Double-Crested Cormorant Predation on Smallmouth Bass and Other Fishes of the Eastern Basin of Lake Ontario

Summary of 2002 Studies

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During the summer of 1998, the New York State Department of Environmental Conservation (NYSDEC) and the United States Geological Survey (USGS) conducted 11 studies designed to evaluate the impact of double-crested cormorant predation on smallmouth bass and other fish populations in the New York waters of the eastern basin of Lake Ontario. The results of the studies (Schneider et al. 1999) provided evidence that cormorant predation on smallmouth bass has been substantial and led to the conclusion that cormorant predation has resulted in a significant decline in the abundance of adult bass and in the quality of the sportfishery.

Based on these studies, the NYSDEC announced a five-year experimental plan for the management of double-crested cormorants and fish populations in eastern Lake Ontario. Complete details of the five-year plan were presented in a March 13, 1999 NYSDEC News Release (copy attached). Important activities conducted in 2002 included reducing the number of successful cormorant nests on Little Galloo Island by oiling eggs to prevent hatching, evaluating the impact of egg oiling on fish consumption by cormorants from the Little Galloo Island colony, and an evaluation of the diet composition and fish consumption by cormorants from colonies on Pigeon and Snake Islands, located in Canadian waters of eastern Lake Ontario.

Two studies, initiated in 2000, to determine the movements of cormorants nesting on Little Galloo, Pigeon and Snake Islands were completed. In cooperation with the US Department of Agriculture's National Wildlife Research Center, a satellite telemetry study of cormorant movements associated with the Little Galloo Island nesting colony was undertaken. Satellite transmitters were attached to nesting cormorants with the objectives of determining nest site fidelity, foraging behavior and migratory behavior. The second study involved placing radio transmitters on nesting cormorants on Little Galloo Island, on Pigeon Island, and on Snake Island to further evaluate nest site fidelity, foraging behavior and movements between Lake Ontario, St.Lawrence River, Oneida Lake and other nearby waters. The abundance of smallmouth bass in the New York waters of eastern Lake Ontario was also monitored in 2002, as in past years.

The purpose of this report is to summarize the 2002 studies and provide additional information, where available, relating to studies conducted from 1998-2001.

Overview of Attached Reports

Cormorant Management Activities in Lake Ontario's Eastern Basin: Farquhar et al (2003) reported on activities conducted by the NYSDEC on four islands in the New York waters of eastern Lake Ontario. Since 1994, a variety of methods have been used to restrict cormorant nesting to Little Galloo Island. In 2002, 156 cormorant nests were removed from Gull Island and 987 from Bass Island between May 6 and July 24. No nests were found on Calf Island.

All cormorant eggs that could be reached from the ground on Little Galloo Island were treated with pure food grade corn oil starting May 7. The oiling process was conducted 6 times, at two week intervals. Oil was applied from a backpack sprayer in sufficient volume to cover the exposed surface of each egg. The number of eggs oiled on each trip ranged from 237 to 9,507. The peak nest count was 4,780 recorded on June 19.

Hatching success for oiled eggs was less than 1%. This meets the objective set in the NYSDEC five-year management plan to reduce the number of successful nests on Little Galloo Island by 90%. An estimated total of 600 chicks fledged on the island in 2002, mostly in

untreated tree nests. Fewer than 50 chicks hatched in treated nests.

Egg oiling continues to be a very effective and relatively inexpensive method of limiting cormorant chick production on Little Galloo Island. Population modeling indicates that egg oiling will need to conducted at least through 2009 to reach the target population of 1500 nesting pairs of cormorants on Little Galloo Island.

Diet Composition and Fish Consumption of Double-Crested Cormorants from the Little Galloo Island Colony of Eastern Lake Ontario in2002: Johnson et al. (2003a) provided diet information for the 2002 season. A total of 1,928 pellets collected between April 6 and October 8 were examined. Alewife (40%), yellow perch (19%), three-spine stickleback (5%), minnows (7%) and pumkinseed (12%) composed over 83% of the diet. Smallmouth bass composed 2.8% of the diet, and increased from 1% during the pre-chick feeding period to 2% during the chick feeding period and to 8% during the post-chick feeding period. A similar pattern was observed in 2000 and 2001.

Cormorants from the Little Galloo colony consumed an estimated 16.98 million fish with a total weight of 1.67 million pounds during 2002. Forage fish (9.66 million) dominated the diet with the primary species being alewife, cyprinids, three-spine stickleback, slimy sculpin and trout perch. Cormorants consumed an estimated 6.52 million panfish, including 3.29 million yellow perch, 1.23 million rock bass, and 2.0 million pumpkinseed.

An estimated 470,000 smallmouth bass were eaten by cormorants in 2002. This represents a reduction of 290,000 bass from 2001.

Since 1992 (11 years), it is estimated that Little Galloo Island cormorants have consumed 333 million fish, weighing 31 million pounds, from the waters of eastern Lake Ontario.

The Effects of Egg Oiling on Fish Consumption by Double-Crested Cormorants on Little Galloo Island, Lake Ontario in 2002: Johnson et al. (2003b) provides an estimate of the reduction of fish consumption by cormorants as a result of the egg oiling activities on Little Galloo Island. Utilizing the results of the first two studies discussed, it is estimated that 8,604 fewer cormorant chicks were produced on the island as a result of oiling. This reduced total fish consumption by the Little Galloo Island colony by an estimated 5.8 million fish, a 25% reduction in total fish consumed. Consumption of smallmouth bass was reduced by an estimated 270,000 fish as a result of egg oiling.

While the experimental egg oiling program continued to be effective in reducing fish consumption in eastern Lake Ontario, it is too early to determine what effect this will have on the fish community or individual species.

Diet Composition and Fish Consumption of Double-Crested Cormorants from the Pigeon and Snake Island Colonies of Eastern Lake Ontario in 2002: Johnson et al. (2003c) present diet information from two islands located in the Canadian waters of eastern Lake Ontario. In 2002, raccoons were observed on Pigeon Island on May 30 and all 1,014 cormorant nests present at that time were subsequently abandoned and no chicks were produced. There were 732 cormorant nests on Snake Island. To evaluate the diet of cormorants nesting on the islands, pellets were collected once a month on each island from May to October.

Analysis of the 1,087 pellets collected in 2002 indicated that total fish consumption by the two colonies was lower than that observed in 1999 to 2001. Cormorants on Pigeon Island consumed an estimated 4.4 million fish weighing 0.22 million pounds, and those on Snake an estimated 6.6 million fish, with a weight of 0.37 million pounds. Cormorants on Pigeon Island consumed an estimated 10,000 smallmouth bass, and those on Snake 90,000.

Effects of Egg-Oiling on Double-crested Cormorant Movements in Eastern Lake Ontario: Dorr et al. (2003) reported on the results of a two year satellite telemetry study of the movements of cormorants in eastern Lake Ontario. Study objectives to evaluate cormorant emigration, reproductive success, nest-site fidelity, and foraging movements following control activities at Little Galloo Island. Satellite transmitters (expected life of one year) were attached to 26 nesting cormorants during May 2000 and 26 in May 2001. Movements were monitored until transmitters failed.

The study results indicate control efforts (egg oiling) did not result in complete abandonment of Little Galloo Island by cormorants during the nesting period. However, control efforts may influence temporary relocation to other colony sites. More importantly, few cormorants relocated to other active colonies for long enough periods to successfully raise young. This study indicates that, given long-term committment, local

and/or regional egg oiling effects in the Great Lakes can be successful in cormorant recruitment within breeding seasons.

Double-crested Cormorants and VHF Telemetry on Lake Ontario, 2002: Mazzocchi (2003) reported on the results of a radio telemetry study to evaluate the movements of cormorants nesting on Little Galloo in response to egg oiling and pellet collection management activities. VHF radio transmitters were attached to 40 cormorants on Little Galloo Island during May 2002. Twenty-one transmitters were placed on cormorants nesting in areas that were to be subjected to egg oiling and pellet collections. Nineteen were attached to cormorants nesting in a control area that was not subjected to human disturbance.

Preliminary results indicate a significant difference in nest fidelity between cormorants nesting in the two areas. Not surprisingly, those nesting in the disturbed area were more likely to abandon their nests and the colony. Further analysis will determine if cormorants that left Little Galloo Island by early July due to human disturbance were able to relocate and produce young capable of fledging.

Summary of 1976 to 2002 Warm Water Fish Stock Assessment: Eckert (2003) examined trends in the abundance of warm water fish stocks in eastern Lake Ontario based on a gillnet assessment program conducted annually from 1976 to 2002. Eckert (1999a) described a pattern of overall decline in the warm water fish community from 200-250 fish per gang in 1976-1979 to approximately 20 fish per net gang in the late 1990's.

The abundance of smallmouth bass declined to record low levels during the period from 1995 to the present.

Based on 2002 sampling, the overall abundance of fish remained low: 19 fish per net gang. Smallmouth bass abundance remained at record low levels, with abundance in the last 6 years being the lowest on record during the 27 year sampling period.
The abundance of smallmouth bass has decreased from an average catch of 27.6 bass per gill net during the period from 1976-79 to average 4.0 bass per gill net in 2000-02. In contrast, smallmouth bass abundance in the Pultneyville area of western Lake Ontario increased from 15.5 to 82.6 bass per gill net for the same two time periods. A major difference between the two areas is the presence of double-crested cormorants in eastern Lake Ontario.

Summary

Oiling double-cormorant eggs has proven to be an effective method of limiting reproductive success on Little Galloo Island. Based on population modeling projections, it appears that the stated objective of reducing the Little Galloo Island cormorant population to 1,500 nesting pairs within the next 5 years with continued annual oiling activities.

However, this may not result in a desirable response in fish populations, particularly smallmouth bass, in eastern Lake Ontario. The results of the satellite and radio telemetry studies indicate that cormorants from the Pigeon and Snake Islands breeding colonies forage in the New York waters of eastern Lake Ontario, and may continue to suppress fish abundance in all areas of the eastern basin. Desired responses in the fish community may not be possible without control activities on cormorant colonies in Canadian waters.

References

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