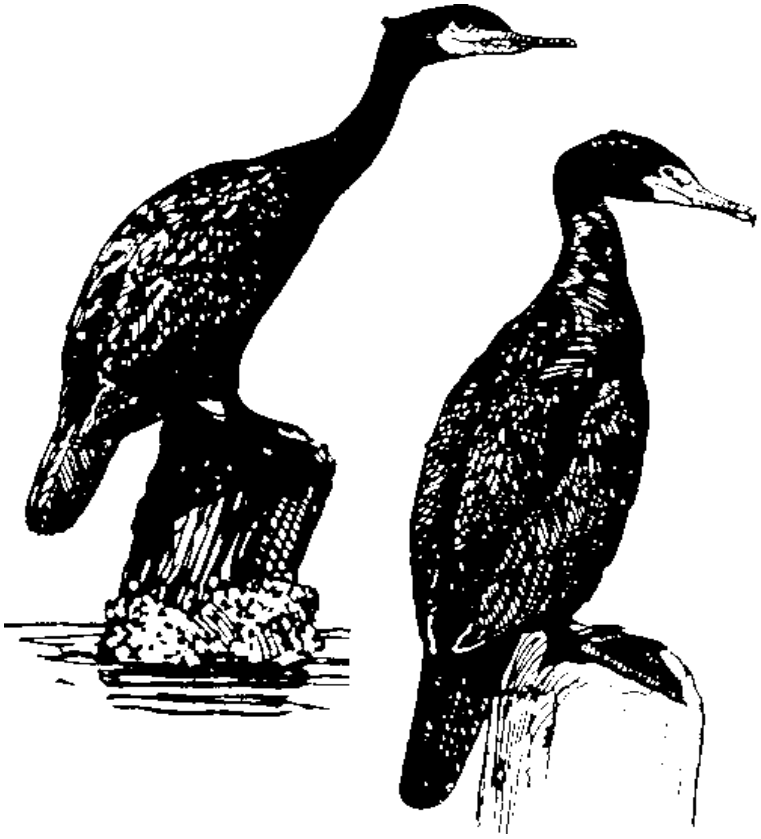
Draft Environmental Impact Statement: Double-crested Cormorant Management



U.S. Department of Interior Fish and Wildlife Service

"Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people"

in cooperation with

U.S. Department of Agriculture APHIS Wildlife Services

"providing leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and safeguarding public health and safety"

2001

DRAFT ENVIRONMENTAL IMPACT STATEMENT:

Double-crested Cormorant Management

RESPONSIBLE AGENCY:

Department of the Interior
U.S. Fish and Wildlife Service

COOPERATING AGENCY:

Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

RESPONSIBLE OFFICIAL:

Director
U.S. Fish and Wildlife Service
Main Interior Building
1849 C Street
Washington, D.C. 20240

FOR FURTHER INFORMATION CONTACT:

Shauna Hanisch, EIS Project Manager
Division of Migratory Bird Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive MS634
Arlington, Virginia 22203
(703) 358-1714
Shauna_Hanisch@fws.gov

Jon Andrew, Chief
Division of Migratory Bird Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive MS634
Arlington, Virginia 22203
(703) 358-1714

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/AMBS/DMBM/005371

Dear Reader:

The U.S. Fish and Wildlife Service is pleased to provide you with this copy of the draft Environmental Impact Statement for the management of double-crested cormorants (DCCO).

The Service's Proposed Action (Alternative D) would establish a Public Resource Depredation Order authorizing State, Tribal, and Federal land management agencies to implement a DCCO management program to address public resource conflicts, while maintaining Federal oversight of DCCO populations via reporting and monitoring requirements.

The draft EIS examines four additional alternatives and, in accordance with National Environmental Policy Act regulations, a No Action Alternative is also examined. The draft EIS addresses impacts of these alternatives on various biological and socioeconomic resources.

The Service is requesting comments on the alternatives described in the draft EIS; all agencies, groups, and individuals are urged to provide comments on the Proposed Action along with any suggestions for improving the draft EIS. All written comments received within 60 days of the publication date of the U.S. Environmental Protection Agency's notice of availability in the *Federal Register* will be considered in preparation of the final Environmental Impact Statement. Comments should be sent to Jon Andrew, Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Suite 634, Arlington, Virginia 22203. Alternatively, comments can be sent by electronic mail to cormorant_eis@fws.gov.

If there are any questions, please contact Jon Andrew at 703-358-1714.

Sincerely,

K Adams

Acting Deputy DIRECTOR

Enclosure

ABSTRACT

Populations of Double-crested Cormorants have been increasing rapidly in many parts of the U.S. since the mid-1970s. This abundance has led to increased conflicts with various biological and socioeconomic resources, including recreational fisheries, other birds, vegetation, and hatchery and commercial aquaculture production. This document describes and evaluates six alternatives for the purposes of reducing conflicts associated with cormorants, enhancing the flexibility of natural resource agencies to deal with cormorant conflicts, and ensuring the health and viability of cormorant populations. We have analyzed the anticipated environmental effects of six management alternatives: 1) Continue current cormorant management practices (No Action); 2) implement only non-lethal management techniques; 3) expand current cormorant damage management practices; 4) establish a new Depredation Order to address public resource conflicts (PROPOSED ACTION); 5) reduce regional cormorant populations; and establish frameworks for a cormorant hunting season. Alternatives were analyzed with regard to their potential impacts on cormorant populations, fish, other birds, vegetation, federally-listed Threatened and Endangered species, water quality and human health, economic impacts, fish hatcheries and environmental justice, property losses, and existence and aesthetic values. This Draft Environmental Impact Statement will have a 60-day comment period. In preparation of the Final Environmental Impact Statement, we will consider all public comments received during the comment period.

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CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The persistence of conflicts associated with Double-crested Cormorants ("DCCOs" or "cormorants"; see Appendix 1 for List of Scientific Names), widespread public and agency dissatisfaction with the status quo, and the desire to develop a more consistent and effective management strategy for DCCOs led us to the decision to prepare a national cormorant management plan for the contiguous United States.

