meter radius) on WSI in May, 2005. Observers accompanied shooters to record any possible

disturbance to other nesting birds. Only one great egret was seen flushing off its nest during the removal operation. As discussed in Section 1.5.6.3 the lead and cooperating agencies would continue to monitor the impacts of DCCO removal on co-nesting species. Precautions used to minimize the likelihood and duration of impacts on co-nesting birds are listed in the SOPs in Chapter 3.

It is extremely unlikely that a non-target species would be shot. No non-target birds or mammals have been killed by WS during CDM operations in Ohio (MIS 2005 database). Non-target species caught in live-traps and nets would be released. While every precaution is taken to safeguard against taking non-target birds, at times changes in local flight patterns and other unanticipated events can result in the incidental take of unintended individuals. These occurrences are rare and should not affect the overall populations of any species under the proposed program. Mitigation measures to reduce potential impacts to non-target species, especially nesting birds, are listed in Chapter 3.

Given the data available, the SOPs established for the protection of non-target species, and the fact that the agencies will continue to evaluate impacts on non-target species and adjust management techniques accordingly, the use of frightening devices proposed in this alternative will have a low magnitude of impact on non-target species.

Beneficial Impacts on Non-target Species (Not Threatened or Endangered Species). This alternative allows the USFWS to issue MBPs for the protection of sensitive vegetation and animals (e.g., co-nesting birds, rare plant communities). Programs to control DCCO damage can reduce negative competition for resources with co-nesting colonial waterbirds and can decrease adverse impacts on vegetation which benefits the vegetation and the wildlife that uses the vegetation (Sections 1.5.1, 1.5.6.1). Under this alternative, actions to protect free-swimming fish populations would be limited and the impact on free-swimming fish would likely be minimal. However, since the management objectives for the proposed project were established for the protection of co-nesting birds and rare plant communities, the USFWS could issue permits for the CDM proposed in this EA. Section 1.5.6.3 provides the reasoning on why the lead and cooperating agencies believe the proposed action will benefit wildlife and vegetation in Ohio. Experience by the lead and cooperating agencies indicates that an integrated CDM program as would be permitted under this alternative would have the greatest potential to achieve management goals.

Threatened and Endangered Species Impacts. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential risks and the establishment of special restrictions or mitigation measures to minimize or negate any risks. Mitigation measures to avoid adverse T&E effects are described in Chapter 3.

***Federally Listed Species.*** A summary of Federally listed T&E bird species in Ohio is provided in Appendix B. The USFWS completed an Intra-Service Section 7 Biological Evaluation on the management of DCCOs in the U.S. for the FEIS (USDI 2003). The only species in the national consultation that could potentially be impacted by CDM actions in Ohio are the piping plover (migrant only), bald eagle, and Lake Erie water snake (USFWS 2003). An additional Intra-Service Section 7 Biological Evaluation is being conducted specific to CDM actions in Ohio. All recommendations from the Ohio Intra-Service Section 7 Biological Evaluation will be incorporated, as appropriate to the selected Alternative. The following is a list of conservation measures to reduce risks of adverse impacts on bald eagles and piping plovers from the national consultation likely to be applicable to CDM in Ohio:

(i) Discharge/use of firearms to kill or harass DCCOs or use of other harassment methods are allowed if the control activities will occur more than 1,000 feet from active piping plover nests or colonies and migrating plovers, and more than 750 feet from active bald eagle nests.

(ii) Other control activities such as egg oiling, cervical dislocation, CO<sub>2</sub> asphyxiation, egg destruction, or nest destruction are allowed if these activities occur more than 500 feet from active piping plover nests or colonies and migrating plovers, and more than 750 feet from active bald eagle nests.

(iii) To ensure adequate protection of piping plovers, any agency or its agents who plan to implement control activities that may affect areas designated as piping plover critical habitat in the Great Lakes Region are to make contact with the appropriate Regional Migratory Bird Permit Office prior to implementing control activities.

The lead and cooperating agencies will abide by the final conservation measures in the Intra-Service Section 7 Biological Consultation for Ohio to avoid risks to bald eagles, piping plovers and Lake Erie water snakes. Because the proposed action is intended to protect vegetation on the Ohio Lake Erie Islands, this action is likely to be beneficial to the Lake Erie watersnake by protecting its habitat (Section 1.5.6.1). Therefore, the lead and cooperating agencies have made a preliminary determination that proposed action will not adversely affect any Federally listed T&E species or critical habitat in Ohio.

***State Listed Species.*** The State list of endangered and threatened species is provided in Appendix C. The lead and cooperating agencies have determined that CDM has the potential to affect the black-crowned night heron, snowy egret, cattle egret, bald eagle, Lake Erie water snake (discussed above under federally listed species), elegant sunburst lichen,

Northern bog violet, Sprengel's sedge, tufted fescue sedge, harebell and rock elm. Prior to any control action, the lead and cooperating agencies will consult with the ODW to ensure that no actions taken under this plan will adversely affect Ohio's listed threatened and endangered species. Actions to minimize risks to these species are described above and in the section on SOPs in Chapter 3. Because the proposed action 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 DCCOs. The lead and cooperating agencies conclude that with the mitigation measures described here and in Chapter 3, this alternative will not adversely impact state listed species.

### **4.1.3 Effects on Human Health and Safety**

#### **4.1.3.1 Effects on Human Health and Safety from CDM Methods**

##### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

The CDM methods to be used are identical to Alternative 5. Risks to human health and safety associated with these methods would be similar to Alternative 5.

##### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Under this alternative, CDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique and harassment with pyrotechnics. The ODW would still use firearms as a lethal CDM technique to take up to 10% of local DCCO populations for the protection of public resources on non-Federal lands. Risks associated with these methods are identical to those for Alternative 1. However, there will likely be greater use of harassment techniques than for Alternative 1. Given the training and experience of lead and cooperating agency personnel conducting CDM, risks to human health and safety are anticipated to be very low.

The state, local governments, landowners and their designated agents (e.g., private damage management businesses) could still use pyrotechnics or firearms in CDM programs and this activity would likely occur to a greater extent in the absence of access to lethal CDM techniques. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities have less training and experience than personnel with the lead and cooperating agencies. However, the lead and cooperating agencies would be able to provide advice and information on the safe and proper use of these methods so risks should be less than Alternative 4. Overall risks to human health and safety are still likely to be low, but might be higher than with Alternative 5.

### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Under this alternative, the Federal agencies would not engage in direct operational use of any CDM methods. Risks to human safety from Federal use of firearms and pyrotechnics would hypothetically be lower than the no action alternative, but not much because the current program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed. The state would still be able to use lethal CDM techniques for the protection of public resources on non-Federal lands. Risks associated with these activities would be similar to Alternative 5 or slightly lower because use of lethal CDM would not be permitted on WSI.

The State, local governments, landowners and their designated agents (e.g., private damage management businesses) could still use pyrotechnics or firearms in CDM programs. Use of these methods by individuals with less training than the lead and cooperating agencies would likely occur to a greater extent in the absence of operational assistance from WS than with Alternative 5. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities have less training and experience than personnel with the lead and cooperating agencies. However, the lead and cooperating agencies would be able to provide advice and information on the safe and proper use of these methods so risks should be less than Alternative 4. Overall risks to human health and safety are still likely to be low, but might be higher than with Alternative 5.

### **Alternative 4 - No CDM by Federal Agencies**

Under Alternative 4, the Federal agencies would not be involved in CDM activities in Ohio so there would be no risks from their use of firearms or pyrotechnics. The state would still be able to use lethal CDM techniques to take up to 10% of local DCCO populations for the protection of public resources. Risks associated with lethal CDM by the ODW will be similar to or slightly lower than Alternative 5 because less lethal CDM will be conducted.

The State, local governments, landowners and their designated agents (e.g., private damage management businesses) could still use pyrotechnics or firearms in CDM programs and this activity would likely occur to a greater extent because access to lethal CDM methods would be extremely limited and no operational assistance would be available from WS. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities have less training and experience than personnel with the lead and cooperating agencies. The lead and cooperating agencies would not be able to provide advice and information on the safe and proper use of these methods so risks may be greater than Alternative 5. Overall risks to human health and safety are still likely to be low, but may be higher than with Alternative 5.

### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

CDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics. Firearms and pyrotechnics would only be used by lead and cooperating agency personnel who are trained and experienced in the safe and legal use of firearms. WS personnel regularly receive refresher safety training to keep them aware of safety concerns and the other agencies have similar training requirements. There have been no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed by the lead or cooperating agencies. A formal risk assessment of WS' operational management methods found that when used in accordance with applicable laws, and WS regulations, policies and directives, risks to human safety were low (USDA 1997, Revised, Appendix P). Therefore, no adverse effects on human safety from use of these methods are expected. Agents acting under the authority of the lead and cooperating agencies will be informed and trained in the safe and proper use of CDM methods including the use of firearms. Additionally, when firearms or pyrotechnics will be used in CDM activities agency personnel may establish a safe perimeter around the colonies and detour boat traffic away from those areas. In 2005, when research on CDM methods was being conducted at WSI, the USFWS had a marked USFWS boat circling the island during the entire shooting period. The USFWS also broadcast a notice to mariners broadcast over Channel 16 VHF radio to warn boaters to stay one mile away from the island. The USFWS plans to do the same for all management trips and similar measures are likely to be used by ODW.

Local governments, landowners and their designated agents (e.g., private damage management businesses) can use pyrotechnics or firearms in non-lethal CDM programs without permits from the USFWS. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities have less training and experience than personnel with the lead and cooperating agencies. However, under this alternative, personnel from the lead and cooperating agencies would be able to provide technical assistance on the safe and effective use of this technique. Some individuals may choose to have the non-lethal CDM conducted by WS or ODW rather than doing it themselves which may also reduce risks associated with improper use of these methods. Overall risks to human health and safety are likely to be low.

#### **4.1.3.2 Effects on Human Health and Safety from Not Conducting CDM**

### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

Impacts would be similar to the no action alternative. Activities to address risks to human health and safety would not differ between the two alternatives.

## **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Under this alternative, the lead and cooperating agencies would be restricted to implementing and recommending only non-lethal CDM methods. As discussed in Chapter 3, the USFWS would not be able to issue MBPs for the use of lethal techniques to address risks to human health and safety from DCCOs. The success or failure of the use of non-lethal methods can be quite variable. In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. However, if the lead and cooperating agencies are providing direct operational assistance in relocating DCCOs, coordination with local authorities will be conducted to assure they do not re-establish in other undesirable locations. This alternative is unlikely to be as effective in reducing DCCO risks to human health and safety because there are some situations, like those at airports, where non-lethal techniques may not provide a sufficiently rapid or controlled response from the target bird(s) or where non-lethal techniques are not effective because the target animal has habituated to the frightening stimulus. Overall risks to human health and safety would be slightly greater under this alternative than Alternative 5.

## **Alternative 3 – Only Technical Assistance by Federal Agencies**

Under this alternative, the lead and cooperating agencies would be restricted to providing technical assistance on CDM methods. WS would be able to assist with the WS Form 37 required for the USFWS to issue MBPs. Potential impacts would be variable. With technical assistance but no direct operational assistance, entities requesting CDM assistance for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement recommendations from the lead and cooperating agencies for non-lethal and lethal control methods. Depending on the training and experience of the individuals or entities that implement CDM actions, their efforts may not be as efficient or effective as programs conducted by the lead and cooperating agencies. This potential risk would be less likely under this alternative than Alternative 4 when people requesting assistance receive and accept technical assistance recommendations.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. This potential risk would be less likely under this alternative than Alternative 4 when people requesting assistance receive and accept technical assistance recommendations. Overall risks to human health and safety would be greater under this alternative than Alternative 5.

#### **Alternative 4 - No CDM by Federal Agencies**

Under this alternative, the lead and cooperating agencies would not participate in CDM. As discussed in Chapter 3, the USFWS would not be able to issue MBPs for the use of lethal techniques to address risks to human health and safety from DCCOs. CDM by entities other than the lead and cooperating agencies would be limited to non-lethal techniques. Resource owners and managers would be responsible for developing and implementing their own CDM program. Efforts by these individuals to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a lesser likelihood of reducing DCCO hazards, than under the proposed action. As discussed for Alternative 2, there may be some situations where non-lethal techniques are not adequate to reduce the risk to human health and safety. In other situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to sites not previously affected. Under this alternative, human health problems could increase if affected individuals were unable to find and implement effective means of controlling DCCOs that cause damage problems. Overall risks to human health and safety would be greatest under this alternative.

#### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

People are concerned with potential injury, illness, and loss of human life resulting from damage and conflicts associated with DCCOs (Sections 1.4.5 and 1.5.5). DCCOs can be a threat to aviation safety and there is also concern about potential disease risks associated with accumulations of fecal material. In most cases, it is difficult to conclusively prove that DCCOs were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of CDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, CDM, either by lethal or non-lethal means, would, if successful, reduce the risk of bird-borne disease transmission at the site for which CDM is requested. An Integrated CDM strategy combining lethal and non-lethal means, has the greatest potential for successfully reducing risks to aviation and human health and safety. An IWDM approach reduces damage or threats to public health or safety for people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. For example, it may be necessary to use lethal methods to remove DCCOs that had habituated or were not responding to frightening devices from the path of an airplane.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall human health concerns in the local area. If the lead and cooperating

agencies are providing direct operational assistance in relocating DCCOs, coordination with local authorities will be conducted to assure that they do not reestablish in other undesirable locations.

#### **4.1.4 Effects on Aesthetic Values**

##### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

Individuals opposed to the use of lethal CDM techniques would be as opposed to this alternative as they are to Alternative 5 because the number of DCCOs that could be removed is the same for the two alternatives. However, the proposed action will not jeopardize the DCCO population and DCCO viewing opportunities will still be available. In most cases, CDM activities will reduce but not eliminate local DCCO populations. Green Island is the only site where the lead and cooperating agencies propose to stop the use of the site by breeding DCCOs. However, DCCO viewing opportunities would still be available on nearby islands. If proposed management objectives were met for the Lake Erie island colonies (WSI, TPI, and Green Island), there would still be 1,900 to 2,400 breeding pairs of DCCOs plus associated juveniles and non-reproductive individuals for people recreating on Lake Erie to view and enjoy.

Positive impacts on the opportunity to enjoy vegetation and co-nesting species of birds that can be negatively impacted by high numbers of DCCOs would be greatest under this alternative and Alternative 5 because these alternatives are anticipated to have the greatest beneficial impacts on non-target species (Section 4.1.2).

##### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Under this alternative the Federal agencies would only use non-lethal CDM techniques. People who oppose lethal control of wildlife by government but are tolerant of government involvement in non-lethal wildlife damage management might favor this alternative, especially since no lethal CDM would be conducted at WSI. However, some lethal CDM would still be conducted by ODW under the PRDO on non-Federal lands. People who have developed affectionate bonds with individual wild birds would be less affected by the death of individual birds than under Alternative 5, but might still be opposed to the dispersal or translocation of certain birds. On the Lake Erie island colonies, the ability of individuals to enjoy viewing DCCOs would not differ from Alternative 5 in that the management goals of the projects would remain the same. However, the fate of some of the birds would be different since there would be much less use of lethal CDM techniques.

This alternative would allow the lead and cooperating agencies to conduct work under the PRDO. This alternative would reduce the negative aesthetic impacts of

DCCOs on birds, vegetation and fisheries resources if non-lethal methods were effective in reducing such damage to acceptable levels. However, as stated in Section 4.1.2, non-lethal methods are not always effective and, so this alternative is not anticipated to be as effective in reducing negative impacts of DCCOs on non-target species as Alternative 1. However, Alternative 2 maybe more effective in protecting benefits of public resources than Alternative 5 because this alternative would still allow for action under the PRDO and therefore could be used to protect public fishery resources.

### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Under this alternative, the Federal agencies would be restricted to providing technical assistance on CDM methods. WS would be able to assist with WS form 37 required for the USFWS to issue MBPs. People opposed to direct operational assistance in CDM by the government might prefer this alternative to Alternative 5 especially because no CDM would be conducted on Federal lands. However, the ODW would still be able to conduct CDM under the PRDO including the use of lethal CDM techniques on non-Federal lands. Persons concerned about the welfare of individual birds and opposed to the use of lethal control would likely be opposed to this alternative because lethal control could be conducted by ODW and other non-Federal entities.

Under this alternative, the lack of operational assistance in reducing negative DCCO impacts at WSI could result in an increase in adverse affects on aesthetic values. Beneficial impacts of this alternative on the opportunity to enjoy vegetation and co-nesting birds on non-Federal sites would be similar to Alternatives 1 and 5.

### **Alternative 4 - No CDM by Federal Agencies.**

Under this alternative, the Federal agencies would not conduct any CDM in Ohio. People opposed to any government involvement in CDM would favor this alternative. People concerned about the welfare of individual birds or the use of lethal CDM would prefer this alternative over alternative 5 because the lethal removal of DCCOs would be lower. However, entities other than the lead and cooperating agencies could still use non-lethal techniques and some individuals might oppose dispersal or translocation of certain birds.

Under this alternative, the lack of operational assistance in reducing negative DCCO impacts on vegetation, birds and fish could result in an increase in adverse affects on aesthetic values. The PRDO would only be implemented by ODW, and ODW's actions would be limited to take of up to 10% of the local DCCO population on non-Federal lands. Beneficial impacts of this alternative on the opportunity to enjoy vegetation, birds, or fisheries resources that are negatively affected will be much lower than Alternative 1.

### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

Some people who routinely view individual birds or flocks of DCCOs would likely be disturbed by removal of such birds. Some people are morally or philosophically opposed to the killing of any birds. The lead and cooperating agencies are aware of such concerns and take this into consideration when planning CDM activities. Under the current program, lethal removal of DCCOs would continue and these persons would continue to be opposed. However, many persons who voice their opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by lethal control activities. Lethal control actions would generally be restricted to sites already closed to the public and overall DCCO viewing opportunities will still be available. In all instances except Green Island, CDM activities will reduce but not eliminate local DCCO populations. Although DCCO viewing opportunities would be lost at Green Island, similar opportunities would still be available for WSI and TPI. Lethal removal of DCCOs from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The abilities to view and interact with DCCOs at these sites are usually either restricted to viewing from a location outside boundary fences or are forbidden.

In some instances, large roosting or nesting populations of DCCOs can destroy habitat and displace other nesting birds, reducing the aesthetic value for some people. This alternative would reduce negative impacts caused by DCCOs on wildlife species and their habitats including black-crowned night herons and other colonial waterbirds co-nesting with DCCOs at the sites proposed for CDM. The enjoyment of recreational fishing, and, for some, the opportunity to consume the fish captured, are a positive aesthetic values for some people. The USFWS generally does not issue MBPs for the protection of free-swimming fish although exceptions can be made for sites where hatchery fish are released. None of the CDM objectives in Section 1.5.6.3 were established for the protection of fishery resources. However, if there was a need to conduct CDM specifically for the protection of fishery resources, that need could not be met under this alternative. Any adverse impacts of DCCOs on free swimming fish would continue to adversely impact the aesthetic enjoyment of those who value fishery resources.

#### **4.1.5 Humaneness and Animal Welfare Concerns of the Methods Used**

### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

Impacts would be similar to the no action alternative. Individual perceptions of the humaneness of the proposed action would be as described for Alternative 5.

### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by the Federal agencies. However ODW could still conduct limited amounts of lethal CDM on non-Federal lands for the protection of public resources. In general, people who consider the use of lethal CDM methods inhumane would find this alternative preferable to Alternative 5.

### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Under this alternative, the Federal agencies would not be involved in operational use of CDM techniques. No CDM would be conducted on Federal lands. However lethal CDM techniques could be used by ODW for the protection of public resources on non-Federal lands. Lethal CDM methods could also be used by the state and other non-Federal entities under MBPs. Use of lethal CDM methods would be lower than for Alternatives 1 and 5 because no lethal CDM would be conducted at WSI, but it would still be higher than Alternatives 2 and 4. Individuals who believe lethal CDM techniques are inhumane might consider this alternative slightly preferable to Alternative 5.

### **Alternative 4 - No CDM by Federal Agencies**

Under this alternative the Federal agencies would not be involved in CDM and CDM would not be conducted on Federal lands. ODW could use non-lethal CDM techniques and could still use lower levels of lethal CDM techniques for the protection of public resources on non-Federal lands. Other non-Federal entities could not use lethal CDM techniques but would still have access to non-lethal CDM. Individuals who believe lethal CDM techniques are inhumane are likely to perceive this method as similar to Alternative 2 and more humane than Alternative 5.

### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

Under this alternative, methods viewed by some persons as inhumane would be used in CDM. Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane. Some people may also be opposed to killing embryos via egg oiling or egg addling, but this technique is generally viewed as preferable to killing juvenile or adult birds.

Occasionally, DCCOs captured alive would be euthanized. The most common method of euthanasia would be by decapitation, cervical dislocation or CO<sub>2</sub> gas.

These methods are described and approved by AVMA as humane euthanasia methods (Beaver et al. 2001).

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 CDM methods are used in situations where non-lethal damage management methods are not practical or effective.

Personnel with the lead and cooperating agencies are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

#### **4.1.6 Impacts of Carcass Disposal**

##### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

Under this alternative, take of DCCOs and disposal of carcasses would be identical to Alternative 5. For reasons explained for Alternative 5, carcass disposal will not significantly adversely impact soils, water or air quality.

##### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Lethal CDM would not be conducted at WSI so there would be no composting of carcasses at that site. Maximum take of DCCOs by ODW at Green Island and the other Lake Erie Islands and near shore areas would be reduced to 270 birds, so impacts at Green Island would be much less than under Alternative 5. There would be no other use of lethal CDM and no other carcass disposal under this alternative. Therefore, based on analysis provided for Alternative 5, the lead and cooperating agencies conclude that this alternative would not have a significant adverse impact on air, soil or water quality.

##### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Lethal CDM would not be conducted at WSI so there would be no composting of carcasses at that site. Lethal CDM by ODW under the PRDO and associated impacts relative to carcass disposal would be identical to Alternative 5. Take of DCCOs and disposal of carcasses under MBPs and scientific collecting permits would also be identical to Alternative 5. For reasons provided in Alternative 5, the lead and cooperating agencies conclude that the proposed action will not have a significant adverse impact on air, soil or water quality.

#### **Alternative 4 - No CDM by Federal Agencies**

Lethal CDM would not be conducted at WSI so there would be no composting of carcasses at that site. Maximum take of DCCOs by ODW at Green Island and the other Lake Erie islands and near shore areas would be reduced to 270 birds, so impacts at Green Island would be less than under Alternative 5. There would be no other use of lethal CDM and no other carcass disposal under this alternative. Therefore, based on analysis provided for Alternative 5, the lead and cooperating agencies conclude that this alternative would not have a significant adverse impact on air, soil or water quality.

#### **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

This alternative would result in the lethal take of up to 7,252 DCCOs annually. DCCOs taken by the lead and cooperating agencies for reasons other than the protection of public resources would be disposed of via incineration in a Ohio EPA approved incinerator or through burial at a Ohio EPA approved sanitary landfill which accepts animal carcasses. The number of DCCOs that could be disposed of in a landfill is insignificant in relation to the total volume of waste that is placed in landfill sites and will not contribute significantly to the impacts associated with these sites. Use of Ohio EPA approved landfills and incinerators would ensure that disposal actions are conducted in accordance with all State and Federal regulations for the protection of the environment.

The ODW and USFWS would compost all cormorants which are shot on Green Island and WSI onsite. DCCOs taken under the PRDO on other Lake Erie islands and near shore areas would be disposed of in the compost site at Green Island or in a certified landfill. The maximum number of DCCOs that would be placed in the composting sites annually would be 4,766 at WSI (4,626 breeding birds and 140 migrants) and 1,854 at Green Island (1,714 breeding birds from Green Island, 80 breeding birds from TPI, and 60 migrants). The Ohio EPA has placed the composting of cormorants on the islands under the authority of the Ohio Division of Soil and Water (ODSW) (pers. communication from Alison Shockley). Under Ohio law, ODW and USFWS employees would attend a mortality composting workshop and be certified by Ohio State University Extension before they begin composting (Keener et. al. 2005).

Dead animal composting can be described as "above ground burial in a bio-filter with pathogen kill by high temperature." The decomposition process is anaerobic (lacking oxygen) in and around the animal carcasses, but aerobic in the surrounding material where odorous gases are ingested by microorganisms and degraded to CO<sub>2</sub> and H<sub>2</sub>O. The amendment (sawdust) that surrounds the animal carcass or layers of carcasses provides carbon (energy) for the microorganisms and serves as the biofilter (Keener et. al. 2005).

The general procedure followed for composting carcasses is to first construct a base from sawdust or other acceptable amendment at least 30 cm (1 foot) thick. Next, a layer of carcasses is placed on the sawdust base. Then the carcasses are covered with 30 to 60 cm (1 to 2 feet) of damp amendment. The cover material prevents the pile from attracting scavengers and flies, minimizes water leachate in the case of high rainfalls for the uncovered pile, and ensures adequate insulative value for the composting zone to reach 130°F or higher (pathogen kill).

Composting of cormorant carcasses was conducted on Presqu'ile Provincial Park, Ontario in 2004. No complaints were received from the public on the composting area despite the fact that, unlike Green Island and WSI, the public is allowed access to Presqu'ile Provincial Park. Approximately 4,870 cormorants were composted in a 20m x 20m composting area without adverse impacts on soils, water or air quality (Ontario MNR 2005). A similar or lower number of DCCOs (maximum = 4,766 birds) could be composted at WSI and a much lower number (maximum = 1,854 birds) would be composted at Green Island. The proposed composters will not exceed the size of that used at Presqu'ile (4.5m long, 2.5m wide and 1.5m tall).

Based on data from Presqu'ile Provincial Park, and given that all composting will be conducted in accordance with guidelines established by the ODSW for the protection of the environment, the proposed composting will not have a significant adverse impact on environmental quality.

#### **4.1.7 Effects on Recreation in Surrounding Area**

##### **Alternative 1 - Integrated CDM Program, Including Implementation of the PRDO (Proposed Action)**

The actions currently planned under this EA would have the same impacts on recreation as Alternative 5, because the CDM actions currently proposed under the PRDO could be conducted under MBPs. It is possible that at some future time, small projects for the protection of public fishery resources could be conducted under this alternative that would not be possible under Alternative 5 so long as the cumulative adverse impacts do not exceed those analyzed in this EA. If the projects to protect fishery resources enhance sport fish populations, then this alternative may have benefits to recreation that would not be possible under Alternative 5.

##### **Alternative 2 – Only Non-lethal CDM by Federal Agencies**

Although the total amount of lethal CDM (shooting) that could be conducted would be much lower for non-Federal lands and would not occur on Federal lands, overall impacts on recreation resulting from the use of firearms and pyrotechnics discussed for Alternative 5 may not be lower for this alternative. Increased levels of non-lethal CDM, including the use of pyrotechnics, would

probably be needed to achieve management goals. Harassment activities would likely need to be repeated more frequently and for a greater period of time under this alternative than for Alternative 5. If safety buffers are established for these activities like the ones described for Alternative 5, there could be increased closures of the area surrounding the treatment sites to boat traffic. Any potential benefits to sport fishing discussed in Alternative 1 would depend on whether or not the project could be successfully executed when access to the full range of CDM methods is limited.

### **Alternative 3 – Only Technical Assistance by Federal Agencies**

Impacts on recreational activities at non-Federal sites would be similar to or slightly higher under this alternative because ODW would be able to use the full range of CDM methods to achieve CDM goals at non-Federal sites. Risks may be slightly higher because additional CDM may be needed at sites near WSI because of the large, unmanaged DCCO breeding colony at WSI. There would be no CDM conducted at WSI so there would be no impacts on recreational activities conducted near WSI. Overall impacts on recreation are still likely to be low. Any potential benefits to sport fishing discussed in Alternative 1 would depend on whether or not the project could be successfully executed without conducting CDM on Federal lands.

### **Alternative 4 - No CDM by Federal Agencies**

There would be no CDM conducted at WSI so there would be no impacts on recreational activities conducted near WSI. Although the total amount of lethal CDM (shooting) that could be conducted would be much lower for non-Federal lands, overall impacts on recreation resulting from the use of firearms and pyrotechnics discussed for Alternative 5 may not be lower at these sites. Increased levels of non-lethal CDM, including the use of pyrotechnics, would probably be needed to achieve management goals. Harassment activities would likely need to be repeated more frequently and for a greater period of time under this alternative than for Alternative 5. If safety buffers are established for these activities like the ones described for Alternative 5, then increased closures of the area surrounding the treatment sites may result. Additional management efforts may also be needed at sites near the large DCCO colony at WSI that would not be managed under this alternative.

Any potential benefits to sport fishing discussed in Alternative 1 would depend on whether or not the project could be successfully executed without conducting CDM on Federal lands and when access to the full range of CDM methods at other sites is limited.

## **Alternative 5 - Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

Impacts on wildlife viewing opportunities are addressed in Section 4.1.4. The DCCO colonies in Ohio are all located on Federal or state-owned properties and surrounded by or adjacent to popular recreational water bodies. Activities by agency personnel under this alternative should have a minimal effect on recreational use because these areas are already closed to public use. However when firearms or pyrotechnics will be used in CMD activities it might be necessary for agency personnel to establish a safe perimeter around the colonies and detour boat traffic away from those areas. In 2005, when research on CDM methods was being conducted at WSI, the USFWS had a marked USFWS boat circling the island during the entire shooting period. The USFWS also broadcast a notice to mariners broadcast over channel 16 VHF radio to warn boaters to stay one mile from the island. The USFWS plans to do the same for all management trips. Similar measures are likely to be used by ODW. As much as possible, these activities would be planned so as not to coincide with heavy recreational use and boat traffic in a given area. Overall impacts on recreation from these protective measures are likely to be minimal. Use of MBPs by private landowners likely would not have any effect on recreation.

### **4.2 CUMULATIVE IMPACTS**

Cumulative impacts, as defined by the CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under the alternatives presented, the lead and cooperating agencies would address damage associated with DCCOs in a number of situations throughout the State. The lead and cooperating agencies would coordinate their efforts and information on the impacts of their activities and the activities of other entities reporting to the USFWS to monitor the cumulative impacts of their actions. The potential cumulative impacts analyzed below could occur either as a result of the lead and cooperating agency CDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

#### **Cumulative Impacts on Wildlife Populations**

As analyzed in Sections 4.1.1 and 4.1.2, CDM methods used or recommended by the lead and cooperating agencies together with impacts by other entities, will likely have no cumulative adverse effects on DCCO and non-target wildlife populations. The intent and expected result of this program is to prevent the continued loss of rare island vegetation

and critical colonial waterbird nesting habitat attributed to the rapid increase in DCCO densities in Ohio. Take of DCCOs by all sources is anticipated to have no effect on the long-term sustainability of DCCO populations in Ohio, the region, and the U.S. Population trend data and information provided in the USFWS FEIS (USFWS 2003) indicate that DCCO populations have increased for Ohio, the region and the U.S. over the past 20 years. When control actions are implemented by the lead and cooperating agencies the potential lethal take of non-target wildlife species is expected to be minimal to non-existent. The potential for beneficial impacts on vegetation, sensitive wildlife populations is greatest for Alternatives 1 and 5 then decreasingly less under Alternatives 2, 3 and 4.

### **Cumulative Impact Potential from CDM Methods**

CDM methods used or recommended by the lead and cooperating agencies may include recommendations on exclusion through use of various barriers (at aquaculture facilities and private fish ponds), habitat modification of structures or vegetation, live trapping and euthanasia of birds, harassment of birds or bird flocks, nest and egg destruction, and shooting. Shotguns would only use shot that does not contain lead to prevent adverse impacts associated with lead in the environment. No cumulative adverse effects are anticipated from implementation of these CDM methods.

### **4.3 SUMMARY**

Under the Proposed Action, the lethal removal of DCCOs by the lead and cooperating agencies would not have an adverse impact on the long-term sustainability of DCCO populations in Ohio, the Region or the United States, but some local reductions would occur. Given the SOP's for the protection of nontarget species in Chapter 3 and the lead and cooperating agencies' commitment to adhere to all USFWS and ODW recommendations and requirements for the protection of State and Federally listed threatened and endangered species, the proposed action will not adversely impact nontarget species populations. No risk to public safety is expected when the lead and cooperating agencies conduct or recommend CDM because trained and experienced wildlife biologists/specialists would be conducting the work and providing guidance (technical assistance) to others conducting CDM. Potential risks to public safety are slightly higher from persons who reject assistance and recommendations in Alternatives 1, 2, 3 and 5 and conduct their own CDM activities, and when no assistance is provided in Alternative 4. However, overall risks to public safety from the actions of entities other than the lead and cooperating agencies are anticipated to be very low.

Although some persons will likely be opposed to the lead and cooperating agencies conducting CDM activities on public and private lands within the state of Ohio, the analysis in this EA indicates that an Integrated CDM program will not result in cumulative adverse impacts on the quality of the human environment. Table 4-3 summarizes the expected impact of each of the alternatives on each of the issues.

**Table 4-3. Summary of impacts of each of the alternatives on each of the issues related to CDM in Ohio.**

Issues	<i>Alternative 1 Integrated CDM Program Including PRDO (Proposed Action)</i>	<i>Alternative 2 Only Non-lethal CDM by Federal Agencies</i>	<i>Alternative 3 Only Technical Assistance by Federal Agencies.</i>	<i>Alternative 4 No CDM by Federal Agencies</i>	<i>Alternative 5 Integrated CDM, Excluding PRDO (No Action)</i>
<b>Effects on DCCO Populations</b>	Low effect - reductions in local DCCO numbers; would not significantly affect viability of state, regional, national, and continental populations.	No effect by Federal agencies. ODW removal of DCCOs for the protection of public resources would be much lower than Alts 1, 3 and 5. No other lethal CDM would be permitted.	No effect by Federal agencies. Number of DCCOs removed by ODW on non-Federal sites and DCCOs removed under MBPs and research permits could equal that expected under Alts 1 and 5. Total impacts would be lower than Alts. 1 and 5 because there would be no DCCO removal at WSI	No effect by Federal agencies. ODW removal of DCCOs for the protection of public resources would be much lower than Alts 1, 3 and 5. No other lethal CDM would be permitted..	Low effect - reductions in local DCCO numbers; would not significantly affect viability of state, regional, national, and continental populations.
<b>Effects on Other Wildlife Species, Including T&amp;E Species</b>	Low effect - methods used by lead and cooperating agencies would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species. Maximum benefits to species adversely impacted by DCCOs.	Low effect - methods used by lead and cooperating agencies, would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species. Benefits to species adversely impacted by DCCOs dependent upon efficacy of exclusive use of non-lethal methods at WSI and reduced use of lethal techniques at non-Federal sites	No effects by Federal agencies. Low effect by ODW - methods used would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species. Benefits to species adversely impacted by DCCOs on non-Federal lands similar to Alts 1 and 5. No benefit to species adversely impacted by DCCOs at WSI.	No effect by Federal agencies. Low effect by ODW - methods used would be highly selective with very little risk to non-target species. Benefits to species adversely impacted by DCCOs dependent upon efficacy of non-lethal techniques and reduced use of lethal techniques at non-Federal sites. No benefit to species adversely impacted by DCCOs at WSI.	Low effect - methods used by lead and cooperating agencies would be highly selective with very little risk to non-target species. Specific measures to minimize impacts to T&E species. Maximum benefits to species (birds, plants) adversely impacted by DCCOs.

<b>Issues</b>	<i>Alternative 1 Integrated CDM Program Including PRDO (Proposed Action)</i>	<i>Alternative 2 Only Non-lethal CDM by Federal Agencies</i>	<i>Alternative 3 Only Technical Assistance by Federal Agencies.</i>	<i>Alternative 4 No CDM by Federal Agencies</i>	<i>Alternative 5 Integrated CDM, Excluding PRDO (No Action)</i>
<b>Effects on Human Health and Safety</b>	Negligible risk from methods used by lead and cooperating agencies.  Good probability of reducing hazards associated with DCCOs.	Negligible risk from methods used by lead and cooperating agencies.  Risk from ODW use of lethal techniques less than low levels anticipated for Alts. 1 and 5.  Less likely to reduce hazards associated with DCCOs than Alternatives 1, 3, and 5.	No risk from actions of Federal agencies.  Risks from ODW CDM actions on non-Federal lands identical to Alts. 1 and 5.  Risks from actions of other entities low but variable depending upon experience. Risks reduced by use of technical assistance.  Good probability of reducing hazards associated with DCCOs.	No risk from actions of Federal agencies  Risk from ODW use of lethal techniques less than low levels anticipated for Alts. 1 and 5.  Less likely to reduce hazards associated with DCCOs than Alternatives 1, 3, and 5.	Negligible risk from methods used by lead and cooperating agencies.  Good probability of reducing hazards associated with DCCOs.
<b>Aesthetic Impacts</b>	Low to moderate effect at local levels; Some local populations may be reduced. DCCO viewing opportunities would still be available  Best potential for localized benefits to those who enjoy species that may be adversely impacted by DCCOs.	Low to moderate effect. Impact will depend on success of efforts to relocate problem DCCOs with non-lethal techniques and success of limited ODW use of lethal CDM methods to protect public resources on non-Federal lands  Localized benefits to those who enjoy species that may be adversely impacted by DCCOs variable depending on efficacy of non-lethal techniques.	No effect by Federal agencies  Impact of entities other than WS and USFWS would be similar to Alts 1 and 5 on non-Federal lands.  Benefits to those who enjoy species adversely impacted by DCCOs on non-Federal lands similar to Alts. 1 and 5.  No localized benefits to those who enjoy species adversely impacted by DCCOs at WSI because CDM efforts to protect public resources would not be conducted at WSI.	No effect by Federal agencies.  Impact of other entities will depend on success of efforts to relocate problem DCCOs with non-lethal techniques and success of limited ODW use of lethal CDM methods to protect public resources.  Localized benefits to those who enjoy species that may be adversely impacted by DCCOs on non-Federal lands variable depending on efficacy of ODW efforts.	Low to moderate effect at local levels; Some local populations may be reduced. DCCO viewing opportunities would still be available  Best potential for localized benefits to those who enjoy species that may be adversely impacted by DCCOs.

<b>Issues</b>	<i>Alternative 1 Integrated CDM Program Including PRDO (Proposed Action)</i>	<i>Alternative 2 Only Non-lethal CDM by Federal Agencies</i>	<i>Alternative 3 Only Technical Assistance by Federal Agencies.</i>	<i>Alternative 4 No CDM by Federal Agencies</i>	<i>Alternative 5 Integrated CDM, Excluding PRDO (No Action)</i>
<b>Humaneness and Animal Welfare Concerns of Methods Used</b>	Low to moderate effect - methods viewed as inhumane (lethal CDM methods) by some people would be used by lead and cooperating agencies. Same number of DCCOs taken as Alternative 5.	Lower effect than Alt. 5 because only non-lethal methods would be used by entities other than ODW. Use of lethal methods by ODW greatly reduced.	No effect by Federal agencies. Lethal available to other entities but fewer DCCOs would be taken than under Alternative 5 because no lethal used at WSI.	No effect by Federal agencies. No use of lethal by any entity other than ODW. Use of lethal methods by ODW greatly reduced.	Low to moderate effect - methods viewed by some people as inhumane (lethal CDM methods) would be used by lead and cooperating agencies.
<b>Carcass Disposal</b>	Low effects because disposal actions will be conducted in accordance with state and Federal laws and regulations. Impacts same as Alt 5.	Effects lower than Alts 1,3, and 5 because lowest used of lethal CDM methods. Identical to Alt 4.	Effects lower than alts 1 and 5 because less use of lethal CDM methods.	Effects lower than Alts 1,3, and 5 because lowest used of lethal CDM methods. Identical to Alt 2.	Low effects because disposal actions will be conducted in accordance with state and Federal laws and regulations.
<b>Effects on Recreation in the Surrounding Areas</b>	Low impacts on recreation Benefits from potential future projects to benefit sport fishing greatest for this alternative	Less lethal CDM but not necessarily less impact on recreation Benefits from potential future projects to benefit sport fishing dependent upon efficacy of non-lethal methods and reduced access to lethal CDM methods	Less lethal CDM but not necessarily less impact on recreation at non-Federal sites. No impacts at Federal sites Benefits from potential future projects to benefit sport fishing dependent upon whether goals can be accomplished at non-Federal sites	Less lethal CDM but not necessarily less impact on recreation at non-Federal sites. No impacts at Federal sites Benefits from potential future projects to benefit sport fishing dependent upon whether goals can be accomplished at non-Federal sites and efficacy of programs with restricted access to CDM methods.	Low impacts on recreation. Future projects to benefit sport fishing would be extremely limited.

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## APPENDIX A

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## APPENDIX B

### SPECIES THAT ARE FEDERALLY LISTED AS THREATENED OR ENDANGERED IN THE STATE OF OHIO

(T= Threatened, E= Endangered)

#### Federally Endangered, Threatened and Candidate Species in Ohio

##### MAMMALS

Indiana bat - endangered

##### BIRDS

Bald eagle - threatened

Piping plover - endangered

Kirtland's warbler - endangered

##### REPTILE

Eastern massasauga – candidate

Copperbelly water snake – threatened

Lake Erie water snake - threatened

##### FISH

Scioto madtom - endangered

##### INSECTS

Hine's emerald dragonfly – endangered

Karner blue butterfly – endangered

Mitchell's satyr butterfly – endangered

American burying beetle - endangered

##### MOLLUSKS

Fanshell - endangered

Purple catspaw - endangered

White catspaw - endangered

Northern riffleshell - endangered

Pink mucket - endangered

Clubshell - endangered

##### PLANTS

Running buffalo clover - endangered

Northern monkshood - threatened

Lakeside daisy - threatened

Small whorled pogonia - threatened

Prairie fringed orchid - threatened

Virginia spiraea - threatened

## APPENDIX C

### SPECIES THAT ARE LISTED AS ENDANGERED AND THREATENED BY THE STATE OF OHIO

#### PURPOSE, SCOPE, AND RELATIONSHIP TO FEDERAL LAWS

The Division of Wildlife's mission is to conserve and improve the fish and wildlife resources and their habitats, and promote their use and appreciation by the public so that these resources continue to enhance the quality of life for all Ohioans. The Division has legal authority over Ohio's fish and wildlife, which includes about 56 species of mammals, 200 species of breeding birds, 84 species and subspecies of amphibians and reptiles, 170 species of fish, 100 species of mollusks, and 20 species of crustaceans (ODNR 2005).

In addition, there are thousands of species of insects and other invertebrates which fall under the Division's jurisdiction. Furthermore, Ohio law grants authority to the chief of the Division to adopt rules restricting the taking or possession of native wildlife threatened with statewide extirpation and to develop and periodically update a list of endangered species (Ohio Revised Code 1531.25).

#### DEFINITIONS

A species is considered **endangered**, if it is threatened with extirpation from the state. The danger may result from one or more causes, such as habitat loss, pollution, predation, interspecific competition, or disease.

A species is considered **threatened**, whose survival in Ohio is not in immediate jeopardy, but to which a threat exists. Continued or increased stress will result in its becoming endangered.

