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Double-Crested Cormorants in the Midwest: Symposium Summary

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Overview

Populations of double-crested cormorants (DCCO's, *Phalacrocorax auritus)* have increased dramatically in North America during the past 2 decades (1978–98), especially in the Great Lakes region and Southeastern United States. Concern about the impact, real or imagined, of DCCO's on economics and ecosystem health has risen in parallel to the increase in cormorant numbers.

A daylong symposium on this subject was opened by Stephen Lewis and D. V. (Chip) Weseloh, who introduced the audience to the general problems associated with cormorants in the Midwest. The moderators identified the following symposium objectives: (1) to provide current information on the status and biology of the DCCO; (2) to review scientific evidence related to the impacts of cormorants on sport fish, aquaculture operations, vegetation, and other colonial waterbirds; (3) to discuss options available to resolve human–cormorant conflicts; (4) to identify information needs (monitoring and research) related to cormorant management; and (5) to enhance communication and coordination among all entities concerned about cormorants and the resources they potentially affect.

Douglas Siegel–Causey's keynote address reviewed the literature on the long history of human–cormorant conflicts, emphasizing morphological and behavioral adaptations of the continental cormorants (e.g., double-crested) that have allowed the birds to utilize otherwise hostile environments, achieve high juvenile and adult survival, and ultimately affect human economic interests.

Siegel–Causey's presentation was followed by a summary of estimates of breeding pairs for *P. auritus* in the United States and Canada. Laura Tyson and colleagues obtained recent data (most since 1994) from published sources and telephone interviews and reported a conservative estimate of 372,000 cormorant pairs nesting in 852 colonies in North America. Although some populations appear to have stabilized or be declining, the number of nesting cormorants in States and Provinces bordering the Great Lakes has increased significantly in the past decade. This increase corresponds to increasing public and agency concern about cormorant management in the Midwest.

Sumner Matteson and colleagues provided an indepth examination of cormorant status and population changes in a single State: Wisconsin. They described the decline of this species from 1950 to 1970 and its rapid recovery in response to population-enhancement efforts. As numbers grew, conservation efforts were replaced by management actions to deter cormorants where they threatened fishery operations.

The next four papers addressed the impacts of DCCO's on sport and commercial fish populations. Glenn Belyea and colleagues studied the effect of cormorants on the yellow perch *(Perca flavescens)* population in northern Lake Huron. The Belyea team determined perch abundance through creel census counts and perch tagging and collected cormorants to study stomach contents. Cormorants accounted for less than 1 percent of the mortality of legal-sized perch (by comparison, summer sport fishing accounted for 2.5 percent). These researchers concluded that cormorant predation had minimal impact on the local perch population.

The next paper, by Robert Ross and James Johnson, reported on an examination of fecal material and more than 4,000 digestive cormorant pellets over a 6-year period to estimate annual predation on sport and other fishes in the eastern basin of Lake Ontario. Ross and Johnson found substantial annual variation in diet composition of cormorants that probably reflects differences in relative abundance of prey fishes over the years. Therefore, cormorant diet may be an important indicator of fish-community changes in the Great Lakes. Ross and Johnson estimated that cormorants consumed 2 million to 5 million pounds of

fish annually in the eastern basin of Lake Ontario; forage fishes accounted for 67 percent of the diet. Cormorant predation on lake trout *(Salvelinus namaycush)* fingerlings was intense within 1 day of release, but overall game fishes were minor components of the diet.

Alteration of stocking practices may measurably reduce predation by cormorants. Michael Bur and Jerrold Belant studied the diet of DCCO's in western Lake Erie to determine diet overlap between cormorants and piscivorous fishes (e.g., walleye *[Stizostedion vitreum]*, and yellow perch). Cormorant diet, determined from regurgitated pellets in colonies, reflected fish species availability. Cormorants and walleyes had similar diets, although cormorants ate larger fish. Bur and Belant suggested that cormorants are not serious competitors with predatory fishes for prey fish resources.

John Trapp and colleagues presented the final paper on cormorant food habits. In response to concerns from anglers, the U.S. Fish and Wildlife Service (FWS) conducted an extensive review of published studies on the impacts of the DCCO on sport-fish populations in North America. The review indicated that fish species valued by sport and commercial anglers make up a small proportion of cormorant diet. The authors also surveyed attitudes of agency personnel toward cormorant population control and found that most respondents did not believe that a strategy of reducing cormorant populations was biologically warranted at this time. FWS recognizes that cormorants have severe economic impacts on private aquaculture producers and favors a cormorant depredation order that would allow farmers in 13 States, mostly in the South, to take DCCO's that are committing or are about to commit depredations upon aquaculture stocks. (FWS issued such an order in March 1998.) Finally, the FWS acknowledges cormorant impacts on other colonial nesting birds and vegetation but recommends issuing a depredation permit on private land only if cormorant impacts lower property, esthetic, or recreational values.

DCCO depredation throughout Southeastern United States has increased over the past several decades. As commercial catfish (Ictaluridae) farming operations have expanded in this region, so has the number of cormorants that winter in this area. The primary winter range of Great Lakes cormorants is the Southeastern United States. Two papers in this symposium reported on the relationship between cormorants and aquaculture in Mississippi. David Reinhold and Charels Sloan evaluated strategies used to reduce cormorant depredation at aquaculture facilities.

