2-12-1989

Fall Food Habits of Double-Crested Cormorants in Arkansas

Albert E. Bivings
USDA/APHIS/ADC

Michael D. Hoy
USDA/APHIS/ADC

Jeffrey W. Jones
USDA/APHIS/ADC

Fall Food Habits of Double-Crested Cormorants in Arkansas'

Albert E. Bivings, Michael D. Hoy, and Jeffery W. Jones

Abstract.--One hundred forty-eight double-crested cormorants (Phalacrocorax auritus) were collected in OctoberDecember 1988. Some were collected while actively feeding, but most were collected at loafing or roosting areas. Of the 135 with fish in them, 79% contained gizzard shad (Dorosoma cepedianum) and 16% contained centrarchids (mostly Lepomus sp.). The rest contained a variety of aquaculture (commercially raised) fish. Fish prey weights were estimated from total length of prey items and use of published length-weight tables. Total weights of prey ranged from 39 to 4558 with a mean of 185g. This was felt to be a conservative estimate of 1/2 daily consumption. Thus, these birds appear to be eating approximately 370g (0.81 lbs.) of fish per day. Potential impact at aquaculture facilities will depend on the value of the crop.

INTRODUCTION

Double-crested cormorants, formerly year**round residents in Arkansas, are a common** migrant **throughout** the state. The last known nest in the **state was observed** in 1951 at Grassy Lake (Hemp**stead** county). Recently, birds have been seen during the summer on Lake Millwood, but no nests were observed. Band returns indicate the principal sources of Arkansas cormorants are from Saskatchewan, Manitoba, Wisconsin, and North and South Dakota (James & Neal 1986).

Commercial fisheries in the Great Lakes regions suffered increasing depredation problems from cormorants during the period 1920-1945 **(Craven** and Lev 1985). Some control measures were initiated in the period between 1946-1950. However, problems subsided as cormorant populations declined approximately 80% in the Great Lakes region from 1950-1978 (Postupalsky 1978). Principal reasons listed for this decline were DDT, DDE, DDD, PCB, other contaminants, and persecution by fishermen (Craven and Lev 1985). These trends have been reversed with a subsequent rise in the populations (Vermeer and Rankin 1984).

The apparent increase in the wintering population of cormorants in the South prompted a study of food habits on Texas reservoirs (Campo, et al. 1988) and this study in Arkansas. The purpose of this study was to attempt to identify and quantify prey items of double-crested cormorants in the fall, when population of both cormorants and aquaculture fish are high.

The authors would like to thank Messrs. Neal Anderson, I.F. Anderson, Bob Goetz, Mike Freeze, Danny Nixon, Howard Hammans, Charles Summerhill, David Yocum, Jerry Williamson, and the many others who assisted this project. Thanks are also due to T. Booth and R. Owens for their support and editorial assistance.

STUDY AREA AND METHODS

• The study was conducted from 18 October through 05 December 1988 in central and southeast Arkansas at various aquaculture facilities.

Prior to collection, each facility was sur veyed to determine the number of birds present and their location. Most cormorants were collected with shotguns, although a few were taken with rifles. Birds were taken either at the feeding site or transiting to or from roosting or loafing sites. Collection of downed birds was simplified by use of trained retrieving dogs.

Cormorant esophagus and stomach contents were removed and prey items taxonomically identified. Fish prey consumed were classified to either genus or species. Prey were counted by species and total length of each was measured to the nearest 6 mil limeters (1/4 inch). Numbers and length of each prey species for each bird were recorded and tab ulated. Mean total length was computed for each prey species consumed. Total weight of prey con sumed was estimated when possible for each sample bird based on published length-weight tables (Carlander 1969).

'Paper presented at the Ninth Great Plains Wildlife Damage Control Workshop. (Colorado State University, Fort Collins, April 18-19, 1989).

2United States Department of Agriculture, **Animal**

RESULTS AND DISCUSSION

During this study, 148 cormorants were collected and examined for esophageal/ stomach contents. Of the 135 with food items (91%), 106 (71.6%) contained gizzard shad (Table 1). Mean number of shad per bird was 4.87 and mean total length of shad was 149 mm (5.85 in.) (Table 2).