#### MAMMALS

##### Endangered

<i>Myotis sodalist</i> .....	Indiana Bat
<i>Neotoma magister</i> .....	Allegheny woodrat
<i>Felis rufus</i> .....	bobcat
<i>Ursus americanus</i> .....	black bear
<i>Lepus americanus</i> .....	snowshoe hare

## **BIRDS**

### **Endangered**

<i>Botaurus lentiginos</i> .....	American bittern
<i>Haliaeetus leucocephalus</i> .....	bald eagle
<i>Circus cyaneus</i> .....	northern harrier
<i>Falco peregrinus</i> .....	peregrine falcon
<i>Rallus elegans</i> .....	king rail
<i>Grus canadensis</i> .....	Sandhill crane
<i>Charadrius melodus</i> .....	Piping plover
<i>Sterna hirundo</i> .....	Common tern
<i>Chlidonias niger</i> .....	Black tern
<i>Sphyrapicus varius</i> .....	Yellow-bellied sapsucker
<i>Thryomanes bewickii</i> .....	Bewick's wren
<i>Lanius ludovicianus</i> .....	Loggerhead shrike
<i>Vermivora chrysoptera</i> .....	Golden-winged warbler
<i>Dendroica kirtlandii</i> .....	Kirtland's warbler *E
<i>Chondestes grammacus</i> .....	Lark sparrow
<i>Pandion haliaetus</i> .....	Osprey
<i>Cygnus buccinator</i> .....	Trumpeter swan
<i>Egretta thula</i> .....	Snowy egret
<i>Bubulcus ibis</i> .....	Cattle egret

### **Threatened**

<i>Bartramia longicauda</i> .....	Upland sandpiper
<i>Nycticorax nycticorax</i> .....	Black-crowned night-heron
<i>Nyctanassa violacea</i> .....	Yellow-crowned night-heron
<i>Tyto alba</i> .....	Barn owl
<i>Junco hyemalis</i> .....	Dark-eyed junco
<i>Catharus guttatus</i> .....	Hermit thrush
<i>Ixobrychus exilis</i> .....	Least bittern
<i>Empidonax minimus</i> .....	Least flycatcher

## **AMPHIBIANS AND REPTILES**

### **Endangered**

<i>Nerodia erythrogaster neglecta</i> .....	copperbelly water snake
<i>Thamnophis radix radi</i> .....	eastern plains garter snake
<i>Crotalus horridus horridus</i> .....	timber rattlesnake
<i>Nerodia sipedon insularum</i> .....	Lake Erie water snake
<i>Cryptobranchus alleganiensis alleganiensis</i> .....	eastern hellbender
<i>Ambystoma laterale</i> .....	blue spotted salamander
<i>Aneides aeneus</i> .....	green salamander
<i>Eurycea lucifuga</i> .....	cave salamander
<i>Scaphiopus holbrookii</i> .....	eastern spadefoot
<i>Sistrurus catenatus</i> .....	massasauga

### **Threatened**

<i>Clonophis kirtlandii</i> .....	Kirtland's snake
<i>Clemmys guttata</i> .....	spotted turtle
<i>Pseudotriton montanus</i> .....	mud salamander

## **FISH**

### **Threatened**

<i>Salvelinus fontinalis</i> .....	Brook trout
<i>Notropis boops</i> .....	Bigeye shiner
<i>Exoglossum laurae</i> .....	Tonguetied minnow
<i>Moxostoma valenciennesi</i> .....	Greater redhorse
<i>Percina copelandi</i> .....	Channel darter
<i>Anguilla rostrata</i> .....	American eel
<i>Clinostomus funduloides</i> .....	Rosyside dace
<i>Notropis dorsalis</i> .....	Bigmouth shiner
<i>Erimyzon sucetta</i> .....	Lake chubsucker
<i>Percina shumardi</i> .....	River darter
<i>Etheostoma camurum</i> .....	Bluebreast darter
<i>Etheostoma tippecanoe</i> .....	Tippecanoe darter
<i>Polyodon spathula</i> .....	paddlefish

### **Endangered**

<i>Ichthyomyzon bdellium</i> .....	Ohio lamprey
<i>Ichthyomyzon fossor</i> .....	Northern brook lamprey
<i>Ichthyomyzon greeleyi</i> .....	Mountain brook lamprey
<i>Acipenser fulvescens</i> .....	Lake sturgeon
<i>Scaphirhynchus platyrhynchus</i> .....	Shovelnose sturgeon
<i>Lepisosteus oculatus</i> .....	Spotted gar
<i>Lepisosteus platostomus</i> .....	Shortnose gar
<i>Coregonus artedii</i> .....	Cisco (or Lake herring)
<i>Hiodon alosoides</i> .....	Goldeye
<i>Macrhybopsis aestivalis</i> .....	Speckled chub
<i>Opsopoeodus emiliae</i> .....	Pugnose minnow
<i>Notropis ariomus</i> .....	Popeye shiner
<i>Notropis heterodon</i> .....	Blackchin shiner
<i>Notropis heterolepis</i> .....	Blacknose shiner
<i>Hybognathus nuchalis</i> .....	Mississippi silvery minnow
<i>Cycleptus elongates</i> .....	Blue sucker
<i>Catostomus catostomus</i> .....	Longnose sucker
<i>Ictalurus furcatus</i> .....	Blue catfish
<i>Noturus eleutherus</i> .....	Mountain madtom
<i>Noturus stigmosus</i> .....	Northern madtom
<i>Noturus trautmani</i> .....	Scioto madtom *E
<i>Aphredoderus sayanus</i> .....	Pirate perch
<i>Fundulus diaphanus menona</i> .....	Western banded killifish
<i>Etheostoma maculatum</i> .....	Spotted darter

## **MOLLUSKS**

### **Endangered**

<i>Epioblasma triquetra</i> .....	Snuffbox
<i>Fusconaia ebena</i> .....	Ebonys shell
<i>Cyprogenia stegaria</i> .....	Fanshell
<i>Ellipsaria lineolata</i> .....	Butterfly
<i>Elliptio crassidens crassidens</i> .....	Elephant-ear
<i>Epioblasma o. obliquata</i> .....	Purple catspaw
<i>Epioblasma obliquata perobliqua</i> .....	White catspaw
<i>Epioblasma torulosa rangiana</i> .....	Northern riffleshell

<i>Fusconaia maculata maculata</i> .....	Long-solid
<i>Lampsilis orbiculata</i> .....	Pink mucket
<i>Lampsilis ovata</i> .....	Sharp-ridged pocketbook
<i>Lampsilis teres</i> .....	Yellow sandshell
<i>Ligumia nasuta</i> .....	Eastern pondmussel
<i>Megalonaias nervosa</i> .....	Washboard
<i>Plethobasus cyphus</i> .....	Sheepnose
<i>Pleurobema clava</i> .....	Clubshell
<i>Pleurobema cordatum</i> .....	Ohio pigtoe
<i>Pleurobema rubrum</i> .....	Pyramid pigtoe
<i>Quadrula cylindrica cylindrica</i> .....	Rabbitsfoot
<i>Quadrula metanevra</i> .....	Monkeyface
<i>Quadrula nodulata</i> .....	Wartyback
<i>Toxolasma lividus</i> .....	Purple lilliput
<i>Villosa fabalis</i> .....	Rayed bean
<i>Villosa lienosa</i> .....	Little spectaclecase

**Threatened**

<i>Ligumia recta</i> .....	Black sandshell
<i>Obliquaria reflexa</i> .....	Threehorn wartyback
<i>Truncilla donaciformis</i> .....	Fawnsfoot
<i>Unimerus tetralasmus</i> .....	Pondhorn

**BUTTERFLIES AND MOTHS**

**Endangered**

<i>Erynnis persius</i> .....	Persius dusky wing
<i>Incisalia irus</i> .....	Frosted elfin
<i>Lycaeides melissa samuelis</i> .....	Karner blue
<i>Lycaena helloides</i> .....	Purplish copper
<i>Calephelis muticum</i> .....	Swamp metalmark
<i>Speyeria idalia</i> .....	Regal fritillary
<i>Pyrgus cantatae wyandot</i> .....	Grizzled skipper
<i>Neonympha mitchellii</i> .....	Mitchell's satyr
<i>Cycnia inopinatus</i> .....	Unexpected cycnia
<i>Catocala gracilis</i> .....	Graceful underwing
<i>Spartiniphaga inops</i>	
<i>Hypocoena enervata</i>	
<i>Papaipema silphii</i>	
<i>Papaipema beeriana</i>	
<i>Lithophane semiusta</i>	
<i>Trichoclea artesta</i>	
<i>Tricholita notata</i>	
<i>Melanchra assimilis</i>	
<i>Epiglaea apiata</i> .....	Pointed sallow
<i>Ufeus plicatus</i>	
<i>Ufeus satyricus</i>	
<i>Erythroecia hebardei</i> .....	Hebard's noctuid moth

**Threatened**

<i>Boloria selene</i> .....	Silver-bordered fritillary
<i>Catocala antinympha</i> .....	Wayward nymph

*Spartiniphaga panatela*  
*Fagitana littera*  
*Faronta rubripennis*..... The pink-streak

**CADDISFLIES**

**Endangered**

*Chimarra socia*  
*Oecetis eddlestoni*  
*Brachycentrus numerosus*

**Threatened**

*Psilotreta indecisa*  
*Hydroptila albicornis*  
*Hydroptila artesa*  
*Hydroptila koryaki*  
*Hydroptila talledaga*  
*Hydroptila valhalla*

**BETLES**

**Endangered**

*Pseudanophthalmus krameri*.....Kramer's cave beetle  
*Pseudanophthalmus ohioensis*.....Ohio cave beetle  
*Nicrophorus americanus*.....American burying beetle

**Threatened**

*Cicindela hirticollis*  
*Cicindela marginipennis*..... Cobblestone tiger beetle

**CRAYFISHES**

**Threatened**

*Orconectes sloanii*.....Sloan's crayfish

**DRAGONFLIES**

**Endangered**

*Somatochlora hineana*.....Hine's emerald  
*Aeshna clepsydra*.....Mottled darner  
*Gomphus externus*.....Plains clubtail  
*Cordulia shurtleffi*.....American emerald  
*Helocordulia uhleri*.....Uhler's sundragon  
*Leucorrhinia frigida*.....Frosted whiteface  
*Nannothemis bella*.....Elfin skimmer  
*Aeshna Canadensis*.....Canada darner  
*Dorocordulia libera*.....Racket-tailed emerald  
*Somatochlora walshii*.....Brush-tipped emerald  
*Ladona deplanata*.....Blue corporal  
*Ladona julia*.....Chalk-fronted corpora  
*Libellula flavida*.....Yellow-sided skimmer

**Threatened**

*Ophiogomphus carolus*.....Riffle snaketail

**DAMSELFLIES**

**Endangered**

*Ischnura kellicott*..... Lilypad forktail  
*Argia bipunctulata*.....Seepage dancer

**Threatened**

*Calopteryx aequabilis*.....River jewelwing

**MIDGES**

**Endangered**

*Rheopelopia acra*

**Threatened**

*Bethbilbeckia floridensis*  
*Apsectrotanypus johnsoni*  
*Radotanypus florens*

**VASCULAR PLANTS**

**Endangered**

*Acer pensylvanicum*.....Striped Maple  
*Aconitum noveboracense*.....Northern Monkshood  
*Aconitum uncinatum*.....Southern Monkshood  
*Agalinis auriculata*.....Ear-leaved-foxglove  
*Agalinis purpurea var. parviflora*.....Small Purple-foxglove  
*Agalinis skinneriana*.....Skinner's-foxglove  
*Agrostis eliottiana*.....Elliott's Bent Grass  
*Amelanchier sanguinea*.....Rock Serviceberry  
*Andropogon glomeratus*.....Common Broom-sedge  
*Arabis divaricarpa*.....Limestone Rock Cress  
*Arabis drummondii*.....Drummond's Rock Cress  
*Arabis hirsuta var. pycnocarpa*.....Western Hairy Rock Cress  
*Arabis missouriensis*.....Missouri Rock Cress  
*Arabis patens*.....Spreading Rock Cress  
*Aralia hispida*.....Bristly Sarsaparilla  
*Arenaria patula*.....Spreading Sandwort  
*Arethusa bulbosa*.....Dragon's-mouth  
*Aristida necopina*.....False Arrow-feather  
*Artemisia campestris*.....Beach Wormwood  
*Aster surculosus*.....Creeping Aster  
*Astragalus neglectus*.....Cooper's Milk-vetch  
*Aureolaria pedicularia var. ambigens*.....Prairie Fern-leaved False Foxglove  
*Aureolaria pedicularia var. pedicularia*.....Woodland Fern-leaved False Foxglove  
*Baptisia australis*.....Blue False Indigo  
*Bartonia paniculata*.....Screw-stem  
*Botrychium lanceolatum*.....Triangle Grape Fern  
*Botrychium simplex*.....Least Grape Fern  
*Calamagrostis porteri ssp. Inesperata*.....Bartley's Reed Grass  
*Campanula rotundifolia*.....Harebell  
*Cardamine pratensis var. palustris*.....American Cuckoo-flower

<i>Carex alopecoidea</i> .....	Northern Fox Sedge
<i>Carex arctata</i> .....	Drooping Wood Sedge
<i>Carex bushii</i> .....	Bush's Sedge
<i>Carex cephaloidea</i> .....	Thin-leaved Sedge
<i>Carex crinita</i> var. <i>brevicrinis</i> .....	Short-fringed Sedge
<i>Carex decomposita</i> .....	Cypress-knee Sedge
<i>Carex disperma</i> .....	Two-seeded Sedge
<i>Carex echinata</i> .....	Little Prickly Sedge
<i>Carex garberi</i> .....	Garber's Sedge
<i>Carex limosa</i> .....	Mud Sedge
<i>Carex longii</i> .....	Long's Sedge
<i>Carex louisianica</i> .....	Louisiana Sedge
<i>Carex lucorum</i> .....	Fire Sedge
<i>Carex merritt-fernalduii</i> .....	Fernald's Sedge
<i>Carex planispicata</i> .....	Flat-spiked Sedge
<i>Carex pseudocyperus</i> .....	Northern Bearded Sedge
<i>Carex retrorsa</i> .....	Reflexed Bladder Sedge
<i>Carex siccata</i> .....	Hay Sedge
<i>Carex striatula</i> .....	Lined Sedge
<i>Carex timida</i> .....	Timid Sedge
<i>Chrysopsis graminifolia</i> .....	Silk-grass
<i>Clintonia borealis</i> .....	Bluebead-lily
<i>Coeloglossum viride</i> .....	Long-bracted Orchid
<i>Collinsonia verticillata</i> .....	Early Stoneroot
<i>Corallorhiza trifida</i> .....	Early Coral-root
<i>Crataegus uniflora</i> .....	Dwarf Hawthorn
<i>Cuscuta coryli</i> .....	Hazel Dodder
<i>Cuscuta cuspidate</i> .....	Cuspidate Dodder
<i>Cuscuta indecora</i> .....	Pretty Dodder
<i>Cyperus lancastrisensis</i> .....	Many-flowered Umbrella-sedge
<i>Cyperus refractus</i> .....	Reflexed Umbrella-sedge
<i>Cyperus retrofractus</i> .....	Rough Umbrella-sedge
<i>Cypripedium candidum</i> .....	White Lady's-slipper
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i> .....	Small Yellow Lady's-slipper
<i>Desmodium glabellum</i> .....	Hairy Tick-trefoil
<i>Desmodium sessilifolium</i> .....	Sessile Tick-trefoil
<i>Draba brachycarpa</i> .....	Little Whitlow-grass
<i>Drosera intermedia</i> .....	Spathulate-leaved Sundew
<i>Dryopteris celsa</i> .....	Log Fern
<i>Dryopteris clintoniana</i> .....	Clinton's Wood Fern
<i>Dryopteris filix-mas</i> .....	Male Fern
<i>Echinodorus berteroi</i> .....	Burhead
<i>Eleocharis engelmannii</i> .....	Engelmann's Spike-rush
<i>Eleocharis geniculata</i> .....	Caribbean Spike-rush
<i>Eleocharis ovata</i> .....	Ovate Spike-rush
<i>Eleocharis parvula</i> .....	Least Spike-rush
<i>Eleocharis quinqueflora</i> .....	Few-flowered Spike-rush
<i>Eleocharis robbinsii</i> .....	Robbins' Spike-rush
<i>Eleocharis wolfii</i> .....	Wolf's Spike-rush
<i>Epilobium angustifolium</i> .....	Fireweed
<i>Equisetum variegatum</i> .....	Variegated Scouring-rush
<i>Eriocaulon aquaticum</i> .....	White-buttons
<i>Erysimum arkansanum</i> .....	Western Wallflower
<i>Erythronium rostratum</i> .....	Golden-star
<i>Eupatorium hyssopifolium</i> .....	Hyssop Thoroughwort

<i>Euphorbia purpurea</i> .....	Glade Spurge
<i>Euphorbia serpens</i> .....	Round-leaved Spurge
<i>Fissidens hyalinus</i> .....	Filmy Fissidens
<i>Froelichia floridana</i> .....	Common Cottonweed
<i>Galium labradoricum</i> .....	Bog Bedstraw
<i>Galium palustre</i> .....	Marsh Bedstraw
<i>Gentiana puberulenta</i> .....	Prairie Gentian
<i>Gentiana saponaria</i> .....	Soapwort Gentian
<i>Gentiana villosa</i> .....	Sampson's Snakeroot
<i>Geranium bicknellii</i> .....	Bicknell's Crane's-bill
<i>Gnaphalium viscosum</i> .....	Winged Cudweed
<i>Heteranthera reniformis</i> .....	Mud-plantain
<i>Heuchera longiflora</i> .....	Long-flowered Alum-root
<i>Hieracium longipilum</i> .....	Long-bearded Hawkweed
<i>Hydrocotyle umbellata</i> .....	Navelwort
<i>Hymenoxys herbacea</i> .....	Lakeside Daisy
<i>Hypericum canadense</i> .....	Canada St. John's-wort
<i>Hypericum denticulatum</i> .....	Coppery St. John's-wort
<i>Hypericum gymnanthum</i> .....	Least St. John's-wort
<i>Hypnum pretense</i> .....	Wrinkled-leaved Marsh Hypnum
<i>Iris brevicaulis</i> .....	Leafy Blue Flag
<i>Isoetes engelmannii</i> .....	Appalachian Quillwort
<i>Isotria medeoloides</i> .....	Small Whorled Pogonia
<i>Juncus diffusissimus</i> .....	Diffuse Rush
<i>Juncus greenei</i> .....	Greene's Rush
<i>Juncus interior</i> .....	Inland Rush
<i>Juncus platyphyllus</i> .....	Flat-leaved Rush
<i>Juniperus communis</i> .....	Ground Juniper
<i>Koeleria macrantha</i> .....	June Grass
<i>Lactuca hirsute</i> .....	Hairy Tall Lettuce
<i>Lathyrus venosus</i> .....	Wild Pea
<i>Ledum groenlandicum</i> .....	Labrador-tea
<i>Leersia lenticularis</i> .....	Catchfly Grass
<i>Linaria Canadensis</i> .....	Old-field Toadflax
<i>Lipocarpa drummondii</i> .....	Drummond's Dwarf Bulrush
<i>Magnolia macrophylla</i> .....	Bigleaf Magnolia
<i>Monarda punctata</i> .....	Dotted Horsemint
<i>Moneses uniflora</i> .....	One-flowered Wintergreen
<i>Muhlenbergia cuspidata</i> .....	Plains Muhlenbergia
<i>Myrica pensylvanica</i> .....	Bayberry
<i>Myriophyllum heterophyllum</i> .....	Two-leaved Water-milfoil
<i>Myriophyllum verticillatum</i> .....	Green Water-milfoil
<i>Najas gracillima</i> .....	Thread-like Naiad
<i>Nuphar variegata</i> .....	Bullhead-lily
<i>Oenothera clelandii</i> .....	Cleland's Evening-primrose
<i>Ophioglossum engelmannii</i> .....	Limestone Adder's-tongue
<i>Oryzopsis asperifolia</i> .....	Large-leaved Mountain-rice
<i>Oxalis montana</i> .....	White Wood-sorrel
<i>Panicum commonsianum</i> .....	Commons' Panic Grass
<i>Panicum lindheimeri</i> .....	Lindheimer's Panic Grass
<i>Panicum perlongum</i> .....	Long-panicled Panic Grass
<i>Panicum philadelphicum</i> .....	Philadelphia Panic Grass
<i>Panicum praecocius</i> .....	Early Panic Grass
<i>Panicum scoparium</i> .....	Velvet Panic Grass
<i>Panicum spretum</i> .....	Narrow-headed Panic Grass

