

St. Lawrence River Fisheries Discussion Paper

DOUBLE-CRESTED CORMORANTS - are they a cause for concern?

Issues

Sport fish populations of the St. Lawrence River, particularly in the Thousand Islands and Middle Corridor sections, have shown a recent decline. Double-crested cormorants have been implicated in the decline of smallmouth bass populations in the New York waters of eastern Lake Ontario. Other changes including poor weather conditions for successful bass reproduction have contributed to the reduction in smallmouth bass numbers. Government agencies from both sides of the river are currently working to determine if cormorants are having a significant influence on fish populations of the St. Lawrence River in general and smallmouth bass and northern pike populations in particular.

Cormorants are known to have significant negative impacts on island habitats where they nest. Over time, ground vegetation and cover used by other birds and animals are destroyed. Their excretions are also capable of killing trees in which they nest. Cormorants frequently colonize islands already inhabited by other colonial nesters. There are documented cases where cormorants have displaced great blue herons, common terns and black-crowned night herons from their nesting sites.

- ***OMNR and NYSDEC plan to continue working to determine if cormorants are having a significant influence on fish populations in the St. Lawrence River, and no-control activities are planned at this time***

Background Information

Distribution and Abundance

The double-crested cormorant is widespread in North America. This species was first reported breeding on Lake of the Woods in north-western

Ontario in the late 1700s. By the 1930s the birds had spread eastward colonizing all of the Great Lakes, including Lake Ontario. By the early 1950s, cormorants became so common that control measures were established to reduce suspected competition with commercial and sport fisheries.

For the next twenty-five years cormorant numbers declined on the Great Lakes. Even after control measures were removed, populations continued to decline. Accumulation of DDT and PCBs in cormorants caused their eggs to break and deformities young in cormorants.

Cormorant numbers began to rebound in the Great Lakes by the late 1970s after DDT was banned. Populations have grown rapidly since then and new nesting colonies continue to be established. Over 20,000 cormorant nests were counted on Lake Ontario in 1999.

St. Lawrence River Distribution

Three nesting colonies currently existed in the St. Lawrence River during 1999. One colony is on Strachan Island, which is located in Lake St. Lawrence just upstream from the Moses-Saunders Power Dam. In 1992, 38 nesting pairs were counted. By 1999, the colony had grown to 433 nesting pairs.

The other two colonies are located in the Middle Corridor section of the river. Nests were first counted in 1996 (61) on McNair Island, located just south of Brockville. By 1999, the number of nesting pairs had more than doubled (168). Griswold Island, located about 16 km (10 miles) upstream of Brockville, is the site of the third colony. Two nests first appeared on this island in 1994. By 1999, 272 nesting pairs occupied this island.

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The total number of known nesting pairs in the St. Lawrence River has increased from 38 in 1992 to 843 in 1998. The graph below shows that by 1998, Strachan Island supported more than 50% of the total nesting pairs of cormorants on the St. Lawrence River. McNair and Griswold islands accounted for 20% and 29% of the nesting pairs, respectively.

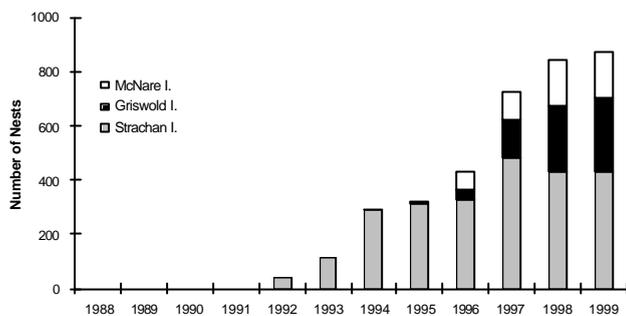


Figure 1. Counts of Double-crested Cormorant nests in the St. Lawrence River. Data from D.V. Weseloh (Canadian Wildlife Service), L. Harper (Riveredge Consulting Ltd.) and J. Johnson (U.S.G.S).

Nesting Habitat

Cormorants are highly adaptive and use a variety of nesting habitats including old swamps and islands in large, open, bodies of water such as lakes and rivers. Areas that are reasonably undisturbed by human activity and provide adequate room for colonization are essential to this species.

Nesting occurs in both living and dead trees and large shrubs anywhere from 0.3 to 19.8 m (1 to 65 ft) above the surface of the ground or water. Nests may also be built on tops of cliffs, manmade structures or on barren rock or cobble shores. Cormorants colonizing Strachan and McNair islands nest primarily in trees and large shrubs. Cormorants on Griswold Island nest primarily on the ground but also make use of a small abandoned building and other rock structures on the island.

Affects on Island Habitats and other Wildlife Species

Accumulations of ammonia-rich droppings from cormorants are capable of destroying ground vegetation, trees and shrubs. Ground cover used by small wading birds is also destroyed. This effect worsens over time because of the large

concentrations of birds and their repeated use of breeding colonies, year after year.

