

15" northern
13" smallmouth

4-24-09

Brevont Lake

By: Larry Meier
November 11, 2004

FLYING PIRANHAS TAKE OVER THE OLD FISHING HOLE

The Double-Crested Cormorant has moved into Michigan during the summer months at such a rate that they have literally depleted the fishing stocks of the Eastern U.P. and are feeding their way through the rest of the Great Lakes and now into inland lakes and streams. In 1911, there were no cormorants in the State of Michigan and they first appeared in 1931 and by 1951, were gone primarily due to the effects of DDT. In 1981, there were eight pairs reported in Michigan and by 1991, there were over 2,000 birds. By 1997, the cormorant has exceeded over 100,000 and by 2002 in the 11.5 mile area of the LesCheneaux Islands, there were 15,000 cormorants.

The Cormorant is a greenish-black bird with orange facial skin and a hooked beak. An adult bird weighs about four pounds and eats from 1.25 to 1.5 pounds of fish per day, per bird. Their fecal droppings are so acidic they destroy any plant life that they encounter, especially the trees and the ground area where they nest. The birds are currently in over 24 states, but the largest population is in the State of Michigan. The Cormorant life span is about 9 years yet some tagged birds have shown to be 16 years of age. They reproduce on the average 3.5 young per year and since they are in areas away from people and predators, their reproductive success rate is close to 90%. Therefore, the quantum leap since the 1970's when only 125 pairs were shown to be in Michigan has resulted in well over 100,000 birds. In the mid-west region, cormorants are reproducing at 29% per year and spend their winters in places such as Florida, Arkansas, Mississippi, etc. Nationally, the cormorant is increasing at 6% per year with now over 2,000,000 birds on the prey.

The Michigan DNR recently completed a 20 year study of the LesCheneaux Islands from 1980 to 2003 and has shown that the collapse of the fishery totally coincided with the increase in cormorant numbers (see Exhibit A). In a recent meeting in the Eastern U.P. in Cedarville, the DNR showed that it takes five man hours to now catch one perch. It should be noted that the Cedarville-Hessel areas use to be known as the Perch Capital of the State. Recently, the charter boat captains, in Lake Huron are finding very few bait fish in the area and therefore, the salmon fishing is now taking a major hit. The pike fishing is all but depleted because the perch population cycle has been disrupted. It is interesting to note that as the cormorants move North, that areas as Manistee, Ludington and Alpena, are getting hit very hard by the cormorants eating the spawning fish. Cormorants have been caught in Indian nets at 150 feet and also observed in 4 inches of water eating other small bait fish. Cormorants have been observed in flocks of over 1,000 birds in a raft fashion, whereby, the front birds go down and push the fish up from the bottom, then the entire flock gouaches themselves in a piranha fashion. The author has seen the clear waters of Lake Huron turn red and the water boil, when a flock of cormorants are on the feed.

The acidity is making the beautiful islands of Northern Michigan, Lake Erie and Saginaw Bay into waste lands (please see the pictures of Goose Island in Hessel Michigan-Exhibit B by Fred Gray of the Petoskey News. The Great Lakes Lighthouse Keepers Association has joined the fight to reduce the number of cormorants because of the damage they are doing to the lighthouses they are trying to restore (see Exhibit C & D). As the population overtakes an island, the stink is unbelievable and their excrement into the clear waters would close down any manufacturing plant for excessive waste. In talking to people from all over the state including the Monroe area, the cormorant is not only devastating the public fishing areas but is also invading private ponds and has been clearing out even small trout streams. It is the opinion of the author that if we continue to let the cormorants have it's way, there will be no fish left to fish and the tourist industry that depends on fishing will collapse. You only have to take a ride to the Eastern U.P. to see resorts for sale and bait shops closed and out of business. At one time, you needed to make reservations years in advance to get into most any resort. An example of this is at the NATCHITOCHEES National Fish Hatchery in Louisiana, a flock of cormorants reduced 30,000 cat fish to less than 1,000 in two days. In Tishomingo, Oklahoma, 400 cormorants wiped out 140,000 seven inch cat fish. The State of Michigan, financially, will continue to get hurt because of the decline of tax revenue from out of state tourists.