<i>Panicum tuckermanii</i> .....	Tuckerman's Panic Grass
<i>Panicum villosissimum</i> .....	Villous Panic Grass
<i>Panicum yadkinense</i> .....	Spotted Panic Grass
<i>Paxistima canbyi</i> .....	Cliff-green
<i>Penstemon laevigatus</i> .....	Smooth Beard-tongue
<i>Phacelia dubia</i> .....	Small-flowered Scorpion-weed
<i>Phacelia ranunculacea</i> .....	Blue Scorpion-weed
<i>Phlox latifolia</i> .....	Mountain Phlox
<i>Phyllanthus caroliniensis</i> .....	Carolina Leaf-flower
<i>Placidium lachneum</i> .....	Brown Stipplescale
<i>Plantago cordata</i> .....	Heart-leaved Plantain
<i>Plantago patagonica</i> .....	Woolly Plantain
<i>Platanthera blephariglottis</i> .....	White Fringed Orchid
<i>Platanthera psychodes</i> .....	Small Purple Fringed Orchid
<i>Pluchea camphorate</i> .....	Camphor-weed
<i>Poa saltuensis</i> .....	Pasture Blue Grass
<i>Poa wolfii</i> .....	Wolf's Blue Grass
<i>Podostemum ceratophyllum</i> .....	Riverweed
<i>Polygala cruciata</i> .....	Cross-leaved Milkwort
<i>Polygala curtissii</i> .....	Curtiss' Milkwort
<i>Polygala paucifolia</i> .....	Gay-wings
<i>Polygonum cilinode</i> .....	Mountain Bindweed
<i>Polygonum setaceum</i> var. <i>interjectum</i> .....	Bristly Smartweed
<i>Populus balsamifera</i> .....	Balsam Poplar
<i>Potamogeton friesii</i> .....	Fries' Pondweed
<i>Potamogeton gramineus</i> .....	Grass-like Pondweed
<i>Potamogeton hillii</i> .....	Hill's Pondweed
<i>Potamogeton praelongus</i> .....	White-stemmed Pondweed
<i>Potamogeton pulcher</i> .....	Spotted Pondweed
<i>Potamogeton robbinsii</i> .....	Robbins' Pondweed
<i>Potamogeton tennesseensis</i> .....	Tennessee Pondweed
<i>Potentilla arguta</i> .....	Tall Cinquefoil
<i>Potentilla paradoxa</i> .....	Bushy Cinquefoil
<i>Prenanthes aspera</i> .....	Rough Rattlesnake-root
<i>Prenanthes trifoliolata</i> .....	Gall-of-the-earth
<i>Prunus mexicana</i> .....	Bigtree Plum
<i>Pteridium aquilinum</i> var. <i>pseudocaudatum</i> .....	Tailed Bracken
<i>Pycnanthemum verticillatum</i> var. <i>pilosum</i> .....	Hairy Mountain-mint
<i>Pyrola chlorantha</i> .....	Green-flowered Wintergreen
<i>Ramalina intermedia</i> .....	Rock Ramalina
<i>Ramalina pollinaria</i> .....	Chalky Ramalina
<i>Ranunculus pusillus</i> .....	Low Spearwort
<i>Rhododendron calendulaceum</i> .....	Flame Azalea
<i>Rhododendron nudiflorum</i> var. <i>nudiflorum</i> .....	Pinxter-flower
<i>Rhynchospora recognita</i> .....	Tall Grass-like Beak-rush
<i>Ribes triste</i> .....	Swamp Red Currant
<i>Rosa blanda</i> .....	Smooth Rose
<i>Saccharum alopecuroideum</i> .....	Silver Plume Grass
<i>Sagittaria graminea</i> .....	Grass-leaved Arrowhead
<i>Salix pedicellaris</i> .....	Bog Willow
<i>Salix petiolaris</i> .....	Slender Willow
<i>Scheuchzeria palustris</i> .....	Scheuchzeria
<i>Schizachne purpurascens</i> .....	False Melic
<i>Schizachyrium littorale</i> .....	Coastal Little Bluestem
<i>Schoenoplectus americanus</i> .....	Olney's Three-square

<i>Schoenoplectus smithii</i> .....	Smith's Bulrush
<i>Schoenoplectus subterminalis</i> .....	Swaying-rush
<i>Scleria oligantha</i> .....	Tuberclad Nut-rush
<i>Silene caroliniana</i> var. <i>wherryi</i> .....	Wherry's Catchfly
<i>Silene nivea</i> .....	Snowy Campion
<i>Silphium laciniatum</i> .....	Compass-plant
<i>Sisyrinchium atlanticum</i> .....	Atlantic Blue-eyed-grass
<i>Sisyrinchium mucronatum</i> .....	Narrow-leaved Blue-eyed-grass
<i>Smilax pulverulenta</i> .....	Downy Carrion-flower
<i>Solidago puberula</i> .....	Dusty Goldenrod
<i>Solidago sphaecelata</i> .....	False Goldenrod
<i>Sorbus decora</i> .....	Western Mountain-ash
<i>Sparganium emersum</i> .....	Small Bur-reed
<i>Spiraea virginiana</i> .....	Appalachian Spiraea
<i>Streptopus lanceolatus</i> .....	Rose Twisted-stalk
<i>Tortella inclinata</i> .....	Curved Tortella
<i>Toxicodendron rydbergii</i> .....	Northern Poison-ivy
<i>Triadenum walteri</i> .....	Walter's St. John's-wort
<i>Trichomanes boschianum</i> .....	Appalachian Filmy Fern
<i>Trichostema dichotomum</i> var. <i>lineare</i> .....	Narrow-leaved Bluecurls
<i>Trifolium reflexum</i> .....	Buffalo Clover
<i>Trifolium stoloniferum</i> .....	Running Buffalo Clover
<i>Trillium undulatum</i> .....	Painted Trillium
<i>Trollius laxus</i> .....	Spreading Globeflower
<i>Urtica chamaedryoides</i> .....	Spring Nettle
<i>Utricularia cornuta</i> .....	Horned Bladderwort
<i>Utricularia geminiscapa</i> .....	Two-scaped Bladderwort
<i>Vaccinium myrtilloides</i> .....	Velvet-leaved Blueberry
<i>Valeriana ciliata</i> .....	Prairie Valerian
<i>Verbesina occidentalis</i> .....	Yellow Crown-beard
<i>Vernonia missurica</i> .....	Missouri Ironweed
<i>Viburnum opulus</i> var. <i>americanum</i> .....	Highbush-cranberry
<i>Viola missouriensis</i> .....	Missouri Violet
<i>Viola nephrophylla</i> .....	Northern Bog Violet
<i>Viola pedatifida</i> .....	Prairie Violet
<i>Viola primulifolia</i> .....	Primrose-leaved Violet
<i>Viola tripartita</i> var. <i>glaberrima</i> .....	Wedge-leaved Violet
<i>Viola walteri</i> .....	Walter's Violet
<i>Xyris difformis</i> .....	Variable Yellow-eyed-grass

## **VASCULAR PLANTS**

### **Threatened**

<i>Acalypha virginica</i> var. <i>deamii</i> .....	Deam's Three-seeded Mercury
<i>Acorus americanus</i> .....	American Sweet-flag
<i>Actaea rubra</i> .....	Red Baneberry
<i>Adlumia fungosa</i> .....	Mountain-fringe
<i>Agalinis gattingeri</i> .....	Gattinger's-foxtail
<i>Ammophila breviligulata</i> .....	American Beach Grass
<i>Androsace occidentalis</i> .....	Western Rock-jasmine
<i>Anemone cylindrica</i> .....	Prairie Thimbleweed
<i>Antennaria virginica</i> .....	Shale Barren Pussy-toes
<i>Apocynum sibiricum</i> .....	Clasping-leaved Dogbane
<i>Arabis lyrata</i> .....	Lyre-leaved Rock Cress
<i>Armoracia lacustris</i> .....	Lake Cress

<i>Asplenium bradleyi</i> .....	Bradley's Spleenwort
<i>Asplenium ruta-muraria</i> .....	Wall-rue
<i>Aster drummondii</i> .....	Drummond's Aster
<i>Aster dumosus</i> .....	Bushy Aster
<i>Aster oblongifolius</i> .....	Shale Barren Aster
<i>Aster ontarionis</i> .....	Bottomland Aster
<i>Aster solidagineus</i> .....	Narrow-leaved Aster
<i>Astragalus canadensis</i> .....	Canada Milk-vetch
<i>Betula pumila</i> .....	Swamp Birch
<i>Botrychium biternatum</i> .....	Sparse-lobed Grape Fern
<i>Botrychium multifidum</i> .....	Leathery Grape Fern
<i>Bromus nottowayanus</i> .....	Satin Brome
<i>Buchnera americana</i> .....	Bluehearts
<i>Calamintha arkansana</i> .....	Limestone Savory
<i>Calla palustris</i> .....	Wild Calla
<i>Callitriche verna</i> .....	Vernal Water-starwort
<i>Calopogon tuberosus</i> .....	Grass-pink
<i>Carex albolutescens</i> .....	Pale Straw Sedge
<i>Carex appalachica</i> .....	Appalachian Sedge
<i>Carex bicknellii</i> .....	Bicknell's Sedge
<i>Carex brevior</i> .....	Tufted Fescue Sedge
<i>Carex brunnescens</i> .....	Brownish Sedge
<i>Carex conoidea</i> .....	Field Sedge
<i>Carex crus-corvi</i> .....	Raven-foot Sedge
<i>Carex lupuliformis</i> .....	False Hop Sedge
<i>Carex mesochorea</i> .....	Midland Sedge
<i>Carex oligosperma</i> .....	Few-seeded Sedge
<i>Carex pallescens</i> .....	Pale Sedge
<i>Carex projecta</i> .....	Necklace Sedge
<i>Carex purpurifera</i> .....	Purple Wood Sedge
<i>Carex sprengei</i> .....	Sprengel's Sedge
<i>Celtis tenuifolia</i> .....	Dwarf Hackberry
<i>Chimaphila umbellata</i> .....	Pipsissewa
<i>Chionanthus virginicus</i> .....	Fringe-tree
<i>Chrysogonum virginianum</i> .....	Golden-knees
<i>Cirsium carolinianum</i> .....	Carolina Thistle
<i>Clintonia umbellulata</i> .....	Speckled Wood-lily
<i>Comptonia peregrina</i> .....	Sweet-fern
<i>Conyza ramosissima</i> .....	Bushy Horseweed
<i>Cornus canadensis</i> .....	Bunchberry
<i>Croton glandulosus</i> .....	Northern Croton
<i>Cuscuta glomerata</i> .....	Glomerate Dodder
<i>Cuscuta pentagona</i> .....	Five-angled Dodder
<i>Cyperus acuminatus</i> .....	Pale Umbrella-sedge
<i>Cyperus schweinitzii</i> .....	Schweinitz' Umbrella-sedge
<i>Cypripedium reginae</i> .....	Showy Lady's-slipper
<i>Dalibarda repens</i> .....	Robin-run-away
<i>Deschampsia flexuosa</i> .....	Crinkled Hair Grass
<i>Descurainia pinnata</i> .....	Tansy Mustard
<i>Draba cuneifolia</i> .....	Wedge-leaved Whitlow-grass
<i>Draba reptans</i> .....	Carolina Whitlow-grass
<i>Eleocharis compressa</i> .....	Flat-stemmed Spike-rush
<i>Eleocharis flavescens</i> .....	Green Spike-rush
<i>Elymus trachycaulus</i> .....	Bearded Wheat Grass
<i>Epilobium strictum</i> .....	Simple Willow-herb

<i>Eryngium yuccifolium</i> .....	Rattlesnake-master
<i>Eupatorium album</i> .....	White Thoroughwort
<i>Eupatorium aromaticum</i> .....	Small White Snakeroot
<i>Euthamia remota</i> .....	Great Lakes Goldenrod
<i>Galactia volubilis</i> .....	Milk-pea
<i>Gentiana alba</i> .....	Yellowish Gentian
<i>Glyceria acutiflora</i> .....	Sharp-glumed Manna Grass
<i>Gratiola virginiana</i> .....	Round-fruited Hedge-hyssop
<i>Gratiola viscidula</i> .....	Short's Hedge-hyssop
<i>Gymnocarpium dryopteris</i> .....	Common Oak Fern
<i>Helianthemum bicknellii</i> .....	Plains Frostweed
<i>Helianthemum canadense</i> .....	Canada Frostweed
<i>Helianthus mollis</i> .....	Ashy Sunflower
<i>Heuchera parviflora</i> .....	Small-flowered Alum-root
<i>Heuchera villosa</i> .....	Hairy Alum-root
<i>Hexalectris spicata</i> .....	Crested Coral-root
<i>Hieracium canadense</i> .....	Canada Hawkweed
<i>Hypericum boreale</i> .....	Northern St. John's-wort
<i>Hypericum ellipticum</i> .....	Few-flowered St. John's-wort
<i>Hypericum kalmianum</i> .....	Kalm's St. John's-wort
<i>Iris verna</i> .....	Dwarf Iris
<i>Juncus secundus</i> .....	One-sided Rush
<i>Krigia dandelion</i> .....	Potato-dandelion
<i>Krigia virginica</i> .....	Virginia Dwarf-dandelion
<i>Lathyrus japonicus</i> .....	Inland Beach Pea
<i>Lathyrus ochroleucus</i> .....	Yellow Vetchling
<i>Leavenworthia uniflora</i> .....	Michaux's Leavenworthia
<i>Lechea minor</i> .....	Thyme-leaved Pinweed
<i>Lechea pulchella</i> .....	Leggett's Pinweed
<i>Lechea tenuifolia</i> .....	Narrow-leaved Pinweed
<i>Liatris cylindracea</i> .....	Slender Blazing-star
<i>Lilium philadelphicum</i> .....	Wood Lily
<i>Lipocarpa micrantha</i> .....	Dwarf Bulrush
<i>Lithospermum carolinense</i> .....	Plains Puccoon
<i>Luzula bulbosa</i> .....	Southern Woodrush
<i>Manfreda virginica</i> .....	American Aloe
<i>Matelea obliqua</i> .....	Angle-pod
<i>Melampyrum lineare</i> .....	Cow-wheat
<i>Melanthium virginicum</i> .....	Bunchflower
<i>Melanthium woodii</i> .....	Wood's-hellebore
<i>Melica nitens</i> .....	Three-flowered Melic
<i>Menyanthes trifoliata</i> .....	Buckbean
<i>Myriophyllum sibiricum</i> .....	American Water-milfoil
<i>Nothoscordum bivalve</i> .....	False Garlic
<i>Oenothera oakesiana</i> .....	Oakes' Evening-primrose
<i>Oenothera parviflora</i> .....	Small-flowered Evening-primrose
<i>Oryzopsis racemosa</i> .....	Mountain-rice
<i>Panicum bicknellii</i> .....	Bicknell's Panic Grass
<i>Panicum boreale</i> .....	Northern Panic Grass
<i>Panicum leibergii</i> .....	Leiberg's Panic Grass
<i>Panicum meridionale</i> .....	Southern Hairy Panic Grass
<i>Panicum verrucosum</i> .....	Warty Panic Grass
<i>Passiflora incarnata</i> .....	Maypop
<i>Penstemon canescens</i> .....	Gray Beard-tongue
<i>Penstemon pallidus</i> .....	Downy White Beard-tongue

<i>Physalis virginiana</i> .....	Virginia Ground-cherry
<i>Plagiothecium latebricola</i> .....	Lurking Leskea
<i>Platanthera ciliaris</i> .....	Yellow Fringed Orchid
<i>Platanthera leucophaea</i> .....	Prairie Fringed Orchid
<i>Pleopeltis polypodioides</i> .....	Little Gray Polypody
<i>Poa paludigena</i> .....	Marsh Spear Grass
<i>Pogonia ophioglossoides</i> .....	Rose Pogonia
<i>Polygala incarnata</i> .....	Pink Milkwort
<i>Polygala polygama</i> .....	Racemed Milkwort
<i>Polygonum robustius</i> .....	Coarse Smartweed
<i>Prosartes maculata</i> .....	Nodding Mandarin
<i>Prunus pumila</i> var. <i>cuneata</i> .....	Sand Cherry
<i>Quercus falcate</i> .....	Spanish Oak
<i>Quercus marilandica</i> .....	Blackjack Oak
<i>Ramalina petrina</i> .....	Appalachian Trail Ramalina
<i>Rhododendron maximum</i> .....	Great Rhododendron
<i>Ribes missouriense</i> .....	Missouri Gooseberry
<i>Sagittaria cuneata</i> .....	Wapato
<i>Sagittaria rigida</i> .....	Deer's-tongue Arrowhead
<i>Salix candida</i> .....	Hoary Willow
<i>Scleria pauciflora</i> .....	Few-flowered Nut-rush
<i>Senecio pauperculus</i> .....	Balsam Squaw-weed
<i>Silene caroliniana</i> var. <i>pensylvanica</i> .....	Carolina Catchfly
<i>Silene regia</i> .....	Royal Catchfly
<i>Sisyrinchium montanum</i> .....	Northern Blue-eyed-grass
<i>Solidago odora</i> .....	Sweet Goldenrod
<i>Solidago squarrosa</i> .....	Leafy Goldenrod
<i>Sparganium androcladum</i> .....	Keeled Bur-reed
<i>Sphenopholis obtusata</i> var. <i>obtusata</i> .....	Prairie Wedge Grass
<i>Spiranthes romanzoffiana</i> .....	Hooded Ladies'-tresses
<i>Sporobolus heterolepis</i> .....	Prairie Dropseed
<i>Stipa spartea</i> .....	Porcupine Grass
<i>Tofieldia glutinosa</i> .....	False Asphodel
<i>Triadenum tubulosum</i> .....	Large Marsh St. John's-wort
<i>Triglochin maritimum</i> .....	Seaside Arrow-grass
<i>Triphora trianthophora</i> .....	Three-birds Orchid
<i>Ulmus thomasi</i> .....	Rock Elm
<i>Utricularia intermedia</i> .....	Flat-leaved Bladderwort
<i>Vaccinium oxycoccus</i> .....	Small Cranberry
<i>Viburnum molle</i> .....	Soft-leaved Arrow-wood
<i>Viola pedata</i> .....	Birdfoot Violet
<i>Wolffiella gladiata</i> .....	Wolffiella
<i>Xyris torta</i> .....	Twisted Yellow-eyed-grass
<i>Zizania aquatica</i> .....	Wild Rice

**LICHENS**

**Endangered**

<i>Collema bachmanianum</i> .....	Bachman's Jelly Lichen
<i>Collema coccophorum</i> .....	Tar Jelly Lichen
<i>Collema conglomeratum</i> .....	Dotted Jelly Lichen
<i>Collema fuscovirens</i> .....	Dusky Jelly Lichen
<i>Parmotrema madagascariaceum</i> .....	Madagascar Ruffle Lichen
<i>Punctelia perreticulata</i> .....	Reticulate Speckled Shield Lichen
<i>Stictia beauvoisii</i> .....	Fringed Moon Lichen

*Xanthoria elegans*.....Elegant Sunburst Lichen

**Threatened**

*Canoparmelia texana*.....Texas Shield Lichen

*Dibaeis absoluta*.....Pink Dot Lichen

**MOSSES**

**Endangered**

*Barbula indica* var. *indica*.....Twisted Teeth Moss

*Buxbaumia minakatae*.....Ethereal Elf Cap Moss

*Campylostelium saxicola*.....Rock-loving Swan-necked Moss

*Diphyscium cumberlandianum*.....Cumberland Grain o' Wheat Moss

*Lycopodiella margueritae*.....Northern Prostrate Club-moss

*Lycopodiella subappressa*.....Northern Appressed Club-moss

*Lycopodium lagopus*.....One-coned Club-moss

*Philonotis fontana* var. *caespitosa* .....Tufted Moisture-loving Moss

*Pohlia elongata* var. *elongata* .....Narrow-necked Pohl's Moss

*Sphagnum bartlettianum*.....Bartlett's Peat Moss

*Sphagnum riparium*.....Shore-growing Peat Moss

*Tomentypnum nitens*..... Fuzzy Hypnum Moss

*Weissia sharpii*.....Sharp's Green-cushioned Moss

**APPENDIX D**

**LOCATION AND SIZE OF DOUBLE-CRESTED CORMORANT BREEDING COLONIES IN THE STATE OF OHIO WITH  
INFORMATION ON CO-NESTING COLONIAL WATERBIRDS  
(ODW, 2005)**

<b>Colony site name</b>	<b>Ohio County</b>	<b>Double-crested Cormorant</b>	<b>Snowy Egret # nests</b>	<b>Great Blue Heron # nests</b>	<b>Great Egret # nests</b>	<b>Black-crowned Night Heron</b>	<b>Herring Gull # nests</b>
<b>West Sister Island</b>	Ottawa	3,813	14	927	827	500	600
<b>Green Island</b>	Ottawa	857	0	91	4	0	40
<b>Turning Point Island</b>	Erie	409	0	0	41	47	3,000
<b>Grand Lakes St. Mary</b>	Mercer	80	0	40	0	0	0
<b>Portage Lakes</b>	Summit	6	0	0	0	0	0
<b>Total</b>		<b>5,165</b>	<b>14</b>	<b>1,058</b>	<b>872</b>	<b>547</b>	<b>3,640</b>

## APPENDIX E

### INTERACTION AMONG AGENCY DECISIONS

This appendix provides details on how the decisions made by one of the lead agencies would impact the actions and decisions available to the other lead agencies, cooperating agencies, and other individuals that may need CDM or wish to conduct CDM research. Information on the selection of Alternative 1 is not provided because selection of this alternative by any of the lead agencies would not restrict alternatives and actions available to any other entity.

**Table 1. Impacts of agency selection of Alternative 2 – Only Non-lethal CDM**

Agency Choosing Alternative 2 – Only Non-lethal CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
<b>USFWS Migratory Bird Office (MBO)</b>	—	WSINWR can choose the same alternative as the MBO or it can choose to be more, but not less restrictive than the alternative selected by the MBO. Therefore, if the MBO selects Alternative 2, the WSINWR may select Alternatives 2,3 or 4.	WS could select any other alternative. However, the only entity that could receive WS assistance with lethal CDM is ODW because the only type of lethal CDM that could be conducted would be take of less than 10% of a local DCCO population under the PRDO. There could be no other types of lethal DCCO removal because it would require permits from the MBO.  A permit is not required for non-lethal CDM	ODW could take less than 10% of a local DCCO population under the PRDO because this action does not require approval or a permit from the MBO.  Non-lethal CDM does not require a permit from the MBO.	No lethal CDM could be conducted by any entity other than WS or ODW because the MBO office would not be issuing MBPs for take of DCCOs. WS and ODW would be able to take less than 10% of a local DCCO population under the PRDO because this action does not require approval or a permit from the MBO.  Non-lethal CDM does not require a permit

Agency Choosing Alternative 2 – Only Non-lethal CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
<b>USFWS West Sister Island National Wildlife Refuge (WSINWR)</b>	No impact on decisions made by the MBO. WSINWR can only select alternatives that are more but not less restrictive than the MBO.	—	WS could select any alternative. However, it would only be able to assist WSI with non-lethal CDM. This decision would have no impact on WS CDM actions at any other location.	No impact on decisions available to state. However, selection of this alternative will likely have an impact on the need for action and the efficacy of CDM on nearby lands managed by the state.	Entities wishing to conduct research at WSINWR would not be able to use lethal methods.  Decision by WSINWR has no impact on availability of CDM alternatives at any other location.
<b>Wildlife Services (WS)</b>	No Impact	No impact on alternatives available to WSINWR. However, WSINWR would have to go to ODW for assistance with lethal take under the PRDO.  WS would only assist with research and CDM using non-lethal methods.	—	No impact on decisions available to state under the PRDO.  WS would not assist with consultation and Form 37 required for a depredation permit from the USFWS. ODW would not be able to obtain a depredation permit. State would be able to obtain research permits.  WS would only assist ODW with non-lethal CDM and research using non-lethal methods.	WS would not assist with consultation and form 37 required for a depredation permit from the USFWS. These entities would not be able to obtain a depredation permit.  These entities would be able to obtain research permits. WS would only assist with research using non-lethal methods.