For such an action, an EIS is required, under the National Environmental Policy Act (NEPA), according to: (1) Council on Environmental Quality (CEQ) regulations in 40 CFR section 1508.18, which defines a "major Federal action" as "adoption of formal plans, such as official documents prepared or approved by Federal agencies which guide or prescribe alternative uses of Federal resources, upon which future agency actions will be based," and (2) U.S. Fish and Wildlife Service (Service) policy in section 550FW 3.3B(2) which states that one or more of the following relevant criteria may trigger the preparation of an EIS: precedent-setting action with wide-reaching or long-term implications, change in Service policy having a major positive or negative environmental effect, and/or conflicts with local, regional, State or Federal proposed or adopted plans or policies.

Because of the important role of the Wildlife Services program of the USDA Animal and Plant Health Inspection Service (APHIS/WS) in current DCCO management and research, and the need for interagency coordination in developing future cormorant management strategies, this DEIS is being prepared cooperatively by the Service and APHIS/WS.

This section of the Draft Environmental Impact Statement (DEIS) discusses the purpose of and need for the action, the legal and policy context of the action, current DCCO management activities, and agency and stakeholder involvement in the development of the DEIS.

1.2 Purpose of Action

In recent years, increasing populations of DCCOs have led to growing concern from the public and natural resource management professionals about impacts of DCCOs on various human and natural resources. Based on internal and interagency scoping and the direction set forth in 40 CFR 1508.18 and 550FFW3.3B (described in further detail below), we published a Notice of Intent in the Federal Register on November 8, 1999 (64 FR 60826) announcing that we would prepare, in cooperation with APHIS/WS, an Environmental Impact Statement and national management plan "to [address] impacts caused by population and range expansion of the double-crested cormorant in the contiguous United States." This DEIS identifies and provides an evaluation of six alternative approaches for managing DCCOs. Each alternative is analyzed based on anticipated impacts on various biological and socioeconomic impact areas.

The purpose of the proposed action is threefold: to reduce resource conflicts associated with DCCOs in the contiguous United States, to enhance the flexibility of natural resource agencies in dealing with DCCO-related resource conflicts, and to ensure the conservation of healthy, viable DCCO populations. This DEIS is a comprehensive programmatic plan intended to guide and direct DCCO management activities in the 48 States (excluding Hawaii and Alaska). Where NEPA analysis is suggested or required for site-specific control projects carried out under the guidance of this document, analyses will "tier to" or reference the Final EIS and cormorant management plan. Site-specific NEPA analysis will focus on issues, alternatives, and environmental effects unique to the project and may be documented in either an environmental assessment or an environmental impact statement, depending on the significance of the effects.

1.2.1 Conceptual Foundations

"Conceptual foundations" are the set of principles and assumptions that direct management activities (Anderson 1991). They influence how we interpret information, identify problems, and select approaches to their resolution (ISG 1999). Similarly, they are an expression of agency goals and philosophy, which guide management decisions. The following five statements form the conceptual foundations on which the national management plan is based:

(1) DCCOs are an international migratory bird resource and as such they have inherent value regardless of their direct use to humans;
(2) DCCOs are native to North America;
(3) DCCOs are predators that, while a natural part of the ecosystem, can compete with humans for fisheries, although the ecological and socioeconomic significance of this competition is highly variable;
(4) DCCO populations have increased significantly in the past 25 years in North America and this increase has led to real and perceived resource conflicts that are both biological and socioeconomic in nature;
(5) There are biological and socioeconomic rationales for developing a comprehensive strategy to reduce resource conflicts with DCCOs.

1.2.2 Human Dimensions in Cormorant Management

In 1943, Aldo Leopold, the father of wildlife management, remarked that "The real problem of game management is not how we should handle [wildlife]...the real problem is one of human management" (in Duda et al. 1998). The human dimensions component of wildlife management entails "identifying what people think and do regarding wildlife, understanding why, and incorporating that insight into policy and management decision-making processes and programs" (Decker and Lipscomb 1991). Thus, human dimensions address the *social* nature of today's natural resource problems (Manfredo et al. 1998) and are particularly relevant to "people-wildlife problems" in which the behavior of wildlife creates a negative impact for some stakeholders, or is perceived by some stakeholders as having adverse impacts (Decker and Chase 1997).

At a 1998 workshop on DCCO management in Glen Falls, New York, participants agreed that human dimensions are important in the DCCO issue because: (1) economics and recreation are important factors; (2) it is an emotional issue that can cause polarization; and (3) it accentuates the conflict between politics and science-based management. For these reasons, the DCCO conflict can be viewed as a classic "people-wildlife problem," entailing both biological and social elements.

The Great Lakes Fishery Resources Restoration Study (USFWS 1995), in a discussion on decision-making and public expectations, said the following about human dimensions in natural resource controversies: "When different segments of society place competing demands on nature, conflicts are inevitable and often contentious.... Agencies and publics are often prevented from realizing resource potential when special interest groups fail to recognize public trust responsibilities, resource limitations based upon scientific assessment, and the legitimacy and roles of other users." Certainly, with the DCCO issue, just as with other examples of abundant species management, from white-tailed deer to Canada Geese, public perception of the proper way to deal with the problem varies considerably.

The truth is that the vast majority of Americans are largely ambivalent about DCCOs. They rarely, if ever, come into contact with cormorants, give little thought to their existence, and have no strongly developed ideas about them. Those more interested in DCCO conservation and management can be classified into at least four general categories: 1) animal protectionists who believe that wildlife should always be managed with a non-lethal approach; 2) citizens or resource professionals who tend to emphasize the need to *conserve* DCCO populations and avoid scapegoating them; 3) citizens or resource professionals who emphasize the need to *manage* DCCO populations and avoid risking further resource damage; and 4) citizens who are directly affected by DCCO presence (aquaculturists, landowners, etc.) and who would like to see an aggressive management approach.

