FINAL

ENVIRONMENTAL ASSESSMENT

REDUCING DOUBLE-CRESTED CORMORANT DAMAGE IN OHIO

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Animal and Plant Health Inspection Service
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In Cooperation with

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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'ile 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.

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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 [1]). 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

[1] 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 resuling 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.

Cormorants were regular migrants along Lake Erie in the early 1800's and only moved to inland Ohio to breed after the creation of canal reservoirs during the construction of the Erie Canal (Peterjohn 1989). The first records of DCCOs breeding on these canal reservoirs in OH were at Buckeye Lake and Grand Lake St Mary's during the 1860's and 1870's. The Buckeye Lake colony housed about 10-15 pairs only while Lake St Mary's reportedly was much larger (Peterjohn and Price 1991). Both of these colonies were reported gone by 1880's due to unregulated hunting and egg collecting (Peterjohn 1989). There are reports that DCCOs were once again breeding at Grand Lakes St Mary around 1922 (Bent 1964) but others claim that DCCOs did not return to Ohio to breed until the 1940's (Peterjohn 1989). Lake Erie was first colonized by DCCO in 1939. Nonetheless the cormorant had a rare existence in Ohio during the early 1900's and while the 1950's -1970's showed increased DCCO breeding activity within the state, their reproductive success was hampered by the use of DDT and other

harmful pesticides (Peterjohn 1989, Peterjohn and Rice 1991). It wasn't until the 1980's that DCCOs were observed again in large numbers during both spring and fall migration. According to Peterjohn (1989) 6 pairs of cormorants built nests on Ottawa National Wildlife Refuge property in 1987 and while none of the nests were successful, they did provide the first concrete record of cormorant nesting in Ohio during the 20th century. 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.