Agency Choosing Alternative 2 – Only Non-lethal CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
Ohio Division of Wildlife (ODW)	No impact on decisions made by the MBO.	No impact on alternatives available to WSINWR. WSINWR would have to work with WS for assistance with lethal CDM. Selection of this alternative will likely have an impact on the need for action and the efficacy of CDM at WSINWR.	WS could select any alternative. However, it would only be able to assist ODW with non-lethal CDM. This decision would have no impact on WS CDM actions on lands that are not owned or managed by the state.	—	Entities wishing to conduct research on lands owned or managed by the state would not be able to use lethal methods.  Decision by ODW has no impact on availability of CDM alternatives at any other location.

**Table 2. Impacts of agency selection of Alternative 3 – Only Technical Assistance.**

Agency Choosing Alternative 3 – Only Technical Assistance	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
<b>USFWS Migratory Bird Office (MBO)</b>	—	WSINWR can select alternatives that are the same or more restrictive than the MBO. Therefore, no CDM would be conducted at WSINWR.	Permitting and approval processes are a form of technical assistance so no impact on CDM alternatives available to WS	Permitting and approval processes are a form of technical assistance so no impact on CDM alternatives available to ODW.  Lack of CDM at WSINWR will likely have an impact on the need for action and the efficacy of CDM on lands near WSINWR that are managed by the state.	Permitting and approval processes are a form of technical assistance so no impact on availability of CDM and research alternatives
<b>USFWS West Sister Island National Wildlife Refuge (WSINWR)</b>	WSINWR can select alternatives that are the same or more restrictive than the MBO. No impact on decisions made by the MBO	—	WS could select any alternative. WSINWR would not request assistance with CDM from WS.	No impact on decisions available to state. However, selection of this alternative will likely have an impact on the efficacy and need for action on lands near WSINWR that are managed by the state.	Decision by WSINWR has no impact on availability of CDM alternatives at any other location.
<b>Wildlife Services (WS)</b>	No Impact	No impact on alternatives available to WSINWR. However, WSINWR would have to go to ODW for operational assistance with CDM under the PRDO.	—	No impact on decisions available to state.  WS would assist with consultation required for a depredation permit from the USFWS. ODW would	WS would assist with consultation and form 37 required for a depredation permit from the USFWS. These entities would be able to obtain a

Agency Choosing Alternative 3 – Only Technical Assistance	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
		WS would not provide operational assistance with research.		<p>be able to obtain depredation permits. State would be able to obtain research permits.</p> <p>WS would only be able to provide technical assistance with CDM and research.</p>	<p>depredation permits. These entities would also be able to obtain research permits.</p> <p>WS would only be able to provide technical assistance with CDM and research.</p>
<b>Ohio Division of Wildlife (ODW)</b>	No Impact	No impact on alternatives available to WSINWR. WSINWR would have to go to WS for operational assistance with CDM. Lack of CDM on state lands near WSINWR would likely have an impact on the need for action and the efficacy of CDM at WSINWR.	No impact on alternatives available to WS. WS would not assist ODW with CDM. This decision would have no impact on WS CDM actions on lands that are not owned or managed by the state.	—	Decision by ODW has no impact on availability of CDM alternatives at any other location.

**Table 3. Impacts of agency selection of Alternative 4 – No Federal CDM.**

Agency Choosing Alternative 4 – No Federal CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
<b>USFWS Migratory Bird Office (MBO)</b>	—	WSINWR cannot select an alternative that is less restrictive than that selected by the MBO. Therefore, there would be no CDM on WSINWR.	<p>WS could select any other alternative. However, the only entity that could receive WS assistance with lethal CDM would be ODW because the only type of lethal CDM that could be conducted would be take of less than 10% of a local DCCO population under the PRDO. There could be no other types of lethal DCCO removal because it would require permits from the MBO.</p> <p>Non-lethal CDM does not require a permit from the MBO.</p>	<p>ODW could take less than 10% of local DCCO populations on non-Federal lands under the PRDO because this action does not require approval or a permit from the MBO.</p> <p>Non-lethal CDM does not require a permit from the MBO.</p> <p>Lack of CDM at WSINWR will likely have an impact on the need for action and the efficacy of CDM on lands near WSINWR that are managed by the state.</p>	<p>No lethal CDM could be conducted because the MBO office would not be issuing MBPs for take of DCCOs. WS and ODW are the only Ohio entities that can take DCCOs under the PRDO.</p> <p>Non-lethal CDM does not require a permit from the MBO.</p>
<b>USFWS West Sister Island National Wildlife Refuge (WSINWR)</b>	No impact on decisions made by the MBO	—	<p>WS could select any alternative.</p> <p>WSINWR would not request CDM assistance from WS.</p>	No impact on decisions available to state. However, selection of this alternative will likely have an impact on the need for action and the efficacy of CDM on lands near WSINWR that are managed by the state.	Decision by WSINWR has no impact on availability of CDM alternatives or research at any other location.
<b>Wildlife Services</b>	No Impact	No impact on alternatives	—	No impact on decisions	WS would not assist

Agency Choosing Alternative 4 – No Federal CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
(WS)		<p>available to WSINWR. However, WSINWR would have to go to ODW for assistance with lethal take under the PRDO.</p> <p>WS would not assist with CDM or research.</p>		<p>available to state under the PRDO.</p> <p>WS would not assist with consultation and form 37 required for a depredation permit from the USFWS. ODW would not be able to obtain a depredation permit. State would be able to obtain research permits.</p> <p>WS would not assist with CDM or research.</p>	<p>with consultation and Form 37 required for a depredation permit from the USFWS. These entities would not be able to obtain a depredation permit.</p> <p>These entities would be able to obtain research permits.</p> <p>WS would not assist with research.</p>
<b>Ohio Division of Wildlife (ODW)</b>	No Impact	<p>No impact on alternatives available to WSINWR. WSINWR would have to go to WS for operational assistance with CDM. Lack of CDM on state lands near WSINWR would likely have an impact on the need for action and the efficacy of CDM at WSINWR.</p>	<p>No impact on alternatives available to WS. WS would not assist ODW with CDM. This decision would have no impact on WS CDM actions on lands that are not owned or managed by the state.</p>	—	<p>Decision by ODW has no impact on availability of CDM alternatives at any other location.</p>

**Table 4. Impacts of agency selection of Alternative 5 – Integrated CDM Program, Excluding Implementation of the PRDO (No Action)**

Agency Choosing Alternative 5 – Integrated CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
<b>USFWS Migratory Bird Office (MBO)</b>	—	WSINWR can only select alternatives that are the same or more restrictive than the alternative selected by the MBO. CDM activities would be restricted to the protection of vegetation and wildlife (not public fishery resources) under MBPs from the MBO. WSINWR would not participate in actions to protect public fishery resources.	WS could select any other alternative. However, WS assistance with protection of public resources would be restricted to those activities permitted under MBPs, specifically the protection of wildlife and vegetation resources but not public fishery resources.  All other types of CDM and research would not be affected.	CDM activities would be restricted to the protection of vegetation and wildlife (not public fishery resources) as would be allowed under MBPs from the MBO.  All other types of CDM and research would not be affected.	No impact
<b>USFWS West Sister Island (WSI)</b>	No impact	—	WS could select any alternative. CDM assistance for WSI would be restricted to the protection of wildlife and vegetation (not public fishery resources) under MBPs  This decision would have no impact on WS CDM and research actions at any other location.	No impact on decisions available to state.  However, selection of this alternative would likely have an impact on the efficacy and need for action on nearby lands managed by the state if the need to protect public fishery resources is determining management objectives.	No impact
<b>Wildlife Services</b>	No Impact	No impact on alternatives	—	No impact on decisions	No impact

Agency Choosing Alternative 5 – Integrated CDM	Choices Available to Other DCCO Management Entities				
	USFWS		Wildlife Services (WS)	Ohio Division of Wildlife (ODW)	Others
	Migratory Bird Office (MBO)	West Sister Island National Wildlife Refuge (WSINWR)			
(WS)		<p>available to WSI. However, WSI would have to go to ODW for assistance with lethal take for the protection of public fishery resources.</p> <p>WS could only assist with activities to protect public wildlife and vegetation resources as would be permitted under MBPs</p>		<p>available to state.</p> <p>WS could only assist with activities to protect public wildlife and vegetation resources as would be permitted under MBPs.</p> <p>This decision would not restrict WS' ability to assist ODW with all other types of CDM and research.</p>	
<b>Ohio Division of Wildlife (ODW)</b>	No Impact	No Impact	No Impact. ODW would not need WS' assistance with projects to protect public fishery resources.	_____	No Impact

## APPENDIX F

### LIST OF SCIENTIFIC NAMES

#### BIRDS

Bald eagle (*Haliaeetus leucocephalus*)  
Black-crowned night heron (*Nycticorax nycticorax*)  
Caspian tern (*Sterna caspia*)  
Cattle egret (*Bubulcus ibis*)  
Double-crested cormorant (*Phalacrocorax auritus*)  
Great blue heron (*Ardea herodias*)  
Great egret (*Ardea alba*)  
Piping plover (*Charadrius melodus*)  
Snowy egret (*Egretta thula*)

#### FISH

Alewife (*Alosa pseudoharengus*)  
Bluegill (*Lepomis macrochirus*)  
Brown trout (*Salmo trutta*)  
Burbot (*Lota lota*)  
Channel catfish (*Ictalurus punctatus*)  
Crappie (*Pomoxis spp.*)  
Freshwater drum (*Aplodinotus grunniens*)  
Gizzard shad (*Dorosoma cepedianum*)  
Golden shiner (*Notemigonus crysoleucas*)  
Lake/northern chub (*Couesius plumbeus*)  
Largemouth bass (*Micropterus salmoides salmoides*)  
Muskellunge (*Esox masquinongy*)  
Rainbow trout (*Oncorhynchus mykiss*)  
Saugeye (*Sander vitreus* x *Sander canadense*)  
Smallmouth bass (*Micropterus dolomieu*)  
Stickleback (*Eucalia inconstans*)  
Striped bass (*Morone saxatilis* x *M. chrysops*)  
Walleye (*Sander vitreus*)  
Yellow perch (*Perca flavescens*)

#### MOLLUSKS

Zebra mussel (*Dreissena polymorpha*)

#### REPTILES

Lake Erie water snake (*Nerodia sipedon insularum*)

#### PLANTS

Harebell (*Campanula rotundifolia*)  
Northern bog violet (*Viola nephrophylla*)

Rock elm (*Ulmus thomasi*)  
Sprengel's sedge (*Carex sprengelii*)  
Tufted fescue sedge (*Carex brevior*)

**LICHENS**

Elegant sunburst lichen (*Xanthoria elegans*)

## APPENDIX G

### USFWS FINAL RULEMAKING AND RECORD OF DECISION ON DOUBLE-CRESTED CORMORANT MANAGEMENT

#### DEPARTMENT OF THE INTERIOR

#### Fish and Wildlife Service

#### 50 CFR Part 21

#### RIN 1018-AI39

#### Migratory Bird Permits; Regulations for Double-Crested Cormorant Management

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule and notice of record of decision.

**SUMMARY:** Increasing populations of the double-crested cormorant have caused biological and socioeconomic resource conflicts. In November 2001, the U.S. Fish and Wildlife Service (Service or we) completed a Draft Environmental Impact Statement (DEIS) on double-crested cormorant management. In March 2003, a proposed rule was published to establish regulations to implement the DEIS proposed action, Alternative D. In August 2003, the notice of availability for a Final Environmental Impact Statement (FEIS) was published, followed by a 30-day comment period. This final rule sets forth regulations for implementing the FEIS preferred alternative, Alternative D (establishment of a public resource depredation order and revision of the aquaculture depredation order). It also provides responses to comments we received during the 60-day public comment period on the proposed rule. The Record of Decision (ROD) is also published here.

**DATES:** This final rule will go into effect on [insert date 30 days following date of publication in the Federal Register].

**ADDRESSES:** Comments can be mailed to the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, MBSP-4107, Arlington, Virginia 22203; or emailed to [cormorants@fws.gov](mailto:cormorants@fws.gov); or faxed to 703/358-2272.

**FOR FURTHER INFORMATION CONTACT:** Brian Millsap, Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service (see ADDRESSES).

#### SUPPLEMENTARY INFORMATION:

##### Background

The Service is the Federal agency with primary responsibility for managing migratory birds. Our authority is based on the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), which implements conventions with Great Britain (for Canada), Mexico, Japan, and Russia. The double-crested cormorant (DCCO) is Federally protected under the 1972 amendment to the Convention for the Protection of Migratory Birds and Game Mammals, February 7, 1936, United States–Mexico, as amended, 50 Stat. 1311, T.S. No. 912. The take of DCCOs is strictly prohibited except as authorized by regulations implementing the MBTA.

As we stated in the proposed rule published in the Federal Register in March 2003, the authority for the regulations set forth in this rule is the MBTA. The MBTA authorizes the Secretary, subject to the provisions of, and in order to carry out the purposes of, the applicable conventions, to determine when, if at all, and by what means it is compatible with the terms of the conventions to allow the killing of migratory

birds. DCCOs are covered under the terms of the Convention for the Protection of Migratory Birds and Game Mammals with Mexico. The DCCO is a nongame, noninsectivorous bird for which the applicable treaty does not impose specific prohibitions or requirements other than the overall purpose of protection so as not to be exterminated and to permit rational utilization for sport, food, commerce, and industry. In the FEIS for this action, the Service has considered all of the statutory factors as well as compatibility with the provisions of the convention with Mexico. The Russian convention (Convention between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment, concluded November 19, 1976) provides an authority to cover DCCOs even though not listed in the Appendix. To the extent we choose to apply the convention, it contains an exception from the prohibitions that may be made for the protection against injury to persons or property. We note, therefore, that there is no conflict between our responsibility for managing migratory birds and our selected action.

Regulations governing the issuance of permits for migratory birds are contained in title 50, Code of Federal Regulations, parts 13 and 21. Regulations in subpart D of part 21 deal specifically with the control of depredating birds. Section 21.41 outlines procedures for issuing depredation permits. Sections 21.43 through 21.47 deal with special depredation orders for migratory birds to address particular problems in specific geographical areas. Section 21.47 addresses DCCOs at aquaculture facilities.

While the Service has the primary responsibility for regulating DCCO management, on-the-ground management activities are largely carried out by entities such as State fish and wildlife agencies, the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS/WS), and, in some cases, by private citizens. APHIS/WS was a cooperating agency in the development of the DEIS and FEIS. Additionally, States and Canadian provinces were involved through the International Association of Fish and Wildlife Agencies.

On March 17, 2003 we published a proposed rule in the Federal Register (68 FR 12653). We solicited comments on the proposed rule until May 16, 2003. During that time, we received approximately 9,700 letters, emails, and faxes. About 85 percent of these comments were opposed to the proposed action, the vast majority of which were driven by mass email/letter campaigns promoted by nongovernmental organizations.

This final rule reflects consideration of comments received on the proposed rule. The final rule promulgates regulations to implement the selected action described in the FEIS. We published the notice of availability for the FEIS in the Federal Register on August 11, 2003 (68 FR 47603). Copies of the FEIS may be obtained by writing us (see ADDRESSES) or by downloading it from our website at <http://migratorybirds.fws.gov/issues/cormorant/cormorant.html>. The Wires et al. report "Status of the double-crested cormorant in North America," mentioned in a Federal Register notice of November 8, 1999 (64 FR 60828), may also be downloaded at <http://migratorybirds.fws.gov/issues/cormorant/status.pdf>.

The FEIS examined six management alternatives for addressing conflicts with DCCOs: (A) No Action, (B) Nonlethal Control, (C) Increased Local Damage Control, (D) Public Resource Depredation Order, (E) Regional Population Reduction, and (F) Regulated Hunting. The selected action in the FEIS is Alternative D, Public Resource Depredation Order. This alternative is intended to enhance the ability of resource agencies to deal with immediate, localized DCCO damages by giving them more management flexibility.

To address DCCO populations from a broader and more coordinated perspective, a population objectives approach will likely need to be considered over the long term. In the future, if supported by biological evidence and appropriate monitoring resources, the Service may authorize management that focuses on setting and achieving regional population goals. At that time, a cormorant management plan will be developed. Until then, our strategy will continue to focus on alleviating localized damages.

We acknowledge that there is a need for more information about DCCOs and their impacts on resources across a variety of ecological settings. We also recognize that more rigorous monitoring efforts would be helpful in thoroughly assessing the impacts of the selected action on DCCO populations. While DCCO

populations are currently tracked by a number of regional and national surveys, the Service concurs with many reviewers of the proposed rule, and recognizes that better information on population status and trends is desirable. For this reason, consistent with program, Service, and Department goals and priorities and subject to available funds, the Service intends to use all reasonable means to implement an improved DCCO population monitoring program of sufficient rigor to detect meaningful population changes subsequent to implementation of this action. The Service's objective will be to use available resources to collect data that can be used to reassess the population status of DCCOs by 2009, in advance of a decision whether or not to extend the depredation orders. This assessment may involve a Service-sponsored technical workshop, with various agency and non-governmental representatives, to discuss optimum survey methodologies. Also as part of that assessment, we will compile and evaluate available data on population trends of other species of birds that nest or roost communally with DCCOs to determine if negative impacts might be occurring to these species.

The Service has weighed these deficiencies against the costs of taking no action, and we believe it is prudent to move forward as outlined in this final rule. In making a decision about whether or not to extend the depredation orders, the Service will review and consider all additional research that has been conducted that evaluates the effects of the proposed action on fish stocks and other resources. The Service strongly encourages all stakeholders to assist in gathering the needed data through well-designed scientific research. Our expectation is that the annual reports in the depredation orders, especially the monitoring and evaluation data associated with the public resource depredation order, will provide substantive increases in scientific and management knowledge of DCCOs and their impacts. We urge States, Tribes, and Federal agencies involved in DCCO control to, wherever possible, design monitoring programs to provide useful information on the effects of DCCO control on public resources. We also urge all relevant governmental and nongovernmental entities to work together, whenever possible, to coordinate research and management activities at the local and regional scale. In particular, the following needs exist: greater demographic information (age-specific survival/mortality, age at first breeding, reproductive output, and philopatry) for use in modeling to help predict population responses to management scenarios; region-wide surveys of DCCOs to document changes in breeding populations; assessments of DCCO-caused fish mortality in relation to other mortality factors at the local level; studies to examine mechanisms within fish populations that may buffer the effects of DCCO predation, including investigation of whether different fish life-stages or species complexes are differentially affected by DCCOs; studies to quantify the impacts of DCCOs on vegetation and other waterbirds; studies to determine how DCCO population processes respond to changes in population density resulting from control activities; and studies to address human dimensions of DCCO conflicts and possible solutions through education and outreach.

The selected action establishes a public resource depredation order in 50 CFR 21.48 and amends 50 CFR 21.47, the aquaculture depredation order that was originally created in 1998. In the proposed rule, we presented draft regulations and opened a 60-day public comment period. Differences between this final rule and the proposed rule reflect both our attentiveness to public comments and our deference to agency expertise. The chart below highlights these changes.

<b>Proposed rule</b>	<b>Final rule</b>	<b>Justification</b>
ADO <sup>1</sup> : Winter roost control authorized from October to March	Winter roost control authorized from October to April [21.47(c)(2)]	Public and agency comments indicate that DCCOs continue to congregate in large numbers in April and these birds have a major impact on adjacent aquaculture facilities
Both DOs <sup>2</sup> : Statement that take of any species protected by the Endangered Species Act (ESA) is not authorized	Same, plus conservation measures added [21.47(d)(8); 21.48(d)(8)]	In accordance with Section 7 of the ESA, we completed informal consultation; this led to development of conservation measures to avoid adverse effects to any species protected by the ESA
Both DOs: General statement that authority	Added specific suspension and revocation procedures	For consistency's sake, we believe it is important to have a revocation/ suspension

under depredation orders can be revoked	[21.47(d)(10); 21.48(d)(13)]	process outlined
Both DOs: OMB information collection control number not specified	Added OMB approval number of 1018-0121 and expiration date [21.47(e); 21.48(e)]	We received this number in May 2003, after publication of proposed rule and comment period
PRDO <sup>3</sup> : Recipients of donations of birds killed must have a scientific collecting permit	This requirement removed [21.48(d)(6)(i)]	The proposed rule would have been more stringent than what is currently allowed in 50 CFR 21.12(b) and we do not consider stricter rules necessary
PRDO: Agencies must provide a one-time notice of their intent to act under the order	Added an advance notification requirement for take of >10% of a breeding colony [21.48(d)(9)]	We wanted to address concerns about there being no opportunity for us to review, and even suspend, control actions before they take place
PRDO: Annual reporting period set at Sept. 1 to Aug. 31	Changed reporting period to Oct. 1 to Sept. 30 [21.48(d)(11)]	The State of New York requested this change to better accommodate fall harassment activities
PRDO: Monitoring requirements for population level activities	Changed the word “monitor” to “evaluate”; added requirement that data from this section be included in annual report; and removed (11)(iii) [21.48(d)(12)]	This section ensures that agencies will consider (and take action to avoid) impacts to nontarget species and will evaluate the effects of control actions at breeding colonies, without being cost-prohibitive

<sup>1</sup> Aquaculture Depredation Order

<sup>2</sup> Aquaculture and Public Resource Depredation Orders

<sup>3</sup> Public Resource Depredation Order

### Population Status of the Double-Crested Cormorant

The information in this section is derived from the FEIS (to obtain a copy, see ADDRESSES). DCCOs are native to North America and range widely there. There are essentially five different breeding populations, variously described by different authors as: Alaska, Pacific Coast, Interior, Atlantic, and Southern (Hatch and Weseloh 1999, Wires et al. 2001). The continental population is estimated at 2 million birds (including breeders and nonbreeders). For the United States as a whole, according to Breeding Bird Survey (BBS) data, the breeding population of DCCOs increased at a statistically significant rate of approximately 7.5 percent per year from 1975-2002 (Sauer et al. 2003). However, growth rates for the different breeding populations vary considerably from this average.