The Service and APHIS/WS fully recognize the controversial nature of DCCO management, and the range of values reflected in public and professional views about best management actions. Management of abundant wildlife populations is a particularly challenging aspect of wildlife conservation, one that demands that decision- makers consider a number of important biological and socioeconomic factors. This DEIS has attempted to reflect full consideration of the diverse views brought forth during public scoping and to provide an analytical foundation on which to base final management decisions. As a public agency, the Service recognizes the importance of social, political, and economic factors in policy decision-making, but emphasizes that the foundation of the Service's mission is fish and wildlife biology. Thus we are committed to pursuing management strategies that are biologically justified based on the best available science (USFWS 1998a).

1.3 Need for Action

1.3.1 Biological

The recent increase in the North American DCCO population has been well-documented (cf. Scharf and Shugart 1981, Milton and Austin-Smith 1983, Buckley and Buckley 1984, Hatch 1984, Ludwig 1984, Blokpoel and Harfenist 1986, Price and Weseloh 1986, Roney 1986, Craven and Lev 1987, Hobson et al. 1989, Hatch 1995, Weseloh et al. 1995, Glahn et al. 1999, Tyson et al. 1999, Hatch and Weseloh 1999). Wires et al. (2001) and Jackson and Jackson (1995) have suggested that the current DCCO resurgence may be, at least in part, a population recovery following years of DDT-induced reproductive suppression. Nonetheless, there appears to be a correlation between increasing DCCO populations and growing concern about associated negative impacts, thus creating a very real management need to address those concerns. Significant biological concerns expressed include impacts to other bird species through habitat destruction, exclusion, and/or nest competition; declines in fish populations associated with DCCO predation; impacts to vegetation, particularly where DCCOs nest; and impacts to populations of Federally-listed fish species. The occurrence and severity of these impacts varies from region to region. They are discussed in further detail in Chapter 3, AFFECTED ENVIRONMENT.

1.3.2 Socioeconomic

While cormorant-human conflicts are not new, from either a historical or a global perspective (Siegel-Causey 1999; Hatch 1995, van Eerden et al. 1995, Wires et al. 2001), the DCCO's rapid increase in numbers over the past 25 years has exacerbated resource conflicts in regions of North America to a level deemed unacceptable to many stakeholders. Socioeconomic concerns expressed include adverse impacts to aquaculture producers and fishing-related businesses; losses to private property interests (including fish in private lakes and damaged trees); impacts to recreational fisheries; and impacts to human health caused by high concentrations of DCCOs. As with biological impacts, the occurrence and severity of these impacts varies from region to region. They are discussed in further detail in Chapter 3, AFFECTED ENVIRONMENT.

1.4 Background

1.4.1 USDI Fish and Wildlife Service

The primary responsibility of the U.S. Department of Interior Fish and Wildlife Service ("Service" or "we") is fish, wildlife, and plant conservation. Our mission is "working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." While the Service's responsibilities are shared with other Federal, State, Tribal, and local entities, we have special authorities in managing and conserving the National Wildlife Refuge System, migratory birds, endangered species, certain marine mammals, and nationally significant fisheries, and in enforcing Federal wildlife laws.

1.4.2 USDA Animal and Plant Health Inspection Service-Wildlife Services

The Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS/WS) is responsible for managing conflicts with and damages caused by wildlife, including migratory birds. APHIS/WS' mission is to "provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety." This is accomplished through: training of wildlife damage management professionals;

development and improvement of strategies to reduce economic losses and threats to humans from wildlife; collection, evaluation, and dissemination of management information; cooperative wildlife damage management programs; informing and educating the public on how to reduce wildlife damage and; providing data and a source for limited use management materials and equipment, including pesticides (USDA-APHIS 1989).

1.4.3 Policy, Authority, and Legal Compliance

Migratory Bird Treaty Act of 1918, as amended (U.S.C. 703-711: 40 Stat. 755).
The Service has the primary statutory authority to manage migratory bird populations in the United States, authority which comes from the Migratory Bird Treaty Act (MBTA; U.S.C. 703-711: 40 Stat. 755). The original treaty was signed by the U.S. and Great Britain (on behalf of Canada) in 1918 and imposed certain obligations on the U.S. for the conservation of migratory birds, including the responsibilities to: conserve and manage migratory birds internationally; sustain healthy migratory bird populations for consumptive and non-consumptive uses; and restore depleted populations of migratory birds. Conventions with Mexico, Japan, and Russia occurred in later years. The cormorant taxonomic family, *Phalacrocoracidae*, and 31 other families were added to the List of Migratory Birds (that is, those bird species protected by the MBTA) in 1972 as a result of an amendment to the 1936 "Convention between the United States of America and the United Mexican States for the Protection of Migratory Birds and Game Mammals" (23 U.S.T. 260, T.I.A.S. 7302). Thus, since 1972, DCCOs have been a trust resource managed by the Service for the American people under the authority of the MBTA.

Animal Damage Control Act of 1931 and Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (7 U.S.C. 426-426c; 46 Stat. 1468).
The U.S. Department of Agriculture is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the APHIS/WS program is the Animal Damage Control Act of March 2,1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides 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, APHIS/WS policies and 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 mandate of APHIS/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 mammal and bird 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."

Endangered Species Act (ESA), as amended (7 U.S.C. 136; 16 U.S.C. 460 et seq.).
It is federal policy, under the ESA, that all Federal agencies seek to conserve threatened and endangered species and utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). In accordance with section 7 of the Act, the Service is preparing a Biological Assessment to evaluate federally-listed species that may be affected by the proposed action.

National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321-4347). NEPA is our basic national charter for protection of the environment; it requires Federal agencies to evaluate the potential environmental impacts when planning a major Federal action and ensures that environmental information is available to public officials and citizens before decisions are made and before actions are taken.