Cormorants are capable of displacing existing colonies of great blue herons, egrets and black-crowned night herons. Large concentrations of cormorants increase the chances of disease and death among cormorants and other bird species. Newcastle disease is a neurological condition caused by a virus that can affect whole colonies of cormorants. This disease also can infect gulls.

Life History

Physical Description

The adult double-crested cormorant is a large, black water bird with a visible yellow-orange throat patch, long, hooked bill and long tail. The neck and head are long and slender. The legs and feet are black. Sexes of this bird are similar in appearance. Spring adults have an inconspicuous tuft of feathers on either side of the head, which are shed during the early part of the nesting season. First-year birds are mostly a dark sooty brown with a pale breast and dark belly.

Cormorants frequently roost in trees and often perch with wings spread out. A cormorant sits low in the water and is most frequently mistaken for a loon. However, the loon has a dagger-like black bill, white necklace around a thicker, shorter neck and a prominent white-checked back.

Cormorants often migrate in large V- shaped flocks like migrating geese, but are silent in flight. During their daily routine they fly and feed singly or in small flocks flying in a straight line or with no obvious formation.

Reproduction

The double-crested cormorant breed in the Great-Lake St. Lawrence region between April and late June. The species is a colonial nester usually nesting on the same islands year after year. Before a new colony is established, cormorants will often take up residence at the site for a few years before actually building a nest.

The nesting territory of the double-crested cormorant is selected and passively defended by the male.

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Courtship display generally occurs on land by both male and female and includes song and various bowing and neck and head-stretching gestures. Both mates share in the construction of the nest, which takes about 4 days to complete. The sturdy nest is made of sticks and stems and is lined with leafy twigs, grasses and other debris. Cormorants nest both on the ground and in trees. The same nest may be reused the following year.

One brood per year is most common, although a pair will re-nest if the nest or eggs are destroyed. An average of three to four eggs is laid over a number of days although as many as seven eggs in a single nest has been reported. Incubation is performed by both sexes soon after the first egg is laid. Eggs begin to hatch in three to four week's time. The young are black and skinny with eyes closed for the first four to five days. By two weeks they are covered with short black down. Both parents tend to the young and feed them regurgitated food.

The young of tree nesters begin to climb out of the nest onto limbs between their second and third week. The young of ground nesters begin to wander around the colony together at three to four weeks. Studies done on Little Galloo and Pigeon islands in Lake Ontario suggest that on average, two chicks successfully leave each nest.

Cormorant young swim and dive before they fly. Flight is achieved by the time they are about six weeks old. By the time they are 10 weeks old, the young are totally independent. At this time they may stay in the colony to roost, roost alone overnight or leave the colony and join up with other juveniles in a different location to roost.

Cormorants are sexually mature and capable of breeding by three years of age. Their average life span in the wild is between six and eight years, but they have been known to live for more than 20 years.

Behaviour

Migration

Fall migration takes place near the end of August through October and is highly dependent on weather and availability of food. Their migration route takes

them along the Mississippi River and Atlantic Ocean to the Gulf of Mexico region where they over-winter. Cormorants return to the eastern Ontario region by April.

Feeding

Cormorants are a diving species and are primarily fish-eaters but also are known to eat molluscs, amphibians and crustaceans. Adult cormorants can dive from the surface of the water to depths between 1.5 to 7.6 m (5 to 25 ft) and remain underwater for 30 to 70 seconds. Cormorants may travel 8 to 16 km (5 to 10 miles) from their colony to search for food.

About 99% of a cormorant's diet consist of fish. Scientific studies have shown that their diet can be quite variable from one location to the next. Seasonal changes in the diet also occur and may be largely dependent on fish availability and vulnerability.

Public concern has been expressed over the rapid increase in cormorant populations and their adverse effects on local fish populations. There is a strong opinion among anglers that cormorants are depleting sport fish populations to the point of reducing angling opportunities.

A study of cormorant diets at the Strachan, McNair and Griswold Island colonies in the St. Lawrence River was conducted during 1999. Panfish (primarily yellow perch, rock bass, pumpkinseed and bullhead) comprised 83% of the diet while forage fish (minnows, slimy sculpin, darters, etc.) made up 13% of the diet. Sportfish (Smallmouth Bass, and Northern Pike) were a minor component of the cormorant diet making up 3%.

The diets of cormorants at the three St. Lawrence River colonies were very similar. One different noted between the colonies was that rock bass were most common in the diet item of cormorant from the McNair Island colony while yellow perch were the most common diet item at the other locations.

The diet of St. Lawrence River colonies did not show the distinctive seasonal pattern observed in cormorant diets in eastern Lake Ontario. During the middle of the breeding season in eastern Lake Ontario alewife are the dominant food item while panfish are more common in the diet early and late

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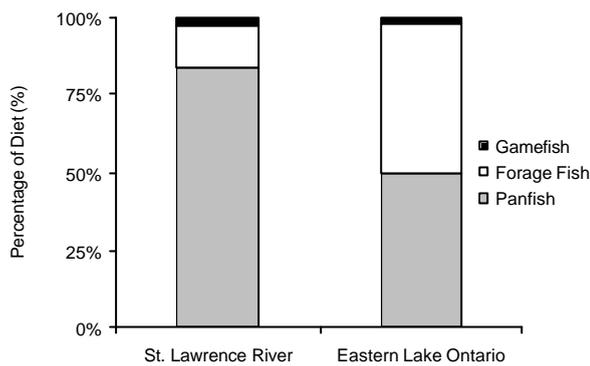


Figure 2. Diet composition of Double-crested Cormorants in the St. Lawrence River and eastern Lake Ontario during 1999. Data from Johnson et al. (1999 NYSDEC Annual Report).

in the season. Panfish were the most common diet item throughout the season in the St. Lawrence River study. The contribution of gamefish to the diets of cormorants in the St. Lawrence River was very similar to that observed in eastern Lake Ontario.

Cormorants and Smallmouth Bass

Lake Ontario

Fish studies in New York waters of eastern Lake Ontario show that the mortality rate of young smallmouth bass increased about the same time that cormorant numbers increased in the late 1980s. More recent New York studies estimate that cormorants consumed up to 1.3 million smallmouth bass (1.6% of their total diet) annually in eastern Lake Ontario.

Compared to the total estimated number of fish of all species consumed by cormorants in a given year, smallmouth bass represent a very small part of the diet. Perhaps more significant is the age, size and rate at which smallmouth bass are being removed from the population.

New York studies also show that double-crested cormorants target age-2 to age-5 smallmouth bass from 33 to 335 mm (1.3 to 13 inches) in the eastern basin of Lake Ontario. These results suggest that many of the young smallmouth bass could be removed from the population before they are able to spawn.

Fish studies in Ontario waters of eastern Lake Ontario do not show the same change in mortality of smallmouth bass coincident with the increase in cormorants, as was observed in New York waters. Cool summer temperatures affecting the over-winter survival of young bass can explain declines in smallmouth bass numbers in Ontario waters of eastern Lake Ontario during the late 1980s and early 1990s. Recent strong year-classes of smallmouth bass due to warm summers from 1995-1999 are beginning to result in increased smallmouth bass numbers in the Ontario waters of eastern Lake Ontario.

Differences in habitat, smallmouth bass populations, and cormorant distribution may explain the differences between the New York and Ontario studies. The differences also indicate that the impact of cormorants can be very different among local areas within the same region.

St. Lawrence River

The impact of cormorants on fish of the St. Lawrence River is not fully understood at this time. Fisheries assessment on the Thousand Islands and Middle Corridor sections of the St. Lawrence River shows a similar decline in smallmouth bass populations to that observed in the eastern basin of Lake Ontario. However, the abundance of both smallmouth bass and northern pike in Lake St. Lawrence has increased during recent years. The cormorant diet study St. Lawrence River, while not as exhaustive as the Lake Ontario studies, showed that the average bass eaten by cormorants was 9 inches during 1999.

Possible Methods of Control

History and experience have demonstrated that wildlife population control programs should be based on careful planning and conducted under close scientific scrutiny. A five-year cormorant control program, done by the Province of Quebec in the St. Lawrence River Estuary, and other studies have showed that cormorants can be controlled in a localized area using a variety of techniques.

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Culling: *the active removal of adult breeding birds from the population*

- ◆ is the most rapid means of reduction (males are more vulnerable (2:1) to shooting than females)
- ◆ raises ethical, moral and legal questions
- ◆ is in contravention of *Migratory Bird Treaty Act, 1918* (United States) and the *Fish and Wildlife Conservation Act (Ontario)* therefore requires a permit
- ◆ should be considered as a 'last resort' control method

Egg-spraying: *spraying eggs with inert mineral or vegetable oil*

- ◆ reduces the number of hatchlings
- ◆ takes about two years before there is a noticeable change in number
- ◆ raises ethical, moral and legal questions
- ◆ is in contravention of *Migratory Bird Treaty Act, 1918* (United States) and the *Fish and Wildlife Conservation Act (Ontario)* therefore requires special consideration and permits at the respective government level

Mechanical nest destruction or disturbance of the nesting cycle

- ◆ enhances predation and abandonment
- ◆ requires more than one visit per colony as birds are known to re-nest and lay additional eggs if nests and eggs are destroyed (time consuming)
- ◆ raises ethical moral and legal questions
- ◆ is in contravention of *Migratory Bird Treaty Act, 1918* (United States) and the *Fish and Wildlife Conservation Act (Ontario)* therefore requires a permit

No control

- ◆ allows for a natural balance in species inter-relationships to become established
- ◆ may not be acceptable where the survival of an endangered species is at risk

Public inquiries should be directed to the following offices:

NYSDEC (315) 785-2262
OMNR (613) 476-3255

Fisheries assessment information presented in this paper was provided by the Lake Ontario Fisheries Management Unit, Ontario Ministry of Natural Resources, R. R. 4 Picton, Ontario K0K 2T0 and Region 6 Fisheries Unit, New York State Department of Environmental Conservation, 317 Washington Street, Watertown, New York 13601. Additional information was obtained by a review of scientific literature and reports from other sources.

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