*Atlantic.* Approximately 23 percent of the DCCO breeding population is found in the Atlantic region (Tyson et al. 1999), which extends along the Atlantic coast from southern Newfoundland to New York City and Long Island (Wires et al. 2001). Atlantic DCCOs are migratory and occur with smaller numbers of great cormorants. From the early 1970s to the early 1990s, the Atlantic population increased from about 25,000 pairs to 96,000 pairs (Hatch 1995). While this population declined by 6.5 percent overall in the early to mid-1990s, some colonies were still increasing during this period. The most recent estimate of the Atlantic population is at least 85,510 breeding pairs (Tyson et al. 1999).

*Interior.* Nearly 70 percent of the DCCO breeding population is found in the Interior region (Tyson et al. 1999), which reaches across the prairie provinces of Canada, includes the Canadian and U.S. Great Lakes, and extends west of Ohio to southwestern Idaho (Wires et al. 2001). Interior DCCOs are strongly migratory and, in the breeding months, are concentrated in the northern prairies, with the Canadian province of Manitoba hosting the largest number of breeding DCCOs in North America (Wires et al. 2001). Additionally, large numbers of Interior DCCOs nest on or around the Great Lakes (Hatch 1995, Wires et al. 2001). Since 1970, when 89 nests were counted during a severe pesticide-induced population decline (Weseloh et al. 1995), DCCO numbers have increased rapidly in the Great Lakes, with breeding surveys in 2000 estimating 115,000 nests there (Weseloh et al. 2002). From 1990 to 1997, the overall growth rate in the Interior region was estimated at 6 percent with the most dramatic increases occurring in Ontario, Ohio,

and Wisconsin. The Interior population (including Canada) numbers is at least 256,212 breeding pairs (Tyson et al. 1999).

*Southern.* The Southern region includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas (Wires et al. 2001). Most DCCOs in this region are winter migrants from the Interior and Atlantic regions; the number of these wintering birds has increased dramatically in recent years (Dolbeer 1991, Glahn and Stickley 1995, Jackson and Jackson 1995, Glahn et al. 2000). Surveys conducted by APHIS/WS biologists suggest that winter numbers in the delta region of Mississippi have increased by nearly 225 percent since the early 1990s (over 73,000 DCCOs were counted in the 2001-2002 winter surveys; G. Ellis, unpubl. data). Breeding DCCOs in this region are also on the rise, with some nesting occurrences representing first records and others recolonizations (Wires et al. 2001). Today, approximately 4 percent of the DCCO breeding population occurs in this region, numbering at least 13,604 breeding pairs (Tyson et al. 1999).

*Pacific Coast and Alaska.* Approximately 5-7 percent of North America's DCCOs are found in this population, which has approximately 27,500 nesting pairs (including Mexico) according to Carter et al. (1995b) or at least 17,084 pairs (not including Mexico) according to Tyson et al. (1999). Carter et al. (1995) documented recent increases in California and Oregon, and declines in British Columbia, Washington, and Baja California. Tyson et al. (1999) did not consider Mexican populations and calculated a decline for the entire West Coast-Alaska region. In the past 20 years, the largest increases in the region have taken place in the Columbia River Estuary, where East Sand Island supports the largest active colony along the coast with 6,390 pairs in 2000 (Carter et al. 1995b, Collis et al. 2000, Wires et al. 2001). Increases at East Sand Island coincided with declines in British Columbia, Washington, and locations in interior Oregon, and the rapid increase undoubtedly reflected some immigration from these other areas (Carter et al. 1995).

#### **Impacts of Double-crested Cormorants on Public Resources**

*Fish.* In order to fully understand fisheries impacts related to predation, DCCO diet must be evaluated in terms of the number of DCCOs in the area, the length of their residence in the area, and the size of the fish population of concern (Weseloh et al. 2002). While most, but not all, studies of cormorant diet have indicated that sport or other human-valued fish species do not make up high percentages of DCCO diet, conclusions about actual fisheries impacts cannot be based on diet studies alone. Nisbet (1995) referred to this as the "body-count" approach (i.e., counting the numbers of prey taken rather than examining the effects on prey populations) and noted that it is necessary to also "consider functional relationships between predation and output parameters."

Stapanian (2002) observed that "Rigorous, quantitative studies suggest that the effects of cormorants on specific fisheries appear to be due in part to scale and stocks of available prey." Indeed, negative impacts are typically very site-specific and thus DCCO-fish conflicts are most likely to occur on a localized scale. Even early cormorant researcher H.F. Lewis recognized that cormorants could be a local problem at some fishing areas (Milton et al. 1995). In sum, the following statements about DCCO feeding habits and fisheries impacts can be concluded with confidence from the available science: (1) DCCOs are generalist predators whose diet varies considerably between seasons and locations and tends to reflect fish species composition; (2) The present composition of cormorant diet appears to have been strongly influenced by human-induced changes in the natural balance of fish stocks; (3) "Impact" can occur at different scales, such that ecological effects on fish populations are not necessarily the same as effects on recreational or commercial catches, or vice versa; (4) Cormorant impact is generally most significant in artificial, highly managed situations; and (5) Because environmental and other conditions vary locally, the degree of conflicts with cormorants will vary locally.

Research in New York's Oneida Lake and eastern Lake Ontario has examined data on DCCO diets and fish populations (walleye and yellow perch in Oneida Lake and smallmouth bass in Lake Ontario) and concluded that cormorant predation is likely a significant source of fish mortality that is negatively impacting recreational catch (Adams 1999, Rudstam 2000, Lantry et al. 1999). Based on these studies, the Service will allow the authorized agencies and Tribes acting under the public resource depredation order to

determine whether a similar situation exists in their location, and undertake appropriate control actions to mitigate negative effects, if applicable.

*Other Birds.* Weseloh et al. (2002) observed that nesting DCCOs could impact other colonial waterbirds in at least three ways: by DCCO presence limiting nest site availability, by DCCOs directly taking over nest sites, or by falling guano and nesting material from DCCO nests leading to the abandonment of nests below. Habitat destruction is another concern reported by biologists (USFWS 2001). The significance of DCCO-related effects on other birds varies with scale. While large-scale impacts on regional or continental bird populations have not been documented (Cuthbert et al. 2002), there is evidence that species such as black-crowned night herons, common terns, and great egrets can be negatively impacted by DCCOs at a site-specific level (Jarvie et al. 1999, Shieldcastle and Martin 1999, USFWS 2001, Weseloh et al. 2002). Biologists from several States and provinces have reported or expressed concern about impacts to other bird species in relation to increased cormorant abundance (Wires et al. 2001, USFWS 2001). Some biologists have also expressed concern about incidental impacts to co-nesting species caused by DCCO control efforts (both lethal and nonlethal). We believe that such impacts are preventable and easily mitigated to a level of insignificance. For example, New York biologists conducting DCCO control work in eastern Lake Ontario have successfully managed to avoid negative impacts to other species such as Caspian terns, herring gulls, and ring-billed gulls (USFWS 2003).

*Vegetation and Habitat.* Cormorants destroy their nest trees by both chemical and physical means. Cormorant guano, or excrement, is highly acidic and kills ground vegetation and eventually the nest trees. In addition, cormorants damage vegetation by stripping leaves for nesting material and by breaking branches due to the combined weight of the birds and their nests. Vegetation and habitat destruction problems tend to be localized in nature. For example, resource professionals from the Great Lakes region are concerned about loss of plant diversity associated with increasing cormorant numbers at some breeding sites (Weseloh and Ewins 1994, Moore et al. 1995, Lemmon et al. 1994, Bédard et al. 1995, Shieldcastle and Martin 1999).

*Aquaculture.* Cormorant depredation at commercial aquaculture facilities, particularly those in the southern catfish-producing region, remains economically significant. DCCOs move extensively within the lower Mississippi valley during the winter months (Dolbeer 1990). In the delta region of Mississippi, cormorants have been found to forage relatively close to their night roosting locations with most birds traveling an average distance of less than 20 km from their night roosting locations to their day roosts (King et al. 1995). Cormorants that use day roosts within the catfish-producing regions of the delta typically forage at aquaculture facilities, and USDA researchers have found that as much as 75 percent of the diet of DCCOs in these areas consists of catfish (Glahn et al. 1999). Losses from cormorant predation on fingerling catfish in the delta region of Mississippi have been estimated at approximately 49 million fingerlings each winter, valued at \$5 million. Researchers have estimated the value of catfish at harvest to be about 5 times more than the replacement cost of fingerlings, placing the total value of catfish consumed by DCCOs at approximately \$25 million (Glahn et al. 2000). Total sales of catfish growers in Mississippi amounted to \$261 million in 2001 (USDA-NASS 2002).

*Hatcheries.* DCCO impacts to hatcheries are related to predation, stress, disease, and financial losses to both hatcheries and recipients of hatchery stock. Hatchery fish may be stressed by the presence of DCCOs, wounds caused by unsuccessful attacks, and noisemakers used to scare away DCCOs. This stress can lead to a decrease in growth factors as feeding intensity decreases. Additionally, disease and parasites can be spread more easily by the presence of fish-eating birds. State and Federal hatchery managers, particularly in the upper Midwest (e.g., Wisconsin, Ohio) and the south (e.g., Arizona, Louisiana, Oklahoma, Texas), have reported significant depredation problems at hatcheries (USFWS 2001). Currently, Director's Order No. 27, "Issuance of Permits to Kill Depredating Migratory Birds at Fish Cultural Facilities," dictates that "kill permits [for fish-eating birds] will be issued for use at public facilities only when it has been demonstrated that an emergency or near emergency exists and an [APHIS/WS] official certifies that all other deterrence devices and management practices have failed." The two depredation orders that we are

proposing would supersede this Director's Order (for DCCOs only) by giving managers at State, Federal, and Tribal fish hatcheries more authority to control DCCOs to protect fish stock.

### **Environmental Consequences of Action**

We analyzed our action in the FEIS. Our environmental analysis indicates that the action will cause the estimated take of <160,000 DCCOs, which is not predicted to have a significant negative impact on regional or continental DCCO populations; will cause localized disturbances to other birds but these can be minimized by taking preventive measures, leading to the action having beneficial effects overall; will help reduce localized fishery and vegetation impacts; will not adversely affect any Federally listed species; is likely to help reduce localized water quality impacts; will help reduce depredation of aquaculture and hatchery stock; is not likely to significantly benefit recreational fishing economies or commercial fishing; may indirectly reduce property damages; and will have variable effects on existence and aesthetic values, depending on perspective.

### **References**

A complete list of citation references is available upon request from the Division of Migratory Bird Management (see ADDRESSES).

### **Responses to Significant Comments**

During the public comment period on the proposed rule, we received approximately 9,700 emails, letters, and faxes. We provide our responses to significant comments here.

Comment 1: The Service should protect, not kill, DCCOs.

Service Response: In the wildlife management field, the control of birds through the use of humane, but lethal, techniques can be an effective means of alleviating resource damages, preventing further damages, and/or enhancing nonlethal techniques. It would be unrealistic and overly restrictive to limit a resource manager's damage management methods to nonlethal techniques, even if "nonlethal" included nest destruction and/or egg oiling. Lethal control techniques are an important, and in many cases necessary, part of a resource manager's "tool box."

Comment 2: States and other agencies don't have sufficient resources to effectively control DCCOs.

Service Response: Agencies will need to decide whether or not cormorant management is a high enough priority for them to justify committing resources to it. We have tried to keep reporting and evaluation requirements such that they are unlikely to be cost prohibitive. We have also allowed agencies to designate "agents" to act under the orders. Our budget does not currently allow us to provide financial assistance to States and other agencies for cormorant control.

Comment 3: The Service needs to manage DCCOs through a coordinated, regional population objectives approach.

Service Response: The selected action, Alternative D, in no way precludes regional coordination or consideration of population objectives, despite being chiefly a localized damage control approach. We are keeping the option open of taking this approach in the future, given greater biological information and the necessary funding.

Comment 4: The Service needs to reduce overall DCCO populations.

Service Response: At this time, we believe that the evidence better supports Alternative D, a localized damage control strategy rather than Alternative E, a large-scale population reduction strategy. While many stakeholders portray cormorant conflicts as being a simple overabundance problem whose solution is population reduction, that is not clearly the case. That is, it is unclear whether fewer cormorants would actually mean fewer problems (since sometimes distribution is as important as number in determining

impacts), what the necessary scale of control would be, and whether or not that scale of control is biologically, socially, and economically feasible.

Comment 5: States should be granted full authority to control DCCOs as needed.

Service Response: Under the MBTA, we have the ultimate responsibility for cormorant management. While we can grant States and other agencies increased authority, giving them “full authority” without any limitations and requirements would abdicate our responsibilities.

Comment 6: The final rule should authorize the use of all effective DCCO control methods at aquaculture facilities.

Service Response: The final rule authorizes shooting, which is considered very effective, to be used at aquaculture facilities. There is no evidence of the need for other techniques to be used.

Comment 7: The Service needs to more fully address other causes of fish depletion.

Service Response: We recognize that factors other than DCCOs contribute to resource impacts such as fishery declines. However, an exhaustive and comprehensive analysis of these myriad factors is outside the scope of the EIS. Our focus is chiefly on addressing conflicts caused by cormorants and then attempting to manage DCCOs, or the resources themselves, to alleviate those conflicts.

Comment 8: There should be a hunting season on DCCOs.

Service Response: While we recognize the validity of hunting as a wildlife management tool, we believe that the risks associated with it outweigh any potential benefits. We are gravely concerned about the negative public perception that would arise from authorizing hunting of a bird with little consumptive (or “table”) value. While it is true that this has been done in the past for other species (e.g., crows), public attitudes are different today than they were 30 years ago when those decisions were made. Additionally, a number of hunters commented that they did not support hunting as a means of cormorant control. Therefore, it is our position that hunting is not, on the whole, a suitable technique for reducing cormorant damages.

Comment 9: The Service should add Montana and New Hampshire to the public resource depredation order.

Service Response: We determined that the most crucial States to include in the public resource depredation order were those States with DCCOs from the increasing Interior and Southern populations or States affected by those populations (e.g., those with high numbers of migrating birds). Other States with cormorant conflicts are not precluded from cormorant control but would have to obtain depredation permits.

Comment 10: The Service should remove DCCOs from MBTA protection.

Service Response: In our view, this is not a “reasonable alternative.” DCCOs have been protected under the MBTA since 1972. Removing DCCOs from MBTA protection would not only be contrary to the intent and purpose of the original treaty, but would require amending it, a process involving lengthy negotiations and approval of the U.S. Senate and President. Since DCCOs are protected by family (*Phalacrocoracidae*) rather than by species, the end result could be the loss of protection for all North American cormorant species in addition to that of DCCOs. At this time, there is adequate authority for managing cormorant conflicts within the context of their MBTA protection and, thus, we believe the suggestion to remove DCCOs from MBTA protection is not practical, necessary, or in the best interest of the migratory bird resource.

Comment 11: Private landowners should be allowed to control DCCOs on their lands.

Service Response: The take of DCCOs and other migratory birds is regulated by the MBTA and, in most cases, requires a Federal permit. Under the aquaculture depredation order, private commercial aquaculture producers in 13 States are allowed to control DCCOs on their fish farms without a Federal permit. However, all other individuals who experience damages to private resources must contact the appropriate Service Regional Migratory Bird Permit Office for a depredation permit. There is not sufficient justification for authorizing “private landowners” in general to take DCCOs without a Federal permit.

Comment 12: The proposed action will be more effective if agencies coordinate with each other.

Service Response: Yes, this is true. While agencies are not required under the public resource depredation order to coordinate with each other, they are entirely free to do so.

Comment 13: Humaneness and the use of nonlethal methods should be emphasized.

Service Response: Wherever feasible, we have required the use of nonlethal methods before killing is allowed. All authorized control techniques for killing birds outside of the egg are approved by the American Veterinary Medical Association as being humane for the euthanization of birds.

Comment 14: The Service needs to better educate the public about DCCOs.

Service Response: We have prepared fact sheets for public distribution. Information about DCCOs is available at our website <http://migratorybirds.fws.gov/issues/cormorant/cormorant.html>. Our intention is to distribute fact sheets on the depredation orders in the near future. Beyond DCCOs, we participate in numerous outreach activities around the nation to increase public awareness about the importance of migratory birds and other Federal trust species.

Comment 15: The Service needs to issue permits to allow DCCOs to be shot legally at anytime.

Service Response: The authorization of virtually unregulated shooting of DCCOs would clearly not be a fulfillment of our responsibilities under the MBTA, since it could lead to extermination of the species. We can only allow take under appropriately adopted regulations that are consistent with our obligations and the relevant treaties. The depredation orders issued in this rulemaking only authorize take of DCCOs in certain locations and timeframes, and by certain agencies, to ensure this take is consistent with the purpose for which the depredation order was established.

Comment 16: DCCOs are being scapegoated for fishery declines.

Service Response: The Service recognizes that many factors other than DCCOs can contribute to fishery declines. However, studies have shown that in some cases cormorants are a significant contributing factor to these declines and therefore we believe that DCCO management, where there is evidence of real conflicts, is likely to have beneficial impacts.

Comment 17: The Service is dumping the burden of DCCO control on the States; the Service should take care of the DCCO problem since they created it.

Service Response: The public resource depredation order is not a requirement being forced upon the States (or any other agency). The decision ultimately lies with individual agencies to choose whether or not to use the authority granted to them by the public resource depredation order. As we were considering options for addressing DCCO conflicts more effectively, it became clear that, since many conflicts tend to be localized in nature, a sensible and flexible solution was to allow local agencies more authority in deciding when to control cormorants. The Service did not “create” the cormorant problem. Their population increases are due to many factors, most of which are entirely out of our control.

Comment 18: The Service should provide financial support for DCCO control.

Service Response: We are currently unable to provide funding to other agencies under the public resource depredation order. However, in our Congressional budget request, we have asked for increased financial resources to implement the DCCO selected action. This figure specifically includes money that could be used in cooperative efforts with States and other agencies to conduct cormorant monitoring, research, and management.

Comment 19: California and Wisconsin should be added to the aquaculture depredation order.

Service Response: We do not believe that adding States to the aquaculture depredation order is necessary at this time. Private, commercial, freshwater aquaculture producers can obtain depredation permits to take DCCOs at their fish farms.

Comment 20: The final rule should allow proactive measures to be taken so problems can be dealt with before they become serious.

Service Response: The rule does allow for proactive measures to a certain extent. Both depredation orders allow DCCOs to be taken when “committing or *about to commit* depredations.” The public resource depredation order takes this a step further by allowing for take of DCCOs to *prevent* depredations on public resources.

Comment 21: Expansion of the aquaculture depredation order to authorize winter roost control should not be allowed.

Service Response: The USDA report, “A Science-Based Initiative to Manage Double-Crested Cormorant Damage to Southern Aquaculture” notes that “Coordinated and simultaneous harassment of cormorants can disperse them from night roosts and reduce damage at nearby catfish farms” and cites three scientific studies that support this claim. It then concludes that shooting at roosts “might enable farmers to reduce the number of birds on their farms significantly....” Part of the logic behind this is that studies in the Mississippi Delta have shown that, while DCCOs move widely in general, they tend to exhibit high roost fidelity. This implies that shooting birds at roosts (where turnover is lower) is likely to be more effective at alleviating damages than shooting birds just at ponds (where turnover is higher).

Comment 22: Actions in the proposed rule should not be allowed to take place.

Service Response: Clearly, we and our cooperators, APHIS Wildlife Services disagree with this statement. The Record of Decision below explains our rationale.

Comment 23: Hatcheries and fish farms should only be allowed to use nonlethal methods.

Service Response: Shooting is a legitimate and effective technique for scaring away or killing depredating birds that, when done in a controlled manner, has no adverse impact on populations.

Comment 24: Habitat damage caused by DCCOs has not been quantified or confirmed.

Service Response: This statement is incorrect. Vegetation/habitat damage has been both confirmed and quantified. See the FEIS, section 4.2.4, for more details.

Comment 25: APHIS Wildlife Services should be granted full authority to manage migratory birds.

Service Response: Under the MBTA and other laws, the Service has been delegated full responsibility for authorizing the take of and management of migratory bird populations. It would require an act of Congress to grant APHIS this authority. We do not support such action.

Comment 26: The Service should take the lead in DCCO research.