In general, the NEPA process entails: determining what need must be addressed; identifying alternative ways of meeting the need; analyzing the environmental impacts of each alternative; and deciding which alternative to pursue and how. While NEPA does not place environmental protection over all other public values, it does require a thorough consideration of the environmental impacts associated with management actions. NEPA neither requires a particular outcome nor that the "environmentally-best" alternative is selected. It mandates a process for thoroughly considering what an action may do to the human environment and how any adverse impacts can be mitigated (http://npi.org/nepa/process.html).

More specifically, there are seven major steps in the planning process for the development of an EIS and the implementation of the proposed action. These include:
1). Publication of Notice of Intent – The Notice of Intent to prepare an Environmental Impact Statement and national cormorant management plan was published in the Federal Register (64 FR 60826) on November 8, 1999. This initiated the scoping process.

2). Identification of Issues and Concerns – The Notice of Intent solicited public participation in the scoping process, which is the chief way that issues, concerns, and potential management options are communicated from the public to the lead agency. In addition to writing or e-mailing comments, citizens could attend any of twelve public meetings held across the country. The scoping period ended on June 30, 2000. All comments were read, compiled, and summarized in a public scoping report (see Appendix 2).

3). Development of Alternatives – Following scoping, six alternatives were developed to offer a range of options for managing DCCOs. These were based on NEPA regulations, public comments, interagency meetings, internal discussion, and review of available scientific information.

4). Analysis of Environmental Effects – After significant issues and alternatives were established, the environmental analysis was prepared in order to help the public and decision-makers understand the environmental consequences of the various alternatives.

5). Publication of Notice of Availability of Draft Environmental Impact Statement – This Federal Register publication announces the completion of the DEIS and its availability for public review. It is typically followed by a 60-day comment period during which several public meetings are held.

6). Publication of Notice of Availability of Final Environmental Impact Statement – This Federal Register publication follows the public comment period for the DEIS and announces the completion of the Final EIS, followed by a 30-day waiting period.

7). Publication of Record of Decision and National Management Plan – This is the final step of the EIS decision-making process, which states the selected alternative and why it was chosen. The actions associated with the EIS cannot be taken until the Record of Decision is issued.

Environmental Justice and Executive Order 12898. Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status.

Executive Order 13186. Executive Order 13186, entitled "Responsibilities of Federal Agencies to Protect Migratory Birds," directs any Federal agency whose actions have a measurable negative impact on migratory bird populations to develop a memorandum of understanding with the Fish and Wildlife Service to promote conservation of migratory birds. The MOUs would establish protocols to guide future agency regulatory actions and policy decisions; renewal of permits, contracts or other agreements; and the creation of or revisions to land management plans. The EO also requires the Secretary of Interior to establish a Council for the Conservation of Migratory Birds to oversee implementation of the EO. The council will be composed of representatives from the Department of Interior; the Departments of Commerce, Agriculture, State, Transportation, Energy, and Defense; the Environmental Protection Agency; and other agencies as appropriate.

1.4.4 Current Cormorant Management Practices of the Service and APHIS/WS

Depredation Permits. While the Migratory Bird Treaty Act (MBTA) provides migratory birds with protection from unauthorized take, it maintains a high degree of flexibility for dealing with human-bird conflicts (Trapp et al. 1995). According to the MBTA, the "take" of DCCOs is strictly prohibited except as allowed under the terms of a migratory bird permit.

Regulations governing permit issuance for migratory birds are authorized by the MBTA and subsequent regulations (50 CFR Parts 13 and 21). Specifically, Part 21.41 of Subpart D of these regulations outlines procedures for issuing permits for the control of depredating birds. These regulations state that all private individuals, organizations, and Federal and State agencies seeking to control migratory birds must file an application for a depredation permit that contains the following information: (1) a description of the area where depredations are occurring; (2) the nature of the crops or other interests being injured; (3) the extent of such injury; and (4) the particular species of migratory birds committing the injury. Thus, Part 21.41 authorizes the take of migratory birds which are injuring "crops or other interests." In issuing depredation permits, the Service has historically interpreted "other interests" to mean threatened and endangered species, property damage on private or public land, and human health and safety. Depredation permits to take DCCOs have been issued by the Service since 1986 and may allow the take of eggs, adults and young, or active nests.

APHIS/WS typically responds to requests for assistance with bird depredation and damage by collecting information on the type of resource being damaged, where the damage is occurring, the number and species of birds responsible for the damage, the economic losses resulting from the damage, and the control methods which have been used in attempt to resolve the damage. Based upon these evaluations, APHIS/WS personnel recommend an Integrated Damage Management approach for resolving bird depredation and damage conflicts, which could include providing recommendations to the Service for issuance of a depredation permit. While APHIS/WS provides recommendations to the Service for the issuance of migratory bird depredation permits to private entities in the cases of severe bird depredation and damage (Mastrangelo et al. 1997), the responsibility of issuing these permits rests solely with the Service (Trapp et al 1995).

APHIS/WS maintains a Management Information System (MIS) database documenting the assistance that the agency provides in resolving wildlife damage conflicts. A review of MIS data collected from 1995-1999 revealed that Wildlife Services responded to 1,196 technical assistance requests ("the provision of advice, recommendations, information, or materials for use in managing wildlife damage problems" [USDA-APHIS 1997b]) to reduce DCCO conflicts in 39 States, with Alabama, Arkansas, Florida, Mississippi, and Texas representing 60 percent of the requests over the 5-year period. MIS resource categories included *aquaculture* (commercially propagated finfish and shellfish) with 72 percent of technical assistance requests; *property* (structures, boats, automobiles, aircraft, pets, timber/trees) with 18 percent of requests; *natural resources* (habitat, wildlife, wild fisheries) with 7 percent of requests; and *human health and safety* (disease transmission to humans, wildlife aircraft strikes, direct personal injury) with 3 percent of requests. Of those 1,196 requests, APHIS/WS recommended the issuance of 414 depredation permits to the USFWS, of which over 97 percent were for the protection of aquaculture and natural resources.