The author also is very concerned that as the cormorants move North during the spawning season of the Great Lakes Fishery Basin, they take now only the spawning fish but the fry as well (See Exhibit E - an unpublished report). The brown trout have been decimated as well as the small mouth bass and the perch and pike population. It's pretty difficult to see us spending tax payers money on restocking many of the areas when all were doing is setting out a smorgasbord for our friendly cormorant. The cormorant is a very smart bird and will react very fast to any environmental change or harassment. The general public has to understand that this bird forages over a 25 mile area and can move their nests and reproduce if any harassment is provided by man or animals, i.e., raccoons being put on the islands or egg smashing. A hunting season would probably cause more problems because hunters would have trouble identifying the types of cormorants and could also end up shooting turns and other birds in the process because cormorants can fly at 40 miles an hour and they can also swim faster than any fish. Also, the cormorant is only here from May through September. The cormorant has *NO* table value, and therefore, they would be left where they were shot. Therefore, many environmental groups would be filing law suits to stop the killings and the dollars wasted in court could be used for cormorant control and fish restocking. In a public meeting in Mackinac City in January, 2002, hosted by the U.S. Fish and Wildlife Services, Gaylord Alexander recommended a 90% reduction in cormorants, if the Michigan Fishery was to survive. Mr. Alexander is a retired chief fishery person from the Michigan DNR.

Roscommon County has over 600 cormorants that visit from April - May and now some birds are remaining. In the two month period that equates to 45,000 lbs of fish being eaten. There is help on the horizon, however, because Senator Debbie Stabenow and representatives Dave Camp and Bart Stupak of Michigan and representative Marcy Kaptor, of Ohio, were able to secure \$125,000.00 this past year to fund the U.S. Department of Agriculture Wildlife Services to decrease the cormorant population in the LesCheneaux Islands. The 2004 year program has just been completed to reduce 10% of the adult birds and oil 90% of the eggs to

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stop further reproduction. The program has already shown that salmon up to 16 inches have been found in some stomach contents. In speaking to many fishermen in Northern Lake Huron, the salmon population size was drastically reduced this year with very few being caught over 20 pounds and the norm was 6-8 pounds.

The State of Michigan Fisheries Department under Dave Fielder in Alpena is going to continue the fish survey count to see what the impact is going to be with the reduction of cormorants in the area. Pete Butchko, State Director of the U.S. Department of Agriculture Wildlife Services, and his staff will be doing the eggging and adult cormorant reduction. Both agencies are following the mandates of the law to the letter and hopefully their research project will be able to be duplicated elsewhere in the State. The MUCC, Pike Masters, Great Lakes Lighthouse Keepers Association and Chambers of Commerce throughout Northern Michigan have been working on this project with our State and Federal legislators. It is the authors opinion that the Department of Agriculture should be the lead agency and that the State of Michigan and private individuals work within their structure and hopefully, we will get our fishing hole back for our families to enjoy the day with a bobber and the opportunity to really "catch a fish". Currently, 18 States are trying to put a proposal together to give fish the opportunity that the birds have. We need each of you to contact your Federal Representative and/or Senator to help us curb the cormorant explosion. Without the dedicated monies from U.S. Congress, the Michigan project will end and the 18 State Program will never get off the ground. Remember, that the old fishing hole belongs to you and your family, not the cormorants.