Service Response: The Migratory Bird Management Program monitors over 800 bird species in North America, including cormorants. However, we are not specifically a research agency. Our involvement in research consists mainly of providing financial assistance to researchers. In fewer cases, we are involved in direct research activities (such as color banding work being done in Lake Ohio by the USFWS Green Bay Field Office). We recognize that we have a leadership role to play in encouraging DCCO research.

Comment 27: The proposed rule is not based on “sound science.”

Service Response: The Service recognizes the importance of resource management being science-based, and we will always defer to well-designed scientific studies when such information is available. In this case, the Service relied on scientific studies as well as the best available biological knowledge to make its decision. Additionally, social, political, and economic factors contribute to the Service’s decisions regarding whether or not to address a problem. Our position is that there is sufficient biological and socioeconomic justification to pursue a solution and sufficient biological information to meet the requirements of the MBTA and to support this rulemaking action.

Comment 28: The Service is caving in to “political pressure” and “special interests.”

Service Response: Given the fact that DCCO populations are not at risk in the areas where the depredation orders are authorized, and the Service is granted management flexibility under the MBTA, we believe it is appropriate to permit control of local DCCO populations. We have considered input from all stakeholders and believe that our decision reflects an appropriate balance of the public interest. Our goal in this and every other issue under our jurisdiction is to make informed, impartial decisions based on scientific and other considerations.

Comment 29: The Service should stay with the No Action alternative.

Service Response: In recent years, it has become clear from public and professional feedback that the status quo is not adequately resolving DCCO conflicts for many stakeholders. Furthermore, our environmental analysis indicated that conflicts were more likely to be resolved under other options than under Alternative A.

Comment 30: The proposed rule is a wrongful abdication of the Service’s MBTA responsibilities.

Service Response: We disagree. Rather than an abdication of our responsibilities, this rule is an exercise of them. The public resource depredation order by no means puts an end to the Federal role in migratory bird management. The conservation of migratory bird populations is and will remain the Service’s responsibility. Second, while the MBTA gives the Federal Government (as opposed to individual States) the chief responsibility for ensuring the conservation of migratory birds, this role does not preclude State involvement in management efforts. Bean (1983) described the Federal/State relationship as such (emphases added):

“It is clear that the Constitution, in its treaty, property, and commerce clauses, contains ample support for the development of a comprehensive body of federal wildlife law and that, to the extent such law conflicts with state law, it takes precedence over the latter. *That narrow conclusion, however, does not automatically divest the states of any role in the regulation of wildlife or imply any preference for a particular allocation of responsibilities between the states and the federal government.* It does affirm, however, that such an allocation can be designed without serious fear of constitutional hindrance. In designing such a system, for reasons of policy, pragmatism, and political comity, *it is clear that the states will continue to play an important role either as a result of federal forbearance or through the creation of opportunities to share in the implementation of federal wildlife programs.*”

Nowhere in the MBTA is the implementation of migratory bird management activities limited to the Federal Government. In fact, the statute specifically gives the Secretary of Interior the authority to determine when take of migratory birds may be allowed and to adopt regulations for this purpose. Additionally, we've ensured that this rule does not conflict with the Convention for the Protection of Migratory Birds and Game Mammals between the U.S. and Mexico (under which cormorants are protected). Finally, the depredation orders specifically limit the authority of non-Federal entities through the terms and conditions, including suspension and revocation procedures, advance notification requirements, and other restrictions. We would also note that we have the authority to amend this rule in the future if DCCO population status or other conditions demand it.

Comment 31: The Service should more fully consider the economic value of DCCOs and activities associated with them such as birding and photography.

Service Response: Assigning economic value to any wildlife species is difficult, and it is made all the more so when that species (such as the DCCO) is of little direct use to humans. However, this should not be read to imply that we have no regard for the indirect and intangible values of cormorants as a native part of the North American avifauna. As such, we stated clearly in the FEIS (p. 6) that DCCOs "have inherent value regardless of their direct use to humans." A quantitative analysis of the economic benefits associated with DCCO was not possible at this time due to lack of studies in this area. The Service welcomes submission of such studies and will consider them in its analysis of future depredation orders, if applicable.

Comment 32: In addition to the Service, States and APHIS Wildlife Service should have a say in revoking authority under the depredation orders.

Service Response: Since, under the MBTA, the Service is the chief agency responsible for migratory bird management, it is our responsibility to decide when to revoke an agency's or individual's authority under the depredation orders. We do, however, give agencies a chance to appeal any revocation decisions.

Comment 33: The public resource depredation order has no sound biological underpinning.

Service Response: We have analyzed the available biological information in the FEIS. We believe our decision is supported by the information available at this time.

Comment 34: Proposed rule contains too much "red tape."

Service Response: We can understand that some people see the rule as having too many mandatory terms and conditions but these are necessary to ensure that the depredation orders are used for their stated purposes and to safeguard cormorant populations and other Federal trust species (e.g., other migratory birds and ESA-protected species). We tried to make the final rule as flexible as we could without compromising these factors.

Comment 35: The public resource depredation order should be expanded to include damages to private property as well.

Service Response: The public resource depredation order does not provide direct relief to private landowners experiencing DCCO conflicts. This is partly because such conflicts have not been well-documented and partly because our practice is not to allow the take of migratory birds, a public resource, to alleviate *minor* damages to private resources (a similar example would be hawks that take privately owned game birds). While the biological and other justification for implementing the aquaculture and public resource depredation orders is strong, this is not necessarily the case for impacts to private resources. In cases of significant economic damage caused by DCCOs, private landowners may request a depredation permit from the appropriate Service Regional Migratory Bird Permit Office.

Comment 36: Requiring monitoring at all control sites is too much of a burden; agencies should be able to use best available information.

Service Response: We understand that strict monitoring requirements (i.e., population surveys) can be cost prohibitive and that, to a certain degree such monitoring is the Service's responsibility. It is important that agencies thoroughly evaluate the impacts of their management actions on DCCOs and, in some cases, on other resources, but we don't want these requirements to be so cost prohibitive that agencies are unable to take any action. Thus, in the final rule, we changed slightly the wording in §21.48(d)(12) to account for this.

Comment 37: Monitoring should be required no less than once every 3 years.

Service Response: The Service currently surveys or sponsors surveys of colonial waterbirds every 5-10 years. We believe that such frequency is adequate to ensure the long-term conservation of populations of DCCOs and other migratory birds.

Comment 38: The winter roost control season should be extended to include April.

Service Response: Since numbers of DCCOs at fish farms in the southern United States are known to peak in March and April, and to cause the most damage at that time, we added April to the months in which roost control can occur.

Comment 39: Monitoring requirements under the public resource depredation order are too vague.

Service Response: We may provide future guidelines for monitoring and evaluation for the benefit of other agencies. Until such guidelines are issued, the Service intends to rely on States, Tribes, and APHIS Wildlife Services to develop and implement protocols for evaluation of the effects of control actions.

Comment 40: The proposal is likely to inflame relations between tribal and nontribal interests.

Service Response: We have not seen sufficient evidence to evaluate whether or not this is indeed likely to occur.

Comment 41: The aquaculture depredation order should be expanded to include all 48 States.

Service Response: At this time, we do not believe the available evidence indicates that expansion beyond 13 States is necessary to further protect commercial aquaculture stock. The issuance of depredation permits for damage at private fish farms is a high priority and, therefore, it is generally a quick process for aquaculture producers to obtain a depredation permit through their Regional Migratory Bird Permit Office.

Comment 42: Under the public resource depredation order, nonlethal techniques (e.g., harassment) should not be prescribed as a mandatory first step at multispecies breeding colonies because of the risk of disturbance.

Service Response: We understand that harassment efforts can have secondary impacts on other colonially nesting birds and that is precisely why we did not require such efforts to be used first but rather stated that they be used "when these are considered effective and practicable by the responsible Agency." We have since changed it to read that agencies "should first utilize nonlethal control methods such as harassment and exclusion devices when these are considered effective and practicable and *not harmful to other nesting birds.*"

Comment 43: The Service should issue guidelines making it clear what constitutes depredation on a public resource.

Service Response: In developing the rule, USFWS wanted to maximize the flexibility of other agencies in determining what constitutes a public resource depredation. We understand that there are concerns about

all of the “what ifs” that could conceivably take place in the absence of guidelines. We have made the purpose of the depredation orders clear, and we trust that our agency partners will not abuse their authority. If they do, we have the option to suspend or revoke their authority under the depredation order or to amend this rule.

Comment 44: In the proposed rule, the only advanced requirement for agencies to initiate a control program is to submit a one-time notice to the Service. The rule does not require evaluation of potential impacts before control actions occur.

Service Response: In the final rule, under the public resource depredation order, we have added a clause for advance notification of control actions that would take 10% or more of the birds in a breeding colony. This will allow us to review such actions for compliance with the purpose of the order and for impacts on overall cormorant populations. Inherent in the idea of this public resource depredation order is the Service’s trust in the professionalism and conservation expertise of the States, Tribes, and APHIS Wildlife Services. At the same time, we will continue our role of providing oversight to ensure that the cumulative effects of activities under the depredation orders do not threaten the long-term conservation of DCCO populations.

Comment 45: There is no process outlined for disputing control at a particular site. Control activities might come into conflict with ongoing research activities.

Service Response: We do not intend to establish guidelines for dispute resolution or public notice of proposed control efforts. In some cases, NEPA analysis will be necessary and this will open the door for limited public input regarding specific management actions. We cannot guarantee that conflicts won’t occur between control and research activities. Researchers will need to coordinate with local resource agencies (as, presumably, they are already doing) on this issue.

Comment 46: The public resource depredation order should have a requirement for agencies to formally assess a control site before control is carried out to determine potential impacts to other species.

Service Response: We do not intend to require formal assessment of control sites before control is conducted. The final rule requires that agencies must provide advance notification for certain actions, including information on the location and a description of the proposed control activity, specifying what public resources are being impacted, how many birds are likely to be taken and what approximate percentage they are of total DCCOs present, and which species of other birds are present. Additionally, in their annual reports, agencies must provide us with detailed information on why they’re conducting control actions, including what they’re doing to minimize effects on other species. Agencies don’t have to report this information until after control actions have occurred, but we believe this process is sufficient.

Comment 47: The proposed rule seems to violate the Service’s mission to “conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

Service Response: We do not in any way believe that the rule interferes with our conservation mission. Our responsibility is to ensure the long-term conservation of DCCO populations, and we will do so. A mission is a general statement of an agency’s vision that, by its very nature, cannot encompass every potential management responsibility. We believe that managing certain species to address economic or social concerns, while ensuring the long-term conservation of such species is consistent with our mission.

Comment 48: The Service has not established a process by which other agencies could set population goals.

Service Response: At some point in the future, we may initiate a process for setting population goals. States and other agencies are fully capable of doing this on their own in local situations (DCCO management efforts on Little Galloo Island in New York are a good example). The public resource

depredation order does not authorize regional population management, and, therefore, regional goals are not yet necessary.

Comment 49: The return of an extirpated species to its former breeding range is a positive ecological event.

Service Response: Weseloh et al. (1995, p48) wrote that DCCO population increases in North America “have involved more than just a re-occupation of areas which experienced severe population declines or extirpations...previously unoccupied breeding and wintering areas have now been colonized” and gave three citations supporting this hypothesis. Regardless of whether or not DCCOs had previously occurred in some parts of their range, we have to manage and conserve them by today’s standards, not those of a hundred (or more) years ago. Our intent under the final rule is not to eliminate cormorants on a regional or national level but to manage them, even to the point of reducing local populations, so that there are fewer impacts to natural and human resources. We fully understand that fish-eating birds are a natural part of the ecosystem and that, within limits prescribed by the need to consider the bigger picture than “ecological” factors alone, population recovery is a positive event.

Comment 50: Only State wildlife agencies should be allowed to take or permit the take of DCCOs at nesting colonies in their State.

Service Response: Under the public resource depredation order, any agency that takes DCCOs must have landowner permission and, if required, a State permit to take DCCOs. We believe that these clauses are sufficient to avoid compromising State oversight.

Comment 51: Issuing a resource depredation order for DCCOs under the proposed rule would set a dangerous precedent for fish-eating birds in the United States and in other nations to our south.

Service Response: We do not agree with the statement that the depredation orders are a “dangerous” precedent. Each conflict must be evaluated on its own merits. If problems with other fish-eating birds arise in the future, we will give full and fair consideration to these issues.

Comment 52: The Service should require safe management practices when DCCO control is conducted to protect birders.

Service Response: Conducting DCCO control in a manner that does not threaten human health or safety is the responsibility of the agencies and individuals carrying out the actions.

Comment 53: The scientific and public outcry against the Service’s proposed rule should be convincing. Sound science is being supplanted by perceptions fueling political cries for substantial lethal population controls.

Service Response: We would note that there is also public outcry against the status quo and in support of the final rule. We believe that our decision is supported by the available data. Furthermore, the rule requires that agencies who act under the public resource depredation order have sound reasoning for doing so.

Comment 54: The Service must publish a Final EIS, Record of Decision, and appropriate Section 7 consultation documents prior to engaging in the rulemaking process.

Service Response: This is not a correct statement of the requirements of either the National Environmental Policy Act or the Endangered Species Act. Issuance of these regulations is in compliance with both of these laws.

Comment 55: The Service cannot establish depredation orders for DCCOs because they are not a “migratory game bird” pursuant to 50 CFR 21.42.

Service Response: This is incorrect because our authority for issuing a depredation order comes from the MBTA, not 50 CFR 21.42. Section 21.42 is a regulation adopted by the Service that allows the Director to issue depredation orders under certain circumstances. This new regulation is in addition to 21.42.  
Comment 56: The Service needs to specify how the depredation orders will be enforced.

Service Response: We have law enforcement agents in every State who investigate violations of Federal wildlife laws. Providing the details of how they work is neither necessary nor sensible since such details could prevent the prosecution of those who violate the terms and conditions of the orders.

Comment 57: The requirement to report unauthorized take of migratory birds or threatened and endangered species requires individuals to incriminate themselves and thus violates the Fifth Amendment to the Constitution.

Service Response: While any take, unless permitted, is prohibited by statute, the Service directs its enforcement efforts on those individuals or companies that take migratory bird species outside the scope of the depredation orders. It is incumbent on those who will be working under the orders to have a working knowledge of what is authorized and to properly act under its terms and conditions. Failure to report would be grounds to revoke authorization. The Service sees the reporting requirements not as an attempt to identify the unlawful take of migratory birds but as a management tool to reduce unauthorized take.

### **Cormorant Regulations Under the Rule**

This final rule implements the FEIS selected action in the following ways: (1) it revises the 1998 aquaculture depredation order that allows APHIS/WS to protect public and private aquacultural stock in the 13 States listed in 50 CFR 21.47 by also allowing the take of DCCOs at winter roost sites and at State and Federal fish hatcheries; and (2) it establishes a new depredation order authorizing State fish and wildlife agencies, Federally recognized Tribes, and APHIS/WS to take DCCOs without a Federal permit to protect public resources on public and private lands and freshwaters in 24 States (the 13 States listed in 50 CFR 21.47 and 11 additional States). Both of the actions revise subpart D of 50 CFR 21.

### **NEPA Considerations**

In compliance with the requirements of section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(C)), and the Council on Environmental Quality's regulation for implementing NEPA (40 CFR 1500-1508), we published a DEIS in December 2001, followed by a 100-day public comment period. In August 2003, both the Service and the Environmental Protection Agency published notices of availability for the FEIS in the Federal Register. This FEIS is available to the public (see ADDRESSES).

### **Endangered Species Act Considerations**

Section 7(a)(2) of the Endangered Species Act, as amended (16 U.S.C. 1531-1543; 87 Stat. 884) provides that "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat..." We completed a biological evaluation and informal consultation (both available upon request; see ADDRESSES) under Section 7 of the ESA for the action described in this final rule. In the letter of concurrence between the Division of Migratory Bird Management and the Division of Endangered Species, we concluded that the inclusion of specific conservation measures in the final rule satisfies concerns about the four species (piping plover, interior least tern, bald eagle, and wood stork) and therefore the proposed action is not likely to adversely affect any threatened, endangered, or candidate species.

### **Executive Order 12866**

In accordance with the criteria in Executive Order 12866, this action is a significant regulatory action subject to Office of Management and Budget review. OMB has made this determination of significance under the Executive Order. OMB has determined that this action raises novel legal or policy issues. This rule will not have an annual economic effect of \$100 million or more or adversely affect any economic sector, productivity, competition, jobs, the environment, or other units of government. The purpose of this

rule is to help reduce adverse effects caused by cormorants, thereby providing economic relief. The total estimated economic impact of DCCOs is less than \$50 million per year. Assuming that landowners (e.g., aquaculture producers) and other stakeholders utilize, informally or formally, some degree of cost-benefit analysis, the financial expenses to control cormorant problems should not exceed the damages incurred. Thus we can assume that the total annual economic effect of this rule will be less than \$50 million.

This rulemaking action will not create inconsistencies with other agencies' actions or otherwise interfere with an action taken or planned by another agency. The selected action is consistent with the policies and guidelines of other Department of the Interior bureaus. This action will not materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

#### **Regulatory Flexibility Act**

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 et seq.) requires the preparation of flexibility analyses for actions that will have a significant economic effect on a substantial number of small entities, which includes small businesses, organizations, or governmental jurisdictions. Because of the structure of wildlife damage management, the economic impacts of our action will fall primarily on State governments and APHIS/WS. These do not qualify as "small governmental jurisdictions" under the Act's definition. Effects on other small entities, such as aquacultural producers, will be positive but are not predicted to be significant. Thus, we have determined that a Regulatory Flexibility Act analysis is not required.

#### **Small Business Regulatory Enforcement Fairness Act**

This rule is not a major rule under 5 U.S.C. 804(2), the Small Business Regulatory Enforcement Fairness Act. It will not have an annual effect on the economy of \$100 million or more, nor will it cause a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions. It will not have significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises.

#### **Paperwork Reduction Act and Information Collection**

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the Office of Management and Budget (OMB) has approved the information collection requirements included in this final rule under OMB control number 1018-0121, which expires on May 31, 2006. Agencies may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

We will collect information from State, Tribal, and Federal agencies and private aquaculture producers who conduct DCCO management under the authority of the depredation orders. The specific monitoring and reporting requirements associated with this rule are listed below. The information collected will help us to determine how many DCCOs are being taken and for what purposes.

In response to public comments on the proposed rule (68 FR 12653, March 17, 2003), we added one new information collection requirement in this final rule that was not included in the proposed rule. That new requirement is advance notification to the Service of any control actions that would take more than 10 percent of a breeding DCCO population. This new requirement is located in § 21.48 (d)(9) and adds 165 hours to the total annual hour burden of these information collection requirements.

The information collections associated with this final rule are in §§ 21.47(d)(7), (d)(8), and (d)(9) and 21.48(d)(7), (d)(8), (d)(9), (d)(10) and (d)(12) and are listed below in the amendments to 50 CFR part 21. The breakdown of the information collection burden is as follows: We estimate that §§ 21.47(d)(7) and (d)(8) will have 50 annual responses at an estimated .5 burden hours per response; we estimate that § 21.47(d)(9) will have 900 annual responses at an estimated 2 burden hours per response; we estimate that §§ 21.48(d)(7) and (d)(8) will have 10 annual responses at an estimated .5 burden hours per response; we estimate that § 21.48(d)(9) will have 75 annual responses at an estimated average of 3 burden hours per response; we estimate that § 21.48(d)(10) will have 60 annual responses at an estimated 20 burden hours per response; and we estimate that § 21.48(d)(12) will have 10 annual responses at an estimated 80 burden hours per response. Overall, we estimate that a total of 960 respondents will annually submit a total of

1,105 responses to the recordkeeping and reporting requirements associated with these depredation orders. Each response will require an average of 3.67 hours to complete, for a total of 4,055 hours per year for all of the information collection and recordkeeping requirements in this final rule.

OMB regulations at 5 CFR part 1320 require that interested members of the public and affected agencies have an opportunity to comment on information collection and record keeping activities. If you have any comments on this information collection at any time, please contact the Service Information Collection Officer, 4401 N. Fairfax Drive, Suite 222, Arlington, VA 22203.

#### **Unfunded Mandates Reform Act**

The Unfunded Mandates Reform Act of 1995 requires agencies to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. We have determined, in compliance with the requirements of the Unfunded Mandates Reform Act, 2 U.S.C. 1502 et seq., that the selected action would not “significantly or uniquely” affect small governments, and will not produce a Federal mandate of \$100 million or more in any given year on local or State government or private entities. Therefore, this action is not a “significant regulatory action” under the Unfunded Mandates Reform Act.

#### **Takings Implication Assessment**

In accordance with Executive Order 12630, this action does not have significant takings implications and does not affect any constitutionally protected property rights. This action will not result in the physical occupancy of property, the physical invasion of property, or the regulatory taking of any property. In fact, this action will help alleviate private and public property damage and allow the exercise of otherwise unavailable privileges.

#### **Federalism Effects**

Due to the migratory nature of certain species of birds, the Federal Government has been given statutory responsibility over these species by the MBTA. While legally this responsibility rests solely with the Federal Government, in the best interest of the migratory bird resource we work cooperatively with States and other relevant agencies to develop and implement the various migratory bird management plans and strategies. This action does not have a substantial direct effect on fiscal capacity, change the roles or responsibilities of Federal or State governments, or intrude on State policy or administration. It will allow, but will not require, States to develop and implement their own DCCO management programs. Therefore, in accordance with Executive Order 13132, this action does not have significant federalism effects and does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

#### **Civil Justice Reform**

Under Executive Order 12988, the Office of the Solicitor has determined that this policy does not unduly burden the judicial system and meets the requirements of Sections 3(a) and 3(b)(2) of the Order.