Depredation Order. In 1998, the Service issued a Depredation Order (USFWS 1998b; 50 CFR 21.47) authorizing commercial freshwater aquaculture producers in 13 States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Minnesota, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas) to take DCCOs, without a Federal permit, when found committing or about to commit depredations to aquaculture stocks. The Depredation Order states that DCCOs may be taken by shooting only during daylight hours, and only when necessary to protect freshwater commercial aquaculture and State-operated hatchery stocks and that such actions must be carried out in conjunction with a non-lethal harassment program certified by APHIS/WS officials.

Research and Population Surveys. Prior to 1950, the U.S. Biological Survey (predecessor of the Fish and Wildlife Service) conducted extensive food habits studies on DCCOs and other fish-eating birds across the continent, with particular emphasis on potential economic impacts. More recently, the Service has conducted or helped fund several site-specific studies of cormorant food habits in areas such as the Penobscot River and upper Penobscot Bay, Maine; Les Cheneaux Islands, Michigan; and the Mississippi River Delta, Mississippi. In 1999, the Service provided funding for a DCCO population status assessment to be prepared by researchers from the University of Minnesota and utilized in the development of this EIS (Wires et al. 2001).

The Service has in many cases issued permits to State agencies or university scientists to collect DCCOs for the purpose of gathering diet information and/or assessing their impacts on fish populations. For example, the Migratory Bird Permit Office in Portland, Oregon has issued scientific permits to researchers from Oregon State University to take DCCOs from the Columbia River Estuary for the purpose of estimating the proportion of salmonid smolts in their diet.

DCCO population monitoring is carried out cooperatively by the Service, APHIS/WS, the Canadian Wildlife Service, the States, and various universities. USGS (Patuxent Wildlife Research Center) and non-governmental organizations such as the National Audubon Society and the Cornell Laboratory of Ornithology participate in recording and analyzing the population data. The various types of surveys include the Great Lakes Colonial Waterbird Survey, Atlantic Coast Colonial Waterbird Survey, winter roost surveys, Christmas Bird Counts, and Breeding Bird Surveys.

Additionally, the APHIS/WS National Wildlife Research Center is involved in a variety of DCCO research projects, including controlled experiments to assess DCCO impacts to gross catfish production; a two-year satellite telemetry study in Alabama, Arkansas, Louisiana, and Mississippi aimed at monitoring migratory movements of DCCOs captured at aquaculture areas; a two-year satellite telemetry study in eastern Lake Ontario (in cooperation with the New York State Department of Environmental Conservation) aimed at assessing the efficacy of control activities at the Little Galloo Island breeding colony in eastern Lake Ontario; development of a deterministic population model for DCCOs; and preparation of a report titled "A Science-Based Initiative to Manage Double-Crested Cormorant Damage to Southern Aquaculture."

Information and Education Outreach. The Service participates in outreach activities to respond to public concerns and to educate the public about DCCOs. In 1998, the Service's Division of Migratory Bird Management developed a fact sheet on DCCOs, and placed it on its website at: migratorybirds.fws.gov/issues/cormorant/cormorant.html. Subsequently, the cormorant subcommittee of the Service's Great Lakes Ecosystem Team, with involvement by State fish and wildlife agency personnel, has produced a cormorant fact sheet series. Additionally, the Service provided funding and production assistance to New York Sea Grant to produce the video "Managing Cormorants in the Great Lakes."

Service personnel have attended numerous public workshops pertaining to DCCOs and their management, often participating with State fish and wildlife agency personnel. In 1997, the Service, together with APHIS/WS, organized a symposium on the biology and management of DCCOs in the Midwest and published the proceedings (Tobin 2000). In November of 2000, the Service cooperated with

University of Minnesota researchers in putting together a one-day workshop on the DCCO-fisheries conflict, which brought together biologists and managers from around the nation and the world. Service personnel have also accepted many invitations to speak to citizens around the country who are interested in cormorants and the Service's role in managing migratory birds.

1.4.5 Other Agency Involvement in DCCO Management

Because DCCOs fall under the authority of Federal legislation (MBTA), the Service has the primary responsibility for establishing management policy for cormorants. However, the States are actively engaged in the management of DCCOs through research activities and the implementation of management activities that are authorized by the Service. In addition to their status under the MBTA, DCCOs are protected by migratory bird legislation in many States.

Control Activities. A survey completed by Wires et al. (2001) found that 10 States (out of 37 States and provinces that responded to the survey) reported the use of DCCO control methods. Six of the States employing control measures were in the southern U.S.; these States were conducting control programs because of depredations at aquaculture facilities and fish hatcheries. All of these States incorporated lethal and non-lethal control measures. In the Northeast, New York and Vermont are employing control measures due to habitat destruction and impacts to other colonial waterbirds in the Great Lakes. Massachusetts has undertaken limited control measures at specific sites. Additionally, the State of Oregon conducts harassment programs along the Oregon coast annually.

Table 1. States Practicing DCCO Control (from Wires et al. 2001)

State	Lethal measures	Non-lethal measures
AL	Shooting	Harassment
AR	Shooting	Harassment, noise-making, decoys
LA	Shooting	Multiple harassment techniques
MA	None	Harassment
MS	Shooting	Harassment; Night roost dispersal program
NY	Egg destruction, egg oiling	Nest destruction
OK	Shooting	Hazing
TX	Shooting	Harassment
VA	Yes[1]	Yes[1]
VT	Egg oiling	Harassment; nest destruction

1 Both lethal and non-lethal measures are undertaken, but details on specific measures employed were not provided.

DCCOs also occur in Canada and Mexico. In Canada, DCCOs are not protected federally and thus are managed at the provincial level. As in the U.S., Canadian DCCO populations are generally increasing. We are currently unaware of any Mexican involvement in management of DCCOs. The precise status of DCCO populations in Mexico is unknown but probably stable (Wires et al. 2001).