Larry Meier
2704 E. West Branch Road
Prudenville, MI 48651

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POPULATION DYNAMICS OF SMALLMOUTH BASS IN THE BEAVER

ARCHIPELAGO, NORTHERN LAKE MICHIGAN, 1999-2002

by

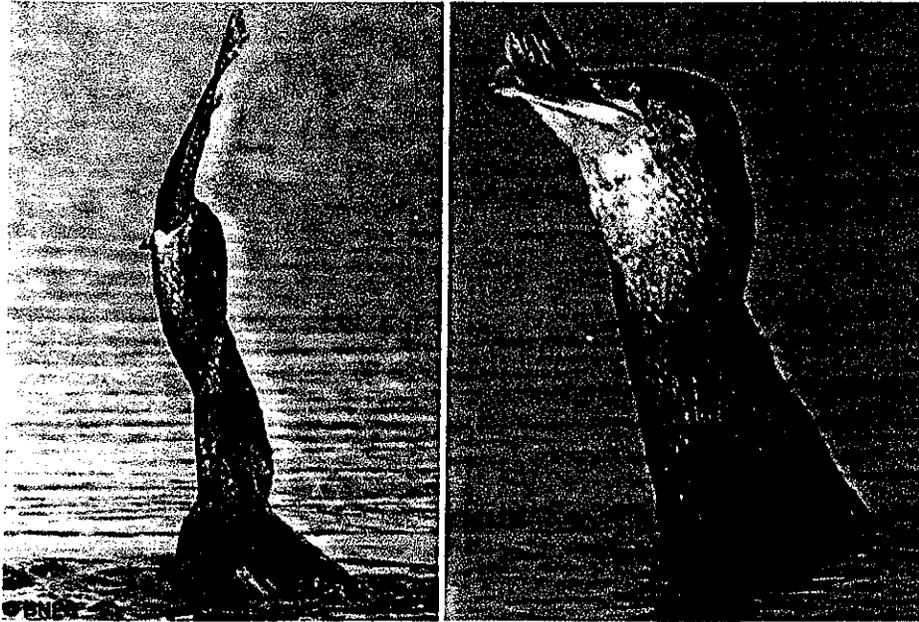
MICHAEL JOHN SEIDER

Under the Direction of Douglas L. Peterson

ABSTRACT

The Beaver Island Archipelago in Lake Michigan had a popular smallmouth bass (*Micropterus dolomieu*) fishery in the 1970-80s. In the 1990s, anglers became concerned that the smallmouth bass population was in decline due to predation by the increasing double-crested cormorant (*Phalacrocorax auritus*) population in the archipelago. The objective of this study was to determine the status of smallmouth bass by estimating current population characteristics and comparing them to past data. I estimated population size, condition, growth, and cohort survival for smallmouth bass from 1999-2002. Smallmouth bass abundance had declined 85-92% since the 1970-80s. Growth rates and condition had increased since the 1970s. High adult survival and similar declines in nongame fish species indicated that angler harvest was not limiting smallmouth bass abundance. Mortality rates for ages 3-5 were as high as 99%, which is consistent with cormorant predation. These data suggested that cormorant predation is limiting smallmouth bass abundance.

INDEX WORDS: Smallmouth Bass, Lake Michigan, Beaver Archipelago, Double-Crested Cormorants, Population Estimates, CAPTURE, Age-Specific Mortality, Relative Weight, von Bertalanffy Growth Equation



Twist in the tail: Size is no obstacle for the cormorant, which simply unhinges its jawbone and lets the pike slide out of sight down its elastic throat

"The cormorant was desperately trying to get the pike into its mouth but it was struggling.

"Then the bird suddenly stretched out its neck and twisted it before swallowing the pike down in one.

Mr Canham was delighted with his luck.

"Quite often I manage to get pictures of birds after they have swallowed their dinner but never a sequence of the event as good as this," he said.

"It was an amazing sight that was all over in the blink of an eye."

Sophie Atherton, from the RSPB, said cormorants can swallow creatures up to two-and-a-half feet long.

She said: "Cormorants have been recorded to eat 86 different species of fish from tiny fry to two-and-a-half-foot-long conger eels.