Total biomass consumed was calculated for 112 of the 135 with prey items based on our ability to determine prey live weights from existing tables. Total biomass ranged from 39g to 4558 with a mean of 185g per feeding.

The results of this study were similar to those found in Texas (Campo et al. 1988) and Wisconsin (Craven and Lev 1985) in that rough fish were consumed most of the time **and the average** size prey was about 150 mm (5.9 in.). Our study did show a greater reliance on commercially important species in our small December sample (N=15) where 33% of the cormorants contained channel catfish. This indicates a potential seasonal shift to catfish that has been suggested by **catfish pro**ducers. Campo, et al. (1988) noticed a similar decline in shad consumption over time indicated. This may be due to changing shad abundance, vulnerability, or to differential thermal response between shad and aquaculture-species.

Since cormorants were full of fish throughout the day, biomass estimates are felt to approximate 1/2 daily consumption. Similar thoughts were compiled by Campo et al. (1988) and Bennett (1970). Our daily consumption of 370g (0.81 lb.) is greater than the hypothetical estimates developed by Schramm, et al. (1987) in Florida, and similar to observed data from other studies (Campo et al. 1988, Bennett 1971). The maximum value of 9108 (2 lbs.) per day also agrees with Bennett (1971).

While the occurrence of aquaculture fish is low, it is also important to note that several very high value species were identified. The wholesale value of the single grass carp was about $4; while koi are worth $5-10 each. Thus, a small percentage of the population could produce high dollar damage to an individual producer. Also, if there is a shift to commercially important fish later in the winter, mean consumption of 370g (.81 lb.) of fish by the expanding population of wintering cormorants may result in substantial economic impact to southern fish farmers. Furthermore, cormorant predation on spring brood stock could be disastrous. Additional data needs to be collected on spring food habits when cormorant populations are high and shad populations are reduced.

Table 1.--Occurrence of prey species in esophagus/stomach of double-crested cormorants in October - December 1988 in Arkansas.

Prey Species	Number of Birds	Percent of Total
Shad 106	71.6	
Channel Catfish	10	6.8
Bluegill 9	6.1	
Green Sunfish	9	6.1
Golden Shiner	7	4.7
Crappie 3	2.0	
Goldfish 2	1.4	
Koi 1	0.7	
Unidentified Sunfish	1	0.7
Grass Carp 1	0.7	
Unidentified 13	9.0	
		109.8

1Total exceeds 100% because birds had more than 1 prey species.

Table 2.--Mean total length of prey species found in double-crested cormorants October December 1988 in Arkansas.

Species	XTL (mm)
Shad 149	
Channel Catfish	227
Golden Shiner 88	
Goldfish/Koi 140	
Bluegill 195	
Green Sunfish 86	
Grass Carp	178
Crappie 167	

LITERATURE CITED

Bennett, G. W. 1971. Management of lakes and ponds. Van Nostrand Reinhold, New York, New York. 375 pp.

Campo, J. J., B. C. Thompson, J. C. Barron, P. P. Durocher, and S. J. Gutreuter. 1988. Feeding habits of double-crested cormorants wintering in Texas. Texas Parks and Wild. Dep., Fed. Aid. Wildl. Restor. Rep., Proj. W-103-R. 32. pp.

Carlander, K. D. 1969. Handbook of freshwater fishieres biology. Iowa State University Press, Ames, Iowa. 752 pp.

Craven, S. R., and E. Lev. 1985. Double-crested cormorant damage to a commercial fishery in the Apostle Islands, Wisconsin. Proc. 2nd Eastern Wildlife Damage Control Workshop.

James, D. A., and J. C. Neal. 1986. Arkansas birds, their distribution and abundance. Univ. of Arkansas Press, Fayetteville, Arkansas. 402 pp.

Postupalsky, S. 1978. Toxic chemicals and cormorant populations in Great Lakes. Can. Wildl. Serv. Wildl. Toxicol. Div. Rept. No. 40. 25 pp.

Schramm, H. L., Jr., M. W. Collopy, and E. A. Okrah. 1987. Potential problems of bird predation for fish culture in Florida. Prog. Fish-Cult. 49:44-49.

Vermeer, K., and L. Rankin. 1984. Population trends in nesting double-crested and pelagic cormorants in Canada. Murrelet 65 (1):1-9.