The Wildlife Services program of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service plays a major role in reducing cormorant damage. Nonlethal harassment, roost dispersal, and lethal control are used to reduced depredation in Mississippi. Depredation has been lessened by these strategies, but efficiency and compatibility of current methods need improvement. James Glahn and Mark Tobin studied possible effects of Mississippi catfish production on overwinter survival of the DCCO's. They suggested that cormorant exploitation of catfish has increased winter survival and contributed to the population explosion of cormorants reported over the past decade. To test this hypothesis, Glahn and Tobin analyzed monthly changes in body mass of wintering cormorants in the delta region of Mississippi and compared these with birds from areas without extensive aquaculture production. The authors reported that premigratory body masses and omental fat of Mississippi males and females differed from those measured in premigratory birds collected in Alabama at sites remote from catfish production, thus providing support for their hypothesis that southern aquaculture increases survival and fitness of cormorants.

Concerns regarding cormorant economic impacts on sport and commercial fisheries and the aquaculture industry have overshadowed the effect of increasing cormorant numbers on other co-occurring colonial waterbird species and native vegetation at breeding

colony and roost sites. Two papers specifically addressed these issues. Mark Shieldcastle and Larry Martin discussed the impact of cormorants on the vegetation of West Sister Island, Lake Erie, a regionally significant breeding site for approximately 40 percent of herons and egrets nesting in U.S. Great Lakes waters. Following occupation of the island by cormorants, defoliation of trees has increased where heavy nesting and roosting occurred. The authors predicted vegetation changes will parallel those that followed cormorant arrival on nearby East Sister Island, Ontario, possibly decreasing the number of great blue herons *(Ardea herodius)* and black-crowned night-herons *(Nycticorax nycticorax)* at the Ohio site.

Scott Jarvie and colleagues reported on a study in Lake Ontario that used a geographic information system (GIS) to monitor vegetation damage caused by cormorants. The GIS clearly illustrated the relationship between the expanding nesting area of the cormorants and the receding nesting area of the night-herons. The authors predicted that GIS products will be helpful in discussions of local cormorant management.

The final paper in the symposium, which addressed the important issue of cormorant culling, was prepared by Jean Bédard and colleagues and summarized a 5-year DCCO culling program in the St. Lawrence River estuary. Culling began in 1989 and was done in combination with egg spraying (mineral oil). After 4 years, the desired population size was reached, and culling was stopped. Bédard and colleagues suggested that culling should be considered as a last resort whenever softer techniques for population control are not sufficient. They further recommended that population control be based on careful planning done under close scientific supervision, not resolved by sport hunting.

A panel discussion followed the oral presentations. Panel members represented management agencies (John Trapp, FWS; John Harcus, Ontario Ministry of Natural Resources); research (Chuck Madenjian, U.S. Department of the Interior's U.S. Geological Survey, Biological Resources Division); fish interests (Jim Boraski, Ontario Federation of Anglers and Hunters; Hugh Warren, Catfish Farmers of America); and conservation organizations (Noel Cutright, Wisconsin Society for Ornithology). The charge to the panel was discussion of issues related to cormorant population control.

The symposium papers and panel discussion demonstrated the magnitude of the cormorant increase in the Midwest and its impact on economics and ecosystem health. Population growth occurred rapidly in a region with limited historical experience with this species. Because cormorant numbers in the Midwest are linked to changing land use in the Southeastern United States, cormorant-caused problems need to be viewed from a continental perspective although human–cormorant conflicts appear best resolved at the local level. Periodic continental-scale breeding population estimates are needed to evaluate the changing status of this species in North America. Although considerable effort has been invested in studying the effect of cormorants on prey population dynamics, many unanswered questions remain regarding ecosystem impacts of the rapidly expanding cormorant populations in the Midwest, including effects on other colonial nesting species and vegetation.

Conclusion

An important contribution to this symposium was the conclusion by Trapp and colleagues that scientific evidence does not support the contention that cormorants significantly affect sport-fish populations or angler catch. Additionally, agency responses to their survey expressed mixed opinions about cormorant control, and no States provided evidence that increased cormorant populations have affected local economies associated with sport fishing or tourism. Furthermore, no States surveyed have developed public education material on cormorants and the problems they cause. The latter is clearly needed. The Canadian Wildlife Service has produced a Great Lakes Fact Sheet: "The Rise of the Double-Crested Cormorant on the Great

Lakes: Winning the War Against Contaminants" (Weseloh and Collier 1995), which serves as an excellent example of public education available on this species in Ontario. The link between the breeding colonies and wintering areas is vital to understanding population increases in both areas. More information is needed on winter ecology and how it affects the life history of breeding birds. Do cormorants that feed at aquaculture facilities have higher survival, breed earlier, and/or produce more offspring than those that winter in areas remote from catfish farms? As Bédard and colleagues pointed out, many problems of over-abundant wildlife are lurking on the horizon and complex philosophical issues affect control decisions.

This symposium was organized to examine issues related to control of cormorants in the Midwest and ended with general consensus that more data are needed to justify regionwide control efforts. At present, cormorant–human conflicts in the Midwest appear best addressed at the local level on an individual case basis.

Reference Cited

Weseloh, D. V.; Collier, B. 1995. The rise of the double-crested cormorant on the Great Lakes: winning the war against contaminants. Great Lakes Fact Sheet No. En 40–222/2–1995E. Burlington, ON: Environment Canada, Canadian Wildlife Service.