"They have an elasticated throat and a special hinged beak that enables them to eat large creatures.

"Basically they pull their distended neck out of shape to get the giant fish down."

She added: "Records have shown that a cormorant was once found to have an 11-and-a-half-inch kitten in its stomach.

The Economic Impact of Double-Crested Cormorants to Central New York

Report prepared for the New York Wildlife Services State Director

Dr. Stephanie Shwiff

and Katy Kirkpatrick

National Wildlife Research Center

Fort Collins, CO

Dr. Travis DeVault

National Wildlife Research Center

Sandusky Field Station

Sandusky, OH

Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

Defining Economic Impacts and Developing Strategies for Reducing Avian Predation in Aquaculture Systems

Major Cooperators

- Catfish Farmers of America
- Canadian Wildlife Service
- Cornell University
- Michigan Department of Natural Resources
- Mississippi State University, College of Veterinary Medicine
- Mississippi State University, Department of Wildlife and Fisheries
- Mississippi Agricultural and Forestry Experiment Station
- Delta Research and Extension Center, Thad Cochran National
- Warmwater Aquaculture Center
- New York Department of Environmental Conservation
- Ontario Ministry of Natural Resources
- Southern Regional Aquaculture Center
- Vermont Fish and Game Department

Groups Affected by These Problems

- Aquaculture producers, distributors and retailers
- Sportfish guides and outfitters
- Wildlife managers

NWRC Scientists Address Aquaculture Losses

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research facility devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques. NWRC's field station in Starkville, MS, is located in the heart of the primary aquaculture producing area of the southeastern United States and was established to develop methods to reduce the impacts of fish-eating birds on aquaculture stocks.

In the past 30 years, populations of fish-eating birds have increased dramatically and caused substantial economic impacts to aquaculture production. Aquaculture industry costs associated with bird damage and damage prevention are estimated to exceed \$25 million annually. The goal of NWRC's research is to determine the impact of fish-eating birds on aquaculture production and natural resources, and to develop methods to reduce depredation of southeastern catfish, baitfish, and crawfish industries. Current research is aimed at gaining information about the abundance, distribution, and foraging behavior of fish-eating birds, the economic impacts associated with their foraging activities, and the diseases they transmit at aquaculture facilities. This information will help to develop new techniques for reducing damage.

Applying Science & Expertise to Wildlife Challenges

Population Trends—NWRC scientists are studying population trends, demographics, and movement patterns of double-crested cormorants and American white pelicans, by tracking large-scale movements through the use of telemetry and banding techniques. This research will provide a better understanding of population trends and bird movements and will be used to evaluate various alternatives for managing impacts of these birds on southeastern aquaculture and natural resources.

Cormorant Damage to Catfish Aquaculture—The catfish industry in the United States is valued at more than \$650 million per year in processed product sales, with nearly 65% of catfish production originating from Mississippi. NWRC biologists completed a field study that evaluated the distribution and numbers of cormorants on catfish aquaculture tying together almost a decade of research on cormorant food habits, bioenergetics and abundance data. Cormorants used catfish ponds extensively during the period January through April, with the greatest economic damage occurring in February and March. During the study, between 1,347 and 1,775 metric tons of catfish were consumed by cormorants in the Delta region of Mississippi. This depredation translated into a loss to the industry of \$10.3 to \$13.7 million annually or approximately 4-5% of farm level value.

Cormorant Movements—NWRC scientists evaluated movements and migration patterns of double-crested cormorants captured near southeastern catfish aquaculture ponds. Results demonstrated that satellite transmitter-equipped cormorants migrated along the Mississippi, Missouri, and Ohio River Valleys. The average duration of spring migration was 12 days traveling 70 km per day. These data show that cormorants tend to stay in one general region throughout winter if adequate food resources are available and their roosting sites are undisturbed. These data provide further evidence that aquaculture is utilized extensively by wintering cormorants. Aquaculturists and resource managers are using these data to refine cormorant management strategies.