1.5 Scoping and Public Involvement

1.5.1 Public involvement

On November 8, 1999, we published a Notice of Intent to prepare an Environmental Impact Statement and national management plan for the DCCO in the Federal Register (64 FR 60826). The notice solicited public participation in the scoping process. Scoping is the initial stage of the EIS process used to identify issues, alternatives, and impacts to be addressed in the NEPA analysis. A Notice of Meetings was subsequently published in the Federal Register (65 FR 20194) on April 14, 2000, to announce twelve public scoping meetings. See Appendix 2 for dates and locations of these meetings. Public comments were accepted from the date of publication of the Notice of Intent on November 8, 1999 until June 30, 2000. Over 900 people attended the public scoping meetings (of which 329 gave verbal testimony) and over 1,450 submitted written comments, either electronically (to cormorant_eis@fws.gov) or by mail.

1.5.2 Issues of Concern and Management Options Identified During Scoping

A majority of the public comments expressed concern over negative impacts associated with DCCOs, especially those relating to sport fisheries (38.7 percent). Some individuals suggested that other reasons for fisheries declines should be examined instead of "scapegoating" cormorants. See Table 1 for issues of concern.

Table 2. Issues of Concern and Where Addressed in DEIS

Issue of Concern	**Where Addressed in DEIS**	**Number of comments**
impacts to recreational fishing	Biological Environment: Fish	673
DCCOs are being scapegoated	Biological Environment	218
impacts to local economies	Socioeconomic Environment: Economics	149
impacts to vegetation	Biological Environment: Vegetation	95
excessive DCCO excrement	Socioeconomic Environment: Water Quality and Human Health	82
private property damage	Socioeconomic Environment: Property Losses	76
DCCO population increasing rapidly	Biological Environment	72

impacts to commercial aquaculture	Socioeconomic Environment: Economics	58
impacts to human health and safety	Socioeconomic Environment: Water Quality and Human Health	52
DCCOs causing ecological imbalance	Biological Environment	43
impacts to birds that coexist with DCCOs	Biological Environment: Other Birds	37
DCCOs are not native	Biological Environment	24
impacts to commercial fishing	1.5.3d	~15

However, not all of these concerns were considered by the Service to be significant or were capable of being analyzed in terms of environmental effects. NEPA regulations state that only "significant" impacts be analyzed (43 FR 55994§1502.2a). Determination of significance was based on professional judgment, interagency discussions, knowledge gained from DCCO research, and public involvement.

Management options and suggestions included: controlling DCCO populations, removing DCCOs from MBTA protection, hunting DCCOs, focusing on non-lethal control, letting States manage DCCOs, changing the depredation permit policy, oiling eggs, giving APHIS/WS more authority, basing decisions on the best science, using population objectives, and increasing education efforts. NEPA regulations state that only "reasonable" alternatives be evaluated (43 FR 55994§1502.14a). Determination of reasonableness was based on professional judgment and interagency discussions.

In addition to citizen input, twenty seven States provided comments during the public scoping period. Fourteen States (Connecticut, Georgia, Indiana, Iowa, Nebraska, New Hampshire, New York, North Dakota, Ohio, Oklahoma, Rhode Island, Texas, Vermont, Wyoming) expressed a desire for increased flexibility/increased State input in managing cormorants. Twenty-three States (Arizona, Connecticut, Georgia, Illinois, Indiana, Iowa, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, North Dakota, New York, Ohio, Oklahoma, Oregon, Rhode Island, Texas, Vermont, Wisconsin, Wyoming) stated or implied that, under certain conditions (e.g., evidence pointing toward a problem, displacement of other colonial nesting birds, impacts on natural systems, etc.), increased control

should be considered. Five States (Arizona, Minnesota, New Hampshire, North Dakota, South Dakota) stated that they currently have no real problems with DCCOs. Additionally, we received comments from four Canadian agencies whose concerns included potential impacts of management actions on Great Cormorant populations (Nova Scotia) and on declining western DCCO populations (British Columbia).

1.5.3 Issues Raised, but Eliminated from Detailed Study

1.5.3a Air and Soil

There are no significant impacts to air quality associated with DCCOs and none of the potential management actions would affect air quality.

Service biologists conducted sampling of soil/guano beneath DCCO nest trees on islands in Green Bay in 1987 and 1988 and found elevated PCB and DDE levels (Dale and Stromborg 1993). In 1999, soil/guano samples carried out by a private consulting firm found high levels of PCBs, DDE, and mercury on Little Galloo Island (LGI) in the eastern Lake Ontario waters of New York, home of one of North America's largest DCCO colonies and greater than 55,000 Ring-Billed Gulls (Anon. 1999; J. Farquhar, NYSDEC, pers. comm). The report showed that, from a limited pool of soil samples, PCBs, DDE, and mercury were detected in levels below that for an "inactive Hazardous Waste Site" designation, but in three samples levels did exceed the thresholds recommended for an "unlimited human use" designation (such as a playground for children). However, human use of LGI, and most other DCCO colony sites, is very limited. Greater numbers of samples are necessary to draw more scientifically accurate conclusions about soil contaminant levels at LGI and other areas where DCCO excrement accumulates. Currently, there is not enough information to evaluate DCCO management alternatives in regard to this impact area.

1.5.3b Aircraft Damage and Safety

Wildlife-aircraft interactions may result in loss of human life and/or injury to passengers or people on the ground. The risk that birds pose to aircraft is well documented with the worst case reported in Boston in 1960 when 62 people were killed in the crash of an airliner which collided with a flock of starlings (Terres 1980). Wildlife strikes may cause expensive structural and mechanical damage to aircraft even if they do not result in a crash (Blokpoel 1976; Cleary et al.1997). In the United States in 1994, the estimated cost of bird strikes to military aircraft was $112 million (Conover et al. 1995). The cost of wildlife aircraft strikes to civil aviation for 1990-1998 in the United States was estimated to be in excess of 461,165 hours/year in aircraft down time, $253.02 million/year in direct monetary losses, and $132.96 million/year in associated costs (Cleary et al. 1999). Associated costs include passenger delays, labor, parts, and costs associated with emergency services and ferrying damaged aircraft to repair facilities.