#### **Government-to-Government Relationship With Tribes**

In accordance with the President’s memorandum of April 29, 1994, “Government-to-Government Relations with Native American Tribal Governments” (59 FR 22951) and Executive Order 13175, we have determined that this action has no significant effects on Federally recognized Indian Tribes. In order to promote consultation with Tribes, a copy of the DEIS was mailed to all Federally recognized Tribes in the continental United States.

#### **Energy Effects—Executive Order 13211**

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As the selected action is not expected to significantly affect energy supplies, distribution, or use, this action is not a significant energy action and no Statement of Energy Effects is required.

### **RECORD OF DECISION**

The Record of Decision for management of double-crested cormorants in the United States, prepared pursuant to National Environmental Policy Act (NEPA) regulations at 40 CFR 1505.2, is herein published in its entirety.

This Record of Decision (ROD) has been developed by the U.S. Fish and Wildlife Service (Service) in compliance with the agency decision-making requirements of NEPA. The purpose of this ROD is to document the Service's decision for the selection of an alternative for managing resource damages associated with the double-crested cormorant (DCCO). Alternatives have been fully described and evaluated in the August 2003 Final Environmental Impact Statement (FEIS) on DCCO management in the United States.

This ROD is intended to: (a) state the Service's decision, present the rationale for its selection, and describe its implementation; (b) identify the alternatives considered in reaching the decision; and (c) state whether all means to avoid or minimize environmental harm from implementation of the selected alternative have been adopted (40 CFR 1505.2).

## PROJECT DESCRIPTION

Increases in DCCO populations over the past 25 years, combined with other environmental and social factors, have led to greater occurrences of both real and perceived conflicts with human and natural resources. In 1999, in response to urgings from the public and from State and Federal wildlife agencies, the Service decided to prepare a programmatic EIS, in cooperation with the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS/WS), to evaluate the significance of, and consider alternatives to address, conflicts associated with DCCOs.

## KEY ISSUES

Public involvement occurred throughout the EIS and rulemaking process. From 1999 to 2003, we held 22 public meetings over the course of more than 10 months of total public comment. Through public scoping (the first stage of public comment) and agency discussions, key issues were identified. Key issues can be placed into two general categories: (1) impacts caused by DCCOs (including impacts to other birds, fish, vegetation, aquaculture, Federally listed species, water quality, hatcheries, recreational fishing economies, and commercial fishing); and (2) impacts caused by control actions (including impacts to DCCO populations, other birds, Federally listed species, and existence and aesthetic values). In the EIS environmental analysis, these issues made up the environmental categories for which effects of the different alternatives were considered.

The alternatives were also considered in terms of their ability to fulfill the purpose of the proposed action: to reduce resource conflicts associated with DCCOs in the contiguous United States, to enhance the flexibility of natural resource agencies in dealing with DCCO-related resource conflicts, and to ensure the long-term conservation of DCCO populations.

## ALTERNATIVES

Since the FEIS is a programmatic document, the alternatives reflect general management approaches to the alleviation of DCCO resource damages. Six alternatives were examined in the EIS: (A) No Action, (B) Nonlethal, (C) Increased Local Damage Control, (D) Public Resource Depredation Order, (E) Regional Population Reduction, and (F) Regulated Hunting.

### Alternative A

Alternative A is essentially the no change, or status quo, alternative. The main features of this alternative are the issuance of a small number of depredation permits to address DCCO conflicts; an aquaculture

depredation order that allows commercial, freshwater aquaculture producers in 13 States to shoot DCCOs without a permit; unregulated nonlethal harassment of DCCOs; and Director's Order No. 27, which prevents most public fish hatcheries from conducting lethal take of DCCOs.

#### Alternative B

Alternative B would not allow the take of DCCOs or their eggs. Only harassment methods and physical exclusion devices would be used to prevent or control DCCO damages.

#### Alternative C

Alternative C would allow for increased take of DCCOs, through a revision of our cormorant damage management practices, but agencies and individuals would still have to obtain a depredation permit. It would also revise the aquaculture depredation order to allow winter roost control.

#### Alternative D

Alternative D, the selected action, creates a public resource depredation order to authorize State fish and wildlife agencies, Federally recognized Tribes, and APHIS/WS to take DCCOs found committing or about to commit, and to prevent, depredations on the public resources of fish (including hatchery stock at Federal, State, and Tribal facilities), wildlife, plants, and their habitats. This authority applies to all lands and freshwaters (with appropriate landowner permission) in 24 States (Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Ohio, Ohio, Mississippi, Missouri, New York, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Vermont, West Virginia, and Wisconsin). This alternative also revises the aquaculture depredation order by specifying that it is applicable to commercial freshwater facilities and State and Federal fish hatcheries, and by authorizing APHIS/WS employees to take DCCOs at roost sites in the vicinity of aquaculture facilities during the months of October, November, December, January, February, March, and April. Depredation permits would continue to be used to address conflicts outside the authority of the depredation orders.

#### Alternative E

Alternative E would reduce regional DCCO populations to pre-determined levels. Population objectives would be developed on an interdisciplinary, interagency basis and would be based on the best available data, while giving consideration to other values. Control would be carried out at nesting, roosting, wintering, and all other sites in order to achieve those objectives as rapidly as possible without adversely affecting other protected migratory birds or threatened and endangered species.

#### Alternative F

Under Alternative F, frameworks to develop seasons and bag limits for hunting DCCOs would be established jointly by Federal and State wildlife agencies. These seasons would coincide with those for waterfowl hunting.

#### DECISION

The Service's decision is to implement the preferred alternative, Alternative D, as it is presented in the final rule. This decision is based on a thorough review of the alternatives and their environmental consequences.

#### Other Agency Decisions

A Record of Decision will be produced by APHIS/WS. The responsible officials at APHIS/WS will adopt the FEIS.

#### RATIONALE FOR DECISION

As stated in the CEQ regulations, “the agency’s preferred alternative is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.” The preferred alternative has been selected for implementation based on consideration of a number of environmental, regulatory, and social factors. Based on our analysis, the preferred alternative would be more effective than the current program; is environmentally sound, cost effective, and flexible enough to meet different management needs around the country; and does not threaten the long-term sustainability of DCCO populations or populations of any other natural resource.

Alternative D was selected because it allows greater responsiveness in addressing localized resource damages (and will therefore be more effective at reducing or preventing them) than the No Action Alternative. It will provide a net benefit to fish, wildlife, and plants by allowing agencies to control DCCOs to protect these resources from damages. It will also alleviate economic damages to aquaculture. Through successful implementation of mitigation measures, it will not result in negative impacts to DCCO populations, other migratory birds, or Federally listed species. As such, this alternative represents the environmentally preferable alternative.

The No Action Alternative (A) was not selected for implementation because by itself it would not adequately address resource damages caused by DCCOs. The Nonlethal Management Alternative (B) was not selected because it severely limits the scope of allowable control techniques and would not adequately address resource damages caused by DCCOs. The Increased Local Damage Control Alternative (C) was not selected because it does not provide other agencies with the flexibility needed to adequately address resource damages caused by DCCOs. The Regional Population Reduction Alternative (E) was not selected because of uncertainty about the actual relationship between cormorant numbers and distribution and subsequent damages. The Regulated Hunting Alternative (F) was not selected because hunting is not a biologically or socially acceptable means of reducing DCCO damages.

### **List of Subjects in 50 CFR Part 21**

Exports, Hunting, Imports, Reporting and recordkeeping requirements, Transportation, Wildlife.

For the reasons stated in the preamble, we hereby propose to amend part 21, of subchapter B, chapter I, title 50 of the Code of Federal Regulations, as set forth below:

### **PART 21–[AMENDED]**

1. The authority citation for part 21 is revised to read as follows:

**Authority:** Pub. L. 95–616; 92 Stat. 3112 (16 U.S.C. 712(2)); Pub. L. 106-108; Section 3 of the Migratory Bird Treaty Act (16 U.S.C. 704), 40 Stat. 755.

2. In Subpart D, revise § 21.47 to read as follows:

#### **§ 21.47 Depredation order for double-crested cormorants at aquaculture facilities.**

(a) What is the purpose of this depredation order?

The purpose of this depredation order is to help reduce depredation of aquacultural stock by double-crested cormorants at private fish farms and State and Federal fish hatcheries.

(b) In what areas can this depredation order be implemented?

This depredation order applies to commercial freshwater aquaculture facilities and to State and Federal fish hatcheries in the States of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Ohio, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

(c) What does this depredation order allow and who can participate?

(1) This depredation order authorizes landowners, operators, and tenants (or their employees or agents) actually engaged in the commercial, Federal, or State production of freshwater aquaculture stocks to take, without a Federal permit, double-crested cormorants when they are found committing or about to commit depredations to aquaculture stocks. This authority is applicable only during daylight hours and only within the boundaries of freshwater commercial aquaculture facilities or State and Federal hatcheries.

(2) This depredation order authorizes employees of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service to take double-crested cormorants, with appropriate landowner permission, at roost sites in the vicinity of aquaculture facilities, at any time, day or night, during the months of October, November, December, January, February, March, and April.

(3) Authorized employees of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service may designate agents to carry out control, provided these individuals act under the conditions of the order.

(d) What are the terms and conditions of this order?

(1) Persons operating under paragraph (c)(1) of this section may only do so in conjunction with an established nonlethal harassment program as certified by officials of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service. Wildlife Services directive 2.330 outlines this certification process.

(2) Double-crested cormorants may be taken only by shooting with firearms, including rifles. Persons using shotguns are required to use nontoxic shot as listed in 50 CFR 20.21(j).

(3) Persons operating under this depredation order may use decoys, taped calls, or other devices to lure within gun range birds committing or about to commit depredations.

(4) Persons operating under this depredation order must obtain appropriate landowner permission before implementing activities authorized by the order.

(5) Double-crested cormorants may not be killed contrary to the laws or regulations of any State, and none of the privileges of this section may be exercised unless the person possesses the appropriate State or other permits, if required.

(6) Persons operating under this depredation order must properly dispose of double-crested cormorants killed in control efforts:

(i) Individuals may donate birds killed under authority of this order to museums or other such scientific and educational institutions for the purposes of scientific or educational exhibition;

(ii) Individuals may also bury or incinerate birds taken; and

(iii) Individuals may not allow birds taken under this order, or their plumage, to be sold, offered for sale, bartered, or shipped for purpose of sale or barter.

(7) Nothing in this depredation order authorizes the take of any migratory bird species other than double-crested cormorants. Two look-alike species co-occur with double-crested cormorants in the southeastern States: the anhinga, which occurs across the southeastern United States, and the neotropic cormorant, which is found in varying numbers in Texas, Louisiana, and Oklahoma. Both species can be mistaken for double-crested cormorants, but take of these two species is not authorized under this depredation order. Persons operating under this order must immediately report the take of a migratory bird species other than double-crested cormorants to the appropriate Service Regional Migratory Bird Permit Office.

(8) Nothing in this depredation order authorizes the take of any species protected by the Endangered Species Act. Persons operating under this order must immediately report the take of species protected under the Endangered Species Act to the Service.

(i) To protect wood storks and bald eagles, the following conservation measures must be observed within any geographic area where Endangered Species Act protection applies to these species: All control activities are allowed if the activities occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks, and if they occur more than 750 feet from active bald eagle nests.

(ii) At their discretion, landowners, operators, and tenants may contact the Regional Migratory Bird Permit Office to request modification of the measures listed above in paragraph (d)(8)(i) of this section. Such modification can occur only if the Regional Director determines, on the basis of coordination between the Regional Migratory Bird Permit Office and the Endangered Species Field Office, that wood storks and bald eagles will not be adversely affected.

(iii) If adverse effects are anticipated from the control activities in a geographical area where Endangered Species Act protection applies to wood storks or bald eagles, either during the intra-Service coordination discussions described above or at any other time, the Regional Migratory Bird Permit Office will initiate consultation with the Endangered Species Field Offices.

(9) Persons operating under this depredation order must:

(i) Keep a log recording the date, number, and location of all birds killed each year under this authorization;

(ii) Maintain this log for a period of 3 years (and maintain records for 3 previous years of takings at all times thereafter); and

(iii) Each year, provide the previous year's log to the appropriate Service Regional Migratory Bird Permit Office. Regional Office addresses are found in § 2.2 of subchapter A of this chapter.

(10) We reserve the right to suspend or revoke the authority of any Agency or individual granted by this order if we find that the specified purpose, terms, and conditions have not been adhered to by that Agency or individual or if the long-term sustainability of double-crested cormorant populations is threatened by that Agency's or individual's action(s). The criteria and procedures for suspension, revocation, reconsideration, and appeal are outlined in §§ 13.27 through 13.29 of this subchapter. For the purposes of this rule, "issuing officer" means the Regional Director and "permit" means the authority to act under this depredation order. For purposes of § 13.29(e), appeals shall be made to the Director.

(e) Does this rule contain information collection requirements?

Yes. The information collection requirements in this section are approved by the Office of Management and Budget (OMB) under OMB control number 1018-0121. Federal agencies may not conduct or sponsor, and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.

(f) When does this depredation order expire?

This depredation order will automatically expire on April 30, 2009, unless revoked or extended prior to that date.

3. In Subpart D, add § 21.48 to read as follows:

**§ 21.48 Depredation order for double-crested cormorants to protect public resources.**

(a) What is the purpose of this depredation order?

The purpose of this depredation order is to reduce the occurrence and/or minimize the risk of adverse impacts to public resources (fish, wildlife, plants, and their habitats) caused by double-crested cormorants.

(b) In what areas can this depredation order be implemented?

This depredation order applies to all lands and freshwaters in the States of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Ohio, Ohio, Mississippi, Missouri, New York, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Vermont, West Virginia, and Wisconsin.

(c) What does this depredation order allow and who can participate?

(1) This depredation order authorizes State fish and wildlife agencies, Federally recognized Tribes, and State Directors of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (collectively termed “Agencies”) to prevent depredations on the public resources of fish (including hatchery stock at Federal, State, and Tribal facilities), wildlife, plants, and their habitats by taking without a permit double-crested cormorants found committing or about to commit, such depredations.

(2) Agencies may designate agents to carry out control, provided those individuals act under the conditions of the order.

(3) Federally recognized Tribes and their agents may carry out control only on reservation lands or ceded lands within their jurisdiction.

(d) What are the terms and conditions of this order?

(1) Persons operating under this order should first utilize nonlethal control methods such as harassment and exclusion devices when these are considered effective and practicable and not harmful to other nesting birds by the responsible Agency.

(2) Double-crested cormorants may be taken only by means of egg oiling, egg and nest destruction, cervical dislocation, firearms, and CO<sub>2</sub> asphyxiation. Persons using shotguns must use nontoxic shot, as listed in 50 CFR 20.21(j). Persons using egg oiling must use 100 percent corn oil, a substance exempted from regulation by the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide, and Rodenticide Act.

(3) Persons operating under this depredation order may use decoys, taped calls, or other devices to lure within gun range birds committing or about to commit depredation of public resources.

(4) Persons operating under this depredation order must obtain appropriate landowner permission before implementing activities authorized by the order.

(5) Persons operating under this depredation order may not take double-crested cormorants contrary to the laws or regulations of any State, and none of the privileges of this section may be exercised unless the person possesses the appropriate State or other permits, if required.

(6) Persons operating under this depredation order must properly dispose of double-crested cormorants killed in control efforts:

(i) Individuals may donate birds killed under authority of this order to museums or other such scientific and educational institutions for the purposes of scientific or educational exhibition;

(ii) Individuals may also bury or incinerate birds taken; and

(iii) Individuals may not allow birds taken under this order, or their plumage, to be sold, offered for sale, bartered, or shipped for purpose of sale or barter.

(7) Nothing in this depredation order authorizes the take of any migratory bird species other than double-crested cormorants. Two look-alike species co-occur with double-crested cormorants in the southeastern States: the anhinga, which occurs across the southeastern United States, and the neotropic cormorant, which is found in varying numbers in Texas, Louisiana, Kansas, and Oklahoma. Both species can be mistaken for double-crested cormorants, but take of these two species is not authorized under this depredation order. Persons operating under this order must immediately report the take of a migratory bird species other than double-crested cormorants to the appropriate Service Regional Migratory Bird Permit Office.

(8) Nothing in this depredation order authorizes the take of any species protected by the Endangered Species Act. Persons operating under this order must immediately report the take of species protected under the Endangered Species Act to the Service.

(i) To protect piping plovers, interior least terns, wood storks, and bald eagles, the following conservation measures must be observed within any geographic area where Endangered Species Act protection applies to these species:

(A) The discharge/use of firearms to kill or harass double-crested cormorants or use of other harassment methods are allowed if the control activities occur more than 1,000 feet from active piping plover or interior least tern nests or colonies; occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;

(B) Other control activities such as egg oiling, cervical dislocation, CO<sub>2</sub> asphyxiation, egg destruction, or nest destruction are allowed if these activities occur more than 500 feet from active piping plover or interior least tern nests or colonies; occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;

(C) To ensure adequate protection of piping plovers, any Agency or its agents who plan to implement control activities that may affect areas designated as piping plover critical habitat in the Great Lakes Region are to obtain prior approval from the appropriate Regional Director. Requests for approval of activities in these areas must be submitted to the Regional Migratory Bird Permit Office. The Regional Migratory Bird Permit Office will then coordinate with the Endangered Species Field Office staff to assess whether the measures in paragraph (B) are adequate.

(ii) At their discretion, Agencies or their agents may contact the Regional Migratory Bird Permit Office to request modification of the above measures. Such modification can occur only if the Regional Director determines, on the basis of coordination between the Regional Migratory Bird Permit Office and the Endangered Species Field Office, that the species listed in (8)(i) will not be adversely affected.

(iii) If adverse effects are anticipated from the control activities in a geographical area where Endangered Species Act protection applies to any of the four species listed in (8)(i), either during the intra-Service coordination discussions described above or at any other time, the Regional Migratory Bird Permit Office will initiate consultation with the Endangered Species Field Offices.

(9) Responsible Agencies must, before they initiate any control activities in a given year, provide a one-time written notice to the appropriate Service Regional Migratory Bird Permit Office indicating that they intend to act under this order.

(i) Additionally, if any Agency plans a single control action that would individually, or a succession of such actions that would cumulatively, kill more than 10 percent of the double-crested cormorants in a breeding colony, it must first provide written notification to the appropriate Service Regional Migratory Bird Permit Office. This letter must be received no later than 30 days in advance of the activity and must provide:

(A) the location (indicating specific colonies, if applicable) of the proposed control activity;

(B) a description of the proposed control activity, specifying what public resources are being impacted, how many birds are likely to be taken and what approximate percentage they are of total DCCOs present, and which species of other birds are present; and

(C) contact information for the person in charge of the control action.

(ii) The Regional Director may prevent any such activity by notifying the agency in writing if the Regional Director deems the activity a threat to the long-term sustainability of double-crested cormorants or any other migratory bird species.

(10) Persons operating under this order must keep records of all activities, including those of designated agents, carried out under this order. On an annual basis, Agencies must provide the Service Regional Migratory Bird Permit Office with a report detailing activities conducted under the authority of this order, including:

(i) By date and location, a summary of the number of double-crested cormorants killed and/or number of nests in which eggs were oiled;

- (ii) A statement of efforts being made to minimize incidental take of nontarget species and a report of the number and species of migratory birds involved in such take, if any;
- (iii) A description of the impacts or anticipated impacts to public resources by double-crested cormorants and a statement of the management objectives for the area in question;
- (iv) A description of the evidence supporting the conclusion that double-crested cormorants are causing or will cause these impacts;
- (v) A discussion of other limiting factors affecting the resource (e.g., biological, environmental, and socioeconomic); and
- (vi) A discussion of how control efforts are expected to, or actually did, alleviate resource impacts.

(11) Agencies must provide annual reports to the appropriate Service Regional Migratory Bird Permit Office, as described above, by December 31 for the reporting period October 1 of the previous year to September 30 of the same year. For example, reports for the period October 1, 2003, to September 30, 2004, would be due on or before December 31, 2004. The Service will regularly review Agency reports and will periodically assess the overall impact of this program to ensure compatibility with the long-term conservation of double-crested cormorants and other resources.

(12) In some situations, Agencies may deem it necessary to reduce or eliminate local breeding populations of double-crested cormorants to reduce the occurrence of resource impacts.

(i) For such actions, Agencies must:

- (A) Comply with paragraph 9 of this subsection;
- (B) Carefully plan activities to avoid disturbance of nontarget species;
- (C) Evaluate effects of management activities on cormorants at the control site;
- (D) Evaluate, by means of collecting data or using best available information, effects of management activities on the public resources being protected and on nontarget species; and
- (E) Include this information in the report described above in paragraph (d)(10) of this subsection.

(ii) Agencies may coordinate with the appropriate Service Regional Migratory Bird Permit Office in the preparation of this information to attain technical or other assistance.

(13) We reserve the right to suspend or revoke the authority of any Agency, Tribe, or State Director granted by this order if we find that the specified purpose, terms, and conditions have not been adhered to or if the long-term sustainability of double-crested cormorant populations is threatened by the action(s) of that Agency, Tribe, or State Director. The criteria and procedures for suspension, revocation, reconsideration, and appeal are outlined in §§13.27 through 13.29 of this subchapter. For the purposes of this rule, “issuing officer” means the Regional Director and “permit” means the authority to act under this depredation order. For purposes of §13.29(e), appeals shall be made to the Director.

(e) Does this rule contain information collection requirements?

Yes. The information collection requirements in this section are approved by the Office of Management and Budget (OMB) under OMB control number 1018-0121. Federal agencies may not conduct or sponsor, and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.

(f) When does this depredation order expire?

This depredation order will automatically expire on April 30, 2009, unless revoked or extended prior to that date.

Date: September 25, 2003

Paul Hoffman

Acting Assistant Secretary – Fish, Wildlife, and Parks

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