Cormorant Breeding Colony Dynamics—NWRC scientists and partners completed a long-term study of cormorant breeding colony dynamics in the Great Lakes. This research was a cooperative effort involving, Mississippi State University, the Canadian Wildlife Service, Ontario Ministry of Natural Resources, Ontario Parks, and Trent University. Survival estimates indicate approximately 80% mortality for first year birds, decreasing to over 20% thereafter. The data show some regional differences in reproductive parameters suggesting that management decisions should be based on local or regional population



United States Department of Agriculture
Animal and Plant Health Inspection Service

information. Population models indicate that a combination of adult culling and egg oiling would have the greatest efficacy for reducing population growth.

Aging Cormorants—NWRC scientists and collaborators at West Virginia University have identified a biomarker in the skin that is a linear ($R^2 = 0.93$) predictor of age in double-crested cormorants. This information may lead to a rapid technique for identifying age of cormorants and many other species of birds without the need for more costly and logistically difficult methods. This technique will help provide a better understanding of the demographics of cormorant populations allowing for development of optimal management strategies for maintaining population viability while minimizing damage.

Pelican Diet and Aquaculture—A study of diet of American white pelicans in the southeastern United States reflect opportunistic foraging across locations. The diet of pelicans collected near catfish aquaculture was comprised of almost 90% commercial catfish. Pelicans collected near non-aquaculture areas included prey such as shad and sunfish. The body condition of pelicans foraging near aquaculture was improved compared to other pelicans possibly causing increased survival and reproductive success. This research demonstrated that the superabundant, large-sized, and vulnerable food source (i.e., catfish in aquaculture ponds) are used extensively by pelicans frequenting aquaculture producing areas.

American White Pelican Disease Ecology—In collaboration with parasitologists at two state universities, the Thad Cochran Warmwater Aquaculture Center, and the Southern Regional Aquaculture Center, NWRC scientists described the life cycle and confirmed that American white pelicans serve as host for the species of trematode infecting catfish in the southeastern United States. Results showed American white pelicans can transmit this disease among catfish ponds. Double-crested cormorants, great blue herons, and great egrets did not appear to serve as hosts for these trematodes. Parasite life-cycle studies indicate low infection of trematodes in pelicans can result in large numbers of trematode eggs deposited into catfish ponds. In addition NWRC scientists found an introduced species of snail can serve as an intermediate host to the parasite. These studies underscore the importance of preventing pelican use of aquaculture facilities and understanding the biology and epidemiology of the disease organism.

Management Activities on Nesting Cormorants—Large colonies of double-crested cormorants breed in the Les Cheneaux Islands region of Lake Huron, Michigan. NWRC Scientists have collaborated with the Michigan Department of Natural Resources, USGS, and Lake Superior State University to evaluate the effectiveness of Wildlife Services cormorant management as a means of improving the local yellow perch fishery. Management activities include egg-oiling and lethal control. Results showed management efforts reduced the number of young cormorants by more than 90% annually and overall cormorant numbers by 60%. Results also indicated cormorants from the colonies were feeding extensively in the specific areas of perch decline, and that perch numbers and harvest following the first four years of management have increased substantially.

Evaluating Cormorant Management Programs—WS and the U.S. Forest Service in Michigan have been working to reduce predation of sportfish by double-crested cormorants during spring migration. The management program enlists wildlife damage management specialists to protect fishery resources through an integrated program of non-lethal harassment supplemented by limited lethal take of cormorants. The designated specialists receive training, supervision, and supplies from WS. In return the specialists volunteer their time to conduct harassment operations.

NWRC research documented a large decline in numbers of cormorant foraging attempts, and an increase in walleye populations at Brevoort Lake, Michigan a location where management and research have been conducted.