All birds are potentially hazardous to aircraft and human safety; however, DCCOs typically do not forage or loaf in abundance near airports, making them less likely to be involved in collisions (USDA-APHIS 1999). According to the Federal Aviation Administration's Bird Strike Database, there were a total of 26,644 reported bird strikes to civil aircraft in the U.S. from 1990 - 2000, with 16 of the strikes involving cormorants. Of these 16 strikes, 3 were classified as minor and resulted in wing damage to the aircraft, 2 were classified as substantial requiring major repair and grounding of the aircraft, and 11 were reported as strikes with no damage/reported damage to aircraft. The risk to aircraft safety associated with DCCOs is low and not considered to be a significant impact area. Current depredation permit practices allow for DCCO control when necessary to ensure aircraft safety.

1.5.3c Affected Human Communities

Social impacts refer to changes in the affected area's customary condition of the human environment. Specifically, this refers to changes in the way people live, work, play, and relate to one another. A large part of the concern caused by DCCOs stems from alterations in the "way of life" that is familiar to those who live or recreate in areas where DCCO numbers are increasing. For example, residents of and visitors to the Great Lakes region view outdoor recreation not only as a quality of life issue, but as a "way of life" (USFWS 1995). Declines in the quality of sport fishing in these and other areas are a major concern as is evidenced by the level of participation from anglers in the public scoping process.

Tribes. Based on responses received during the public scoping period, DCCOs do not appear to be a significant issue for Native American Tribes. We received three letters from Tribes or members of Tribes: (1) a member of the Kiowa Tribe of the State of Oklahoma felt that since waterbirds are sacred, they should be given to Tribal people for use in their native ceremonies; (2) the White Mountain Apache Tribe of Arizona recommended that we use a hunting season to manage DCCOs; and (3) a Conservation Officer from the Wampanoag Tribe of Gay Head (of southeastern Massachusetts) said that they have experienced some trouble with DCCOs roosting on the Tribal Shellfish Aquaculture Program's spawning/rearing cages and recommended limited hunting.

In the Great Lakes, fish are valuable economically and as an important food supply for a number of Native American Tribes who engage in commercial and subsistence fishing, particularly in Lake Superior and northern Lakes Michigan and Huron. For example, the Chippewa/Ottawa Indians annually harvest an average of 1.1 million kg (2.4 million pounds) from their Lake Michigan commercial lake trout fishery (USFWS 1995). However, we did not receive comments during scoping from regional Tribes expressing concern about DCCO impacts. No scientific evidence has implicated DCCOs as having a major negative impact on lake trout reintroduction in the Great Lakes, although they have been known to consume stocked smolts (USFWS 1995). But see section 3.2.3 for Tribal Environmental Justice considerations.

Non-tribal communities. Potentially affected human communities occur anywhere DCCOs and people coexist. Of particular concern are areas where DCCOs are abundant and viewed as a nuisance.

Schusler and Decker (2000) characterized the Henderson Harbor community of New York's eastern Lake Ontario region, an area near the largest DCCO colony in the Great Lakes (Little Galloo Island), as relying heavily on recreation and tourism associated with fishing and hunting. Interviewees described the region as "rural, politically conservative, economically depressed, and ecologically rich." They stated that the residents are "provincial and don't want to see major changes... While they're not anti-progress, they would like to see many qualities of the community stay as they have been for the last 100 years." In a letter to the New York State Department of Environmental Conservation, the Henderson Harbor Chamber of Commerce stated that "The [cormorant] impact on the smallmouth bass fishery has been enormous, and this has both biological and economic implications for the people of this region and the state in general. A native species of fish is threatened. But also, a way of life for the communities bordering the affected area is also threatened" (Cited in NYSDEC 2000). Indeed, this issue is of particular concern in communities where the recreational and economic effects of declining fisheries lead to undesirable sociocultural changes. We received a number of scoping comments expressing concerns about negative cultural impacts such as young people losing a safe and healthy form of recreation, retired citizens no longer being able to enjoy their favorite pastime, and parents losing the opportunity to pass on recreational knowledge to their children. Unfortunately, research on the sociocultural impacts associated with changes in a community's recreational patterns is limited and it would be very difficult to analyze the effects of DCCO management alternatives on this impact area in a meaningful way.

1.5.3d Commercial Fishing

Historically, impacts to open water commercial fish stocks were one of the more prevalent problems associated with DCCOs (cf. Mendall 1936). While concerns about declines in open water commercial fisheries are shadowed by concerns about negative impacts to recreational fisheries and aquacultural stocks, they do still exist. For example, in a March 2000 letter, the State of Maine Department of Marine Resources stated that, "During the past 20 years, alewife runs have declined dramatically. Of the 34 rivers and streams that have supported commercial alewife fisheries, only eight continue to support commercial harvests. The remainder have been closed to harvest for almost a decade to allow rebuilding of the runs. In spite of closures, these runs continue to remain at low levels. Every spring, large concentrations of cormorants are observed in the upper estuaries of rivers that support alewife runs. We believe that cormorant predation on these low level spawning runs is very high and may be having significant impacts on the ability of these stocks to recover to former levels of historical abundance."

Additionally, the States of Maine, New York, and Rhode Island each expressed concern about potential impacts to the commercial winter flounder fishery by DCCOs. For example, the Rhode Island Division of Fish and Wildlife stated that, "significant anecdotal information exists regarding severe predation of juvenile winter flounder in coastal salt ponds and all near-shore marine waters of the state."

Blackwell et al. (1995) noted that examinations of DCCO diet in a variety of habitats have shown that primary prey species are fish of little or no commercial value and cited several studies that confirm this notion (e.g., Taverner 1915; Lewis 1929; Mendall 1934, 1936; Milton and Austin-Smith 1983; Pilon et al. 1983; Craven and Lev 1987; Milton et al. 1988; Hobson et al. 1989; Weseloh and Ewins 1994). They pointed out that commercial groundfish populations (Gadidae, Bothidae, and Pleuronectidae) in the Gulf of Maine have declined drastically, probably due to increasing exploitation since the 1960s (Blackwell et al. 1995). Additionally, as groundfish populations have decreased, cartilaginous fishes(Squalidae and Rajidae) have filled their ecological niches, thereby adding competition to the other factors threatening their numbers (Blackwell et al. 1995). Thus, groundfish species such as flounders and Atlantic cod, which were present in Mendall's (1934, 1936) DCCO diet data in the same area (Penobscot Bay), were noticeably absent from Blackwell et al.'s (1995) list of highest ranking prey species.

In the Great Lakes, overfishing, pollution, shoreline and stream habitat destruction, and introduction of exotic species have all contributed to the decline of commercial fisheries (EPA 1995). Today, commercial fishing activity in the U.S. Great Lakes is highest in Lake Erie and northern Lake Michigan (Hebert et al. 1999). Commercially exploited fish species include lake trout, lake whitefish, smelt, bloater chubs, perch, and alewife (EPA 1995, Crane 1996). Commercial fishing continues to face pressure on several fronts, including toxic contaminants, pressure by sport fishing groups to limit commercial catch, and restricted harvest methods (EPA 1995). Commercial fish generally do not appear to make up a significant part of DCCO diet, as the following studies suggest:

- Ludwig et al. (1989) examined 8,512 regurgitated DCCO food items from Lakes Huron, Michigan, and Superior and did not find any lake trout or common whitefish, two commercially important species. Fish species of local commercial importance constituted 12 percent by number (34 percent by weight) of these food items, including yellow perch (13 percent by weight), smelt (8 percent by weight), and sucker (7 percent by weight).
- In the Apostle Islands of Lake Superior, Wisconsin, there was a concern in the mid-1980s that DCCOs were feeding heavily on commercially valuable whitefish. A subsequent study showed that the diet consisted primarily of forage fish such as sticklebacks, burbot, sculpins, and chubs. No more than 3 percent of the fish eaten by DCCOs were whitefish (Craven and Lev 1987).
- A study conducted in western Lake Erie found that DCCO diet primarily consisted of gizzard shad, emerald shiner, and freshwater drum, suggesting that impacts of DCCOs at current population levels were not detrimental to sport and commercial fishing (Bur et al. 1999).

Work with the Great Cormorant in Europe has not found evidence of significant impacts to commercial fisheries. On a lake in southern Germany, Keller (1995) found that the total catch of whitefish by Great Cormorants amounted to just 3.2 percent of the total commercial catch of this species. Larger consumption rates were found for other commercial species such as eel (22.3 percent) and pike (6.2 percent). It was estimated that cormorants took 3.3 percent of total annual fish production, while commercial fishermen took 28 percent.

In Sweden, Great Cormorants are viewed as a problem by commercial fishermen, mainly because they injure or consume fish in fishing gears (Engström 1998). In studies carried out on six lakes and one coastal area, Engström (1998) found that fishermen may encounter, at most, an average of 8 percent (by weight) of fish damaged by cormorant predation. How much fish was removed from the fishing gear by cormorants was not known, but it was determined to be most likely that such predation affected smaller fish species of lesser economic value. Engström (2000) also found that commercially important species such as eel and pikeperch were absent or made up only a very small part (0.2 percent) of the diet of cormorants in a lake in south-central Sweden and that, for pikeperch, there was no evidence showing that

such small out take would have a negative impact on commercial yields. Examples of DCCO-induced damage to commercial catches in the Great Lakes also exist. One commercial fishermen reported that he no longer fishes his pound nets in the spring because DCCOs chase the whitefish in the pots and spear many of them, lowering the market quality of the catch. Trap net fishers also experience DCCO damage to fish in the pot, but to a much lesser degree since the pot is submerged (S. Lewis, USFWS, pers. comm.).

Wires et al. (2001) noted that "Where cormorants are consuming commercial fishes, isolating the role of cormorant predation relative to other sources of mortality is difficult. Thus the magnitude of impact due to cormorant predation is often unknown." We feel that, at this time, there is no sufficient scientific evidence to justify controlling DCCOs on a national level to benefit open water commercial fisheries. Where site-specific problems are significant, the Service's practice is, and will continue to be, to issue depredation permits to alleviate impacts.

1.5.3e Historic and Cultural Resources

"Historic and cultural" aspects of the environment generally include historic properties, other culturally valued pieces of real property, cultural use of the biophysical environment, and such "intangible" sociocultural attributes as social cohesion, social institutions, lifeways, religious practices, and other cultural institutions (http://npi.org/nepa/whatare.html). These could include:

- Historic sites, buildings, districts, structures, and objects with historic, architectural, archeological, engineering, and cultural values.

- Historical objects such as the equipment that might be found in a surplus industrial facility, objects found at or excavated from an archeological site, and objects associated with the history and culture of an Indian Tribe or Native Hawaiian group.

- Documents with historic, folkloric, or archeological significance.

- Places of traditional religious or cultural importance to an Indian Tribe or Native Hawaiian organization.

- Locations regarded by a community or neighborhood, or others, as contributing to its "sense of place."

- The traditional religious and cultural practices of a community, neighborhood, Indian Tribe, or Native Hawaiian group (http://gsa.gov/pbs/pt/call-in/envbook/page41.htm).

For the most part, the effects of DCCO populations or management actions related to them would have very minor, if any, impacts on these types of resources. Control activities are not anticipated to have any significant negative impacts on historic sites or other resources. In the cultural category, three issues of concern have been raised: 1) cormorants are considered "sacred" to some Native American Tribes, 2) the religious practice of abstaining from work on Sundays (i.e., observing the "Sabbath") is inhibited by the need to patrol aquaculture ponds seven days a week to protect them from DCCO depredation, and 3) popular fishing areas could be considered an important part of a specific area's "sense of place" and DCCOs are viewed by some members of the public as inhibiting that value. Presumably, some Tribes would disagree with killing DCCOs, while the latter two cultural concerns would be alleviated by control actions that contributed to less DCCO presence. Due to lack of empirical information, a full analysis of these concerns is not possible.