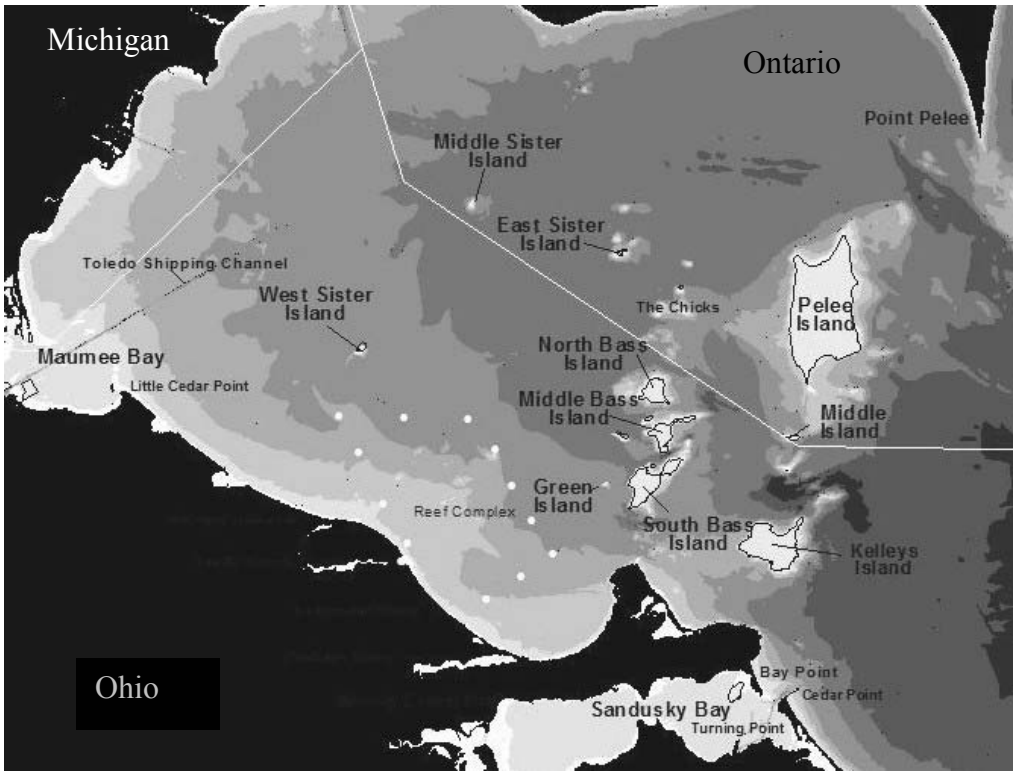

Figure 1-1. The Lake Erie Islands

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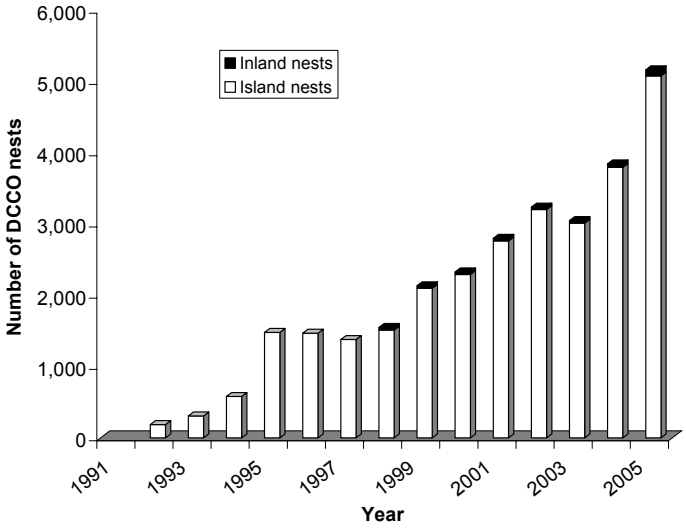

Figure 1-2. Number of DCCO nests in Ohio, 1991-2005 (ODW 2005).

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 primarily 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 following is a brief review of the historical occurrence of some of these species in Ohio.

Black-crowned Night-Heron - Black-crowned night-herons have nested in Ohio since 1867, with the first colony located at Lake St. Mary's (Peterjohn 1989). During the period of 1915 to 1935 black-crowned night-herons expanded their breeding population and had established breeding sites along western Lake Erie by 1920 (Peterjohn 1989). At one time there were at least 19 colonies, ranging from a few pairs to several hundred pairs across 16 Ohio counties. Most of these inland heronries had disappeared by the early 1950's. However, in 1989 a small colony of 6 nests was established in southeastern Butler County and in 2005 a second small colony of 8 nests was reported near Cincinnatti just 25 miles south of the Butler County colony in Hamilton County (Peterjohn and Rice 1991, Whan 2005).

The first colony to appear inland since the late 1960's emerged on the Gilmore Ponds in Butler County in 1989 (Peterjohn and Rice 1991). Gilmore Ponds is a 200 acre wetland complex situated on the headwaters of the East Fork of Mill Creek inside the city limits of Hamilton, Ohio. Black-crowned night-herons have a long history of nesting along the Mill Creek watershed (Whan 2005). In July, 1998, 10 black-crowned night-heron nests with hatchlings and 4 nests with incubating adults were destroyed on Gilmore Ponds by either predation or a strong storm system (Hays and Dykstra 2000).

Hamilton County, Ohio boasted 200 black-crowned night-heron nesting pairs in the 1940's and 1950's one of the two largest inland colonies at that time (Peterjohn and Rice 1991). The most recent Hamilton County colony was established in 2005 on Strauch Island in the Spring Grove Cemetery near Cincinnati. The Spring Grove cemetery is also situated along Mill Creek and is comprised of 733 acres of cemetery and arboretum which contain several wetlands. Five to seven black-crowned night-heron nests were confirmed on the small island (Whan 2005).

Today there are two primary breeding colonies of black-crowned night-herons in Ohio; West Sister Island and Turning Point Island. West Sister Island is the largest colony, with 500 pairs, and has been home to black-crowned night-herons since the 1930's (ODW unpub. data 2005, Peterjohn and Rice 1991). Turning Point Island houses 47 black-crowned night-heron nesting pairs making it the second largest colony in the state (ODW unpub. data 2005).

Great Blue Heron - Great blue heron numbers were greatly reduced in the 1800's due to the millinery trade, but had recovered to 1,500-2,000 pairs statewide by the 1930's after they were given complete protection by law (Peterjohn 1989). During a survey in 1980 and 1981 the ODNR, Division of Natural Areas and Preserves counted 89 great blue heron colonies throughout 52 counties statewide (Peterjohn and Rice 1991). Breeding great blue herons are most numerous in colonies near the western basin of Lake Erie, while inland colonies typically contain 75 or fewer nests (Peterjohn and Rice 1991).

Great Egret - Before the 1880's great egrets were likely common summer visitors to Ohio, but like the other waders were nearly extirpated for their feathers (Peterjohn 1989). It was not until 1924 that they again were sighted in Ohio and in 1930 sightings were reported in large numbers across the state but there was no evidence of breeding. During the 1940's the only breeding of great egrets documented in Ohio was a single pair within an existing great blue heron rookery (Peterjohn 1989). In 1946 a colony of 25 pairs was discovered at WSI and since then great egrets have been regular summer residents and breeders in the state (Peterjohn 1989). West Sister Island retains the majority of the breeding great egrets in Ohio, with 827 nests, but two other Ohio islands, Turning Point and Green, also are consistent hosts to nesting egrets (ODW unpub. data 2005). Ohio

may have several inland great egret colonies within the southwestern Lake Erie marshes but these are not well established (Peterjohn and Rice 1991).

Snowy Egret – Snowy egrets were probably casual summer visitors to Ohio in the 1800's but there is little evidence to validate their presence (Peterjohn 1989). After the feather market put pressures on regional populations snowy egrets were no longer sighted in Ohio and it was not until 1924 that a single bird observation was again reported in the state. During the 1940's and 1950's small groups (3-7) began to appear, but most were isolated in the northern part of the state. Since 1970 fall migrants have been nonexistent while snowy egret sightings in spring have increased. In 1983 WSI housed the first two confirmed snowy egret nests in Ohio (Peterjohn 1989). Breeders still occupy this island and occasionally also nest on TPI but total numbers are unknown (ODW unpub. data 2005).

Cattle Egret - The first cattle egret in Ohio was spotted central-state in 1958 and next along Lake Erie in 1960 (Peterjohn 1989). Breeding of cattle egrets in Ohio was confirmed in 1978 when 20 nests were discovered on WSI, but sightings and nests have declined since (Peterjohn 1989). Today there are a few sporadic nests on both WSI and TPI (Peterjohn and Rice 1991, ODW unpub. data 2005). In 2005 WSI had a documented 10 cattle egret nests while TPI had none (ODW unpub. data 2005).

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 Ohio's two primary 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 black-crowned night-heron population on WSI experienced a steady decline from 1991 through 1999, from 1,113 pairs to 387 pairs. This decline has been mainly attributed to habitat succession on the island (Shieldcastle and Martin 1999). However, since 1996, the black-crowned night-heron population at WSI has fluctuated between a high of 500 pairs (1996, 2005) and a low of 387 pairs (1999). The fluctuation within this period is within sampling error, so no clear population trend is indicated. Black-crowned night-herons appear to be responding well to labor-intensive WSINWR efforts to restore vegetation structure preferred by night-herons (Doug Brewer, ONWR, pers. comm.), and the population may be stabilizing in line with currently available nesting habitat. However, the DCCO population is rapidly expanding to areas near or occupied by black-crowned night-herons, leading the USFWS and ODNR to be concerned for the loss of additional nesting habitat for black-

crowned night-herons. 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 also appear to be influencing a shift of the great egret population from a relatively uniform distribution, to a pattern of higher concentration in areas closer to the black-crowned night-herons and away from DCCOs. 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 other primary 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.

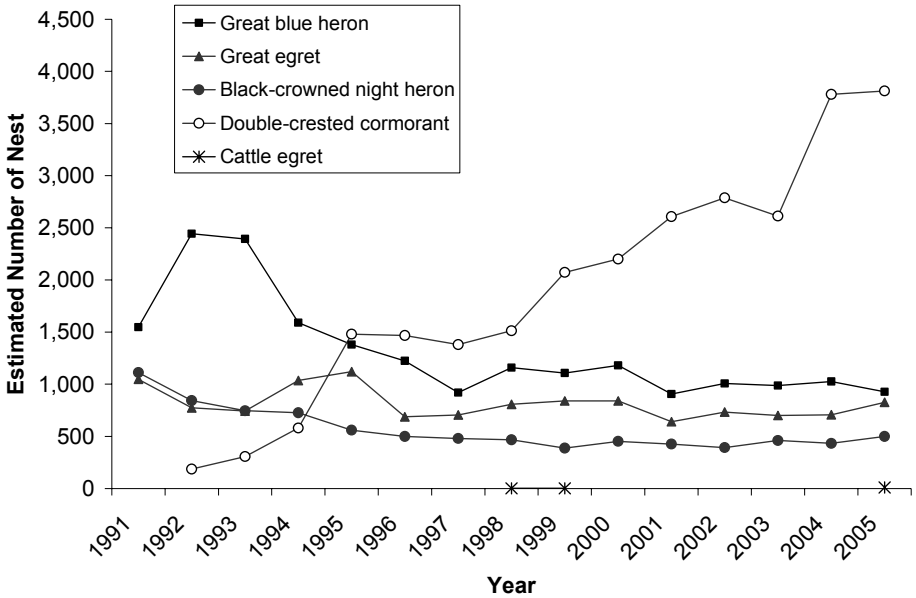

Figure 1-3. West Sister Island colonial bird nesting pair numbers 1991-2005.

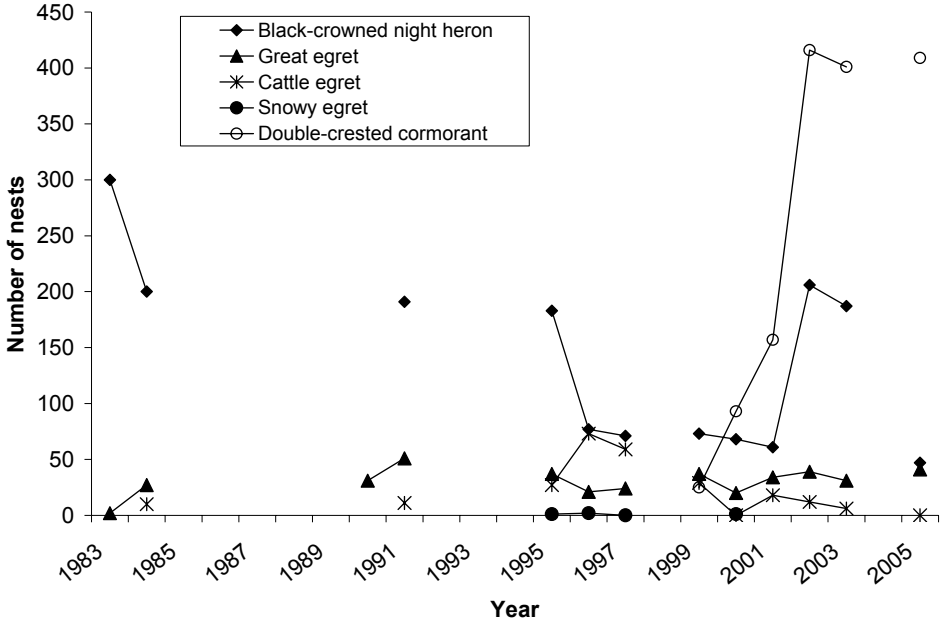

Figure 1-4. Turning Point Island colonial bird nesting pair numbers 1983-2005.

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 watersnake 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 DCCO 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 DCCOs 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 larg 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 of 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.

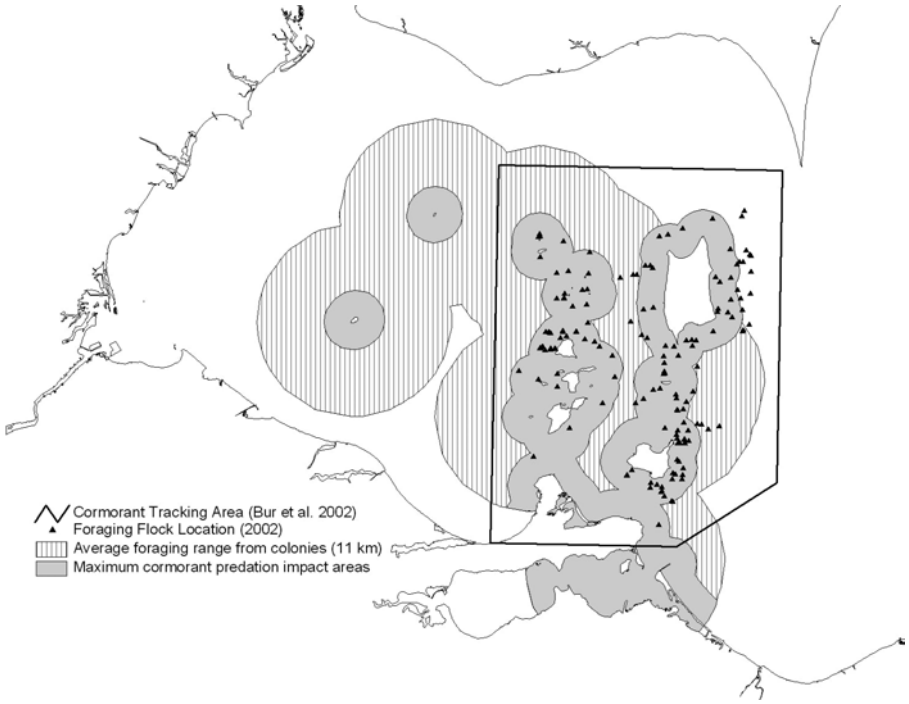

Figure 1-5. Predicted cormorant foraging areas in 2002, and foraging flock locations, 2002 (Stapanian et al. 2002).

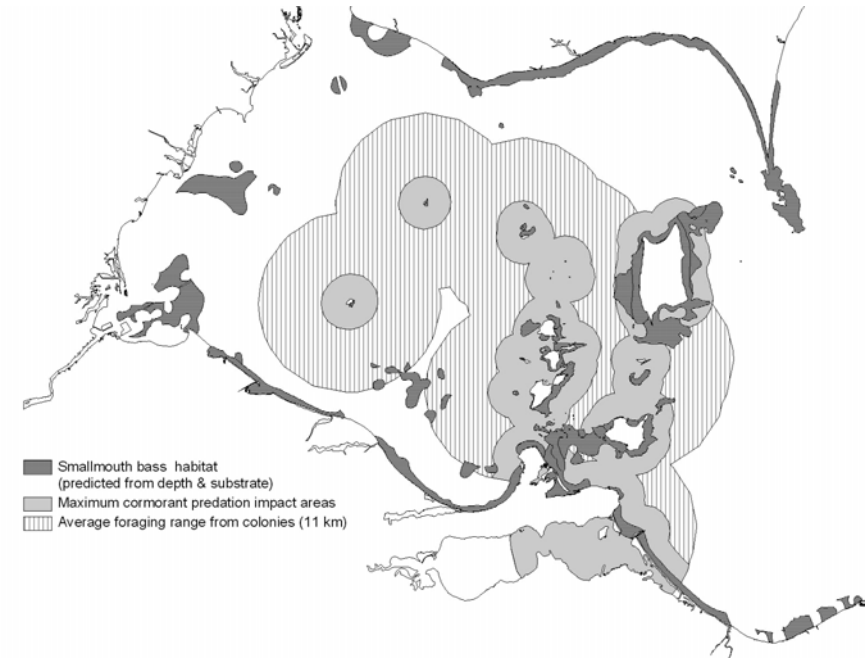

Figure 1-6. Predicted cormorant foraging areas and smallmouth bass habitat in western Lake Erie. Maps are based upon substrate distribution and depth information.

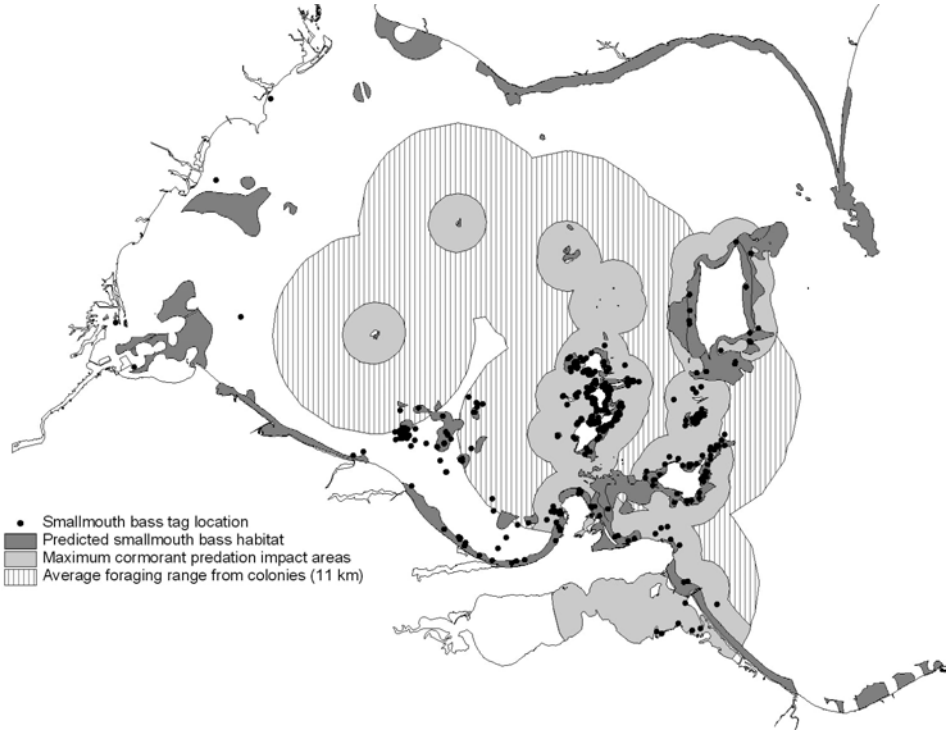

Figure 1-7. Predicted cormorant foraging areas and smallmouth bass habitat in western Lake Erie. Points are actual smallmouth bass tagging locations.

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 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. When nonbreeding birds are included, the Ohio population of DCCOs is conservatively estimated at approximately 13,000 birds (Section 4.1.1). 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 CDM 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 2000*a*) 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 watersnake 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 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 led 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 from the USFWS. 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).

›ecies	ımage	source	cidents	ar Value
CCO	ɛdation	›d Fish	1	3,000
CCO	ɛdation	it Fish	1	,000
CCO	ɛdation	Fingerling	2	,000
CCO	umption/ ɜmination	›ow Trout	1	600
CCO	ɛdation	3ass	1	500
CCO	ɛdation	sh Adult	3	,800
CCO	ɛdation	›ow Trout	7	,700
CCO	ɛdation	it Fish	1	150
CCO	ɛdation	Fingerling	1	,500
CCO	ɛdation	sh Adult	1	0
CCO	ɛdation	›ow Trout	1	0
CCO	ɛdation	›d Fish	1	0
CCO	ɛdation	Fingerling	1	,000
CCO	ɛdation	›d Fish	1	0
CCO	ɛdation	›d Fish	1	,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. Cormorant damage management 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 program's goals and directives are to reduce damage and 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 of large projects like those planned for TPI, WSI, Green Island and the inland colonies discussed 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 higher risks to non-target species than those anticipated in this analysis) the EA would be amended and public comment would be solicited prior to a decision to continue 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 the agencies' mission.

1.8.5 Summary of Public Involvement

Issues related to cormorant damage management 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

ion	Need for Action	Need for Action
	tect Public Resources	**Aquaculture, Property and Health and Safety; t Research with Scientific Collecting Permits)**
	at request of landowners/	under permits issued to WS or
	nical asstance	nical asstance
	less than 10% of local colony) g USFWS	analysis and review required to issue permits
	more than 10% of local colony) al of USFWS	
	e/local DCCO population.	
igratory Bird	y to not approve take of more s local colony	
		pacts of local, regional and

ion	Need for Action	Need for Action
	tect Public Resources	**Aquaculture, Property and Health and Safety; t Research with Scientific Collecting Permits)**
	ed technical asstance	CCO conflict management
	pacts of local, regional and CCO damage management	
	rsight to ensure action agency with the PRDO regulations	
uge	horize take of birds on USFWS	
	as agents of ODW or Wildlife	
	e local DCCO population	
	less than 10% of local colony) g USFWS	for aquaculture damage and h permits
	more than 10% of local colony) al of USFWS	ed technical asstance
	e and local DCCO population	

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

USDA, APHIS, Wildlife Services. The USDA is authorized by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authorities for the APHIS-WS program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)., 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.

<u>USDI Fish and Wildlife Service (USFWS)</u>. 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.

<u>Ohio Division of Wildlife (ODW)</u>. 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 implementation requirements 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 untrammeled 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 Preferred Alternative 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 requires Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

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.

The CDM methods described in this EA that might be used operationally by WS or permitted by the USFWS do not cause major ground disturbance, physical destruction or damage to property, alterations of property, wildlife habitat, or landscapes, or 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 or permitted by the USFWS under the Preferred Alternative are not generally the types of activities that would have the potential to affect historic properties.

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 CDM methods considered in this EA 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 CDM would not increase environmental health or safety risks to children.