Selected Publications:

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Yost, M. C, L. M. Pote, D. J. Wise and B. S. Dorr. 2008. *Biomphalaria havensis* identified as a potential intermediate snail host for the digenetic trematode, *Bolbophorus damnificus*. In Press. *North American Journal of Aquaculture*.



too much of the vegetation."

Locally, biologists' goal is to bring back the vegetation that the cormorants have destroyed with their acidic -- and abundant -- droppings, Sherman said. That vegetation provides habitat for other water birds, like great blue herons and black-crowned night herons, and for migratory birds, he said.

"It's our responsibility to ensure that other wetlands birds have places to nest," he said. "The vast majority (of people) doesn't want to see the islands turn into bare rocks."

Thanks to the shooting, it doesn't appear the islands are close to becoming barren, Sherman said. This year, shooters killed more than 2,000 birds and saw a reduction in the number of nests on Green and Turning Point islands, he said.

"The islands are looking a lot greener throughout the summer," he said. "You can tell a difference from pictures."

Biologists plan to take surveys of the vegetation to determine whether it has become healthier since shooting started, he said.

Although anglers aren't fond of the cormorants, whose diet consists of fish, no studies have been done on Lake Erie to determine whether they have an impact on sport fish populations, Sherman said.

A study of the cormorants' diet on northern Lake Michigan near Beaver Island showed the birds surveyed mainly ate invasive fish and found that round gobies were 33 percent of that diet in 2008, said Nancy Seefelt, Central Michigan University assistant professor of biology. In Michigan, cormorant control focuses on fish populations, as well as vegetation.

"Cormorants are very opportunistic," Seefelt said. "They'll eat anything that fits in their gullet in front of them."

THE CANADIAN SIDE

East of Green Island is the Canadian Middle Island, a desolate rock filled with dead trees and flocks of cormorants.

The island, owned by Point Pelee National Park since 2000, is meant to be a bird sanctuary. In 2008, it was mainly a sanctuary for the cormorants. Some herons and gulls nested there, and other varieties of birds stopped by during migration.

Parks Canada began shooting cormorants -- despite heavy opposition from animal-rights group Cormorant Defenders International -- in spring 2008 and has been doing so every year since then.

"Middle Island is a dying island," said Marian Stranak, Point Pelee National Park superintendent. "The population of double-crested cormorants is just too high for that ecosystem to sustain itself."

The park has a five-year plan to reduce the number of cormorants, which it will evaluate after the fifth year to determine success and plans for the future, Stranak said. Like the U.S. Lake Erie Islands, the goal at Middle Island is to help vegetation rebound, she said.

"It's encouraging," Stranak said of the results so far. "When we do get the nest numbers down, the island can recover."

Parks Canada's wants to reduce the nests on the island to between 600 and 1,100, she said. In 2009, there were about 3,800



Evaluation of harassment of migrating double-crested cormorants to limit depredation on selected sport fisheries in Michigan

S. Dorr Brian ^{a,*}, Ashley Moerke ^b, Michael Bur ^c, Chuck Bassett ^d, Tony Aderman ^e, Dan Traynor ^b, Russell D. Singleton ^a, Peter H. Butchko ^f, Jimmy D. Taylor II ^g

^a U.S. Department of Agriculture, Wildlife Services, National Wildlife Research Center, P.O. Box 6099, Mississippi State University, MS 39762, USA

^b Lake Superior State University, 650 W. Easterday Ave., Sault Ste. Marie, MI 49783, USA

^c USGS Great Lakes Science Center, Lake Erie Biological Station, 6100 Columbus Ave. Sandusky, OH 44870–8329, USA

^d U.S. Forest Service, 2727 N. Lincoln Road, Escanaba, MI 49829, USA

^e Wildlife Services, 1865 O'Rourke Blvd., Suite C, Gaylord, MI, 49735, USA

^f Wildlife Services, 2803 Jolly Road, Suite 100, Okemos, MI, 48864, USA

^g U.S. Department of Agriculture, Wildlife Services, National Wildlife Research Center, 9730-B, Lathrop Industrial Drive SW, Olympia, WA 98512, USA

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ABSTRACT

Diverse management techniques have been used to mitigate conflicts between humans and double-crested cormorants (*Phalacrocorax auritus*) including harassment methods supplemented by lethal take. In this study we evaluated impacts of programs to harass spring migrating cormorants on the walleye (*Sander vitreus*) fishery in Brevoort Lake and the yellow perch (*Perca flavescens*) and walleye fisheries at Drummond Island. Cormorant foraging declined significantly ($p < 0.05$) at both locations subsequent to initiation of harassment programs. Overall harassment deterred 90% of cormorant foraging attempts while taking less than 6% lethally on average at each site. Yellow perch were a predominate prey item in number and biomass at both locations. Walleye made up a small proportion of the diet at both locations. However, both walleye and yellow perch abundance increased significantly ($p < 0.05$) at Drummond Island. Walleye abundance at age 3 increased to record levels in 2008 following 3 years of cormorant management at Brevoort Lake. The estimated cormorant consumption of age-1 walleye in the absence of management at Brevoort Lake during 2005 would account for 55% of the record 2006 age-1 walleye population. These results support the hypothesis that cormorant predation on spawning aggregations of sportfish was a significant mortality factor and cormorant management reduced sportfish mortality and increased abundance at both locations. Continuation of harassment programs and fishery assessments will determine whether improvement of targeted sport fisheries through control of spring migrating cormorants is sustainable.

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Management effects on breeding and foraging numbers and movements of double-crested cormorants in the Les Cheneaux Islands, Lake Huron, Michigan

Brian S. Dorr^{a,*}, Tony Aderman^b, Peter H. Butchko^c, Scott C. Barras^d

^a U.S. Department of Agriculture, Wildlife Services, National Wildlife Research Center, Mississippi Field Station, P.O. Box 6099, Mississippi State, MS 39762, USA

^b U.S. Department of Agriculture, Wildlife Services, 1865 O'Rourke Blvd., Suite C, Gaylord, MI 49735, USA

^c U.S. Department of Agriculture, Wildlife Services, 2803 Jolly Road, Suite 100, Okemos, MI 48864, USA

^d U.S. Department of Agriculture, Wildlife Services, P.O. Box 130, Moseley, VA 23120, USA

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Yellow perch

ABSTRACT

The yellow perch fishery of the Les Cheneaux Islands (LCI) region of Lake Huron, MI suffered a collapse in 2000, attributed in part to the increase of double-crested cormorants (*Phalacrocorax auritus*) in the region. A management program involving egg-oiling and lethal culling was initiated in 2004 to reduce cormorant foraging on yellow perch in the LCI. Counts of cormorant nests, nests oiled, cormorants culled, and aerial counts and telemetry surveys were used to evaluate management. Management contributed to a 74% reduction of cormorants on breeding colonies from 2004 to 2007. Cormorants used the LCI area significantly more ($P < 0.05$) than surrounding areas. Aerial counts of foraging cormorants declined significantly ($P < 0.05$) over the entire survey area but not within the LCI proper. However, aerial counts of cormorants in the LCI were five-fold less than cormorant counts in the same area in 1995. Reduced cormorant numbers were attributed in part to the elimination of cormorant nesting on a large colony due to the introduction of raccoons. Although the numbers of cormorants using the LCI did not decline, flocks were significantly smaller and more dispersed after management began. The reduced number of cormorants from 1995 levels and more dispersed foraging likely reduced predation on fish stocks including yellow perch in the LCI. Our findings indicate that the relationship between reduction in cormorant breeding numbers and reduced cormorant foraging in a given area is complex and may be influenced by density dependent factors such as intraspecific competition and quality of the forage base.

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can take nearly a half-hour at the greatest depths. Whitefish and yellow perch will eat the smaller mussels as part of their diet, but it's not enough to stop the growing mussel population from filtering out phytoplankton important to small fish and invertebrates.

"There's a lot of doom and gloom talk these days," Madenjian said. "People are really concerned. But I do think it would be a mistake to put all the blame on the mussels. There maybe were too many salmon in the lake, and bloater populations could be somewhat cyclic. Let's see what happens."

Some commercial fishermen don't think bloater numbers will come back, but Madenjian is not so sure. The population was lower in 1976, he said, prompting an emergency closure. As for the alewives coveted by salmon and trout — and the anglers who seek them — Madenjian said the most common length seen in the trawls was between 5 and 6 inches, likely from a strong 2005 year class.

Still, alewife numbers were lower only three times since the survey began in 1973.

"The overall trend is smaller size (of salmon)," Madenjian said. "With the states stocking fewer, the numbers might come down some, but it depends on natural reproduction, too."

2006 Salmon Stocking Cuts Looking Prudent

Brian Mulherin - Daily News Staff Writer

Cuts to fish-stocking programs are never popular, but at least one fisheries biologist is saying that the decision to cut Chinook salmon stocking in 2006 was a good one. Indications are that salmon from Lake Michigan aren't in the good shape they appear to be in when they come to a boat splashing and thrashing, said Randy Claramunt of the Michigan Department of Natural Resources' Charlevoix research station. The average size of young fish is down and the amount of water in their bodies is way up, an indication of nutritional deficiency.

Claramunt was in Ludington Saturday for the Michigan Sea Grant Regional Fisheries workshop at Ramada Inn. The best way to deal with salmon that aren't getting enough to eat? More food or fewer salmon. Claramunt said he expects fewer salmon over the next few years and that those fish will indeed be smaller than historical averages. "20 (pounds) probably is the new 30," Claramunt said. "It's not necessarily a bad thing because when you get a lot of big old fish it's a lot of baitfish demand on the system." Claramunt said although today's salmon appear in large part to be very healthy, about 45 percent of the fish returning to weirs have muscle tissue made up of more than 78 percent water. "If your muscle tissue is 85 percent water, you're in pretty poor condition," Claramunt said. But things aren't as bad as the bad old days just yet, Claramunt said.

"After 1998 we've had a low incidence of disease," Claramunt said. "If fish get in really poor condition, we should see an increase in disease and we haven't yet." Claramunt said in recent years the estimates of the Chinook salmon's primary food source — the alewife — have gotten significantly better.

In 2000, the Michigan Department of Natural Resources changed its surveying and sampling techniques and can now scan the lake from depths of 15 to 750 feet. The DNR's boat, the Steelhead, and NOAA's boat, Sturgeon, can do a combination of trawling, netting and hydroacoustic surveys to see exactly how dense schools of fish are. The news on alewives is bad. Since a fairly strong alewife year class in 2004, baitfish stocks have plummeted. Although there's generally a bad year for alewife production following a good year for alewife production, there doesn't seem to be another strong year class on the horizon, Claramunt said. "We're not sure if it's a long-term trend or just a lower year class," he said. "That being said, it was the goal of the stocking cuts in 2006 to reduce the population because there were too many predators out there," Claramunt said.

"I think it was the right thing at the right time," he added. "I really think (Lake Michigan) will reach a balance sooner rather than if we had continued doing the wrong thing (by stocking too many fish)."

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MISSISSIPPI FLYWAY COUNCIL

MISSISSIPPI FLYWAY COUNCIL



1952

MFC ITEM NUMBER: 13
ORIGIN: MFC Non-game Bird Technical Section Item NBTS-1
DIRECTED TO: Mississippi Flyway Council
SUBJECT: Regional approach to double-crested cormorant management.

RECOMMENDATION:

That the Mississippi Flyway Council support the concept of a regional approach to double-crested cormorant (DCCO) management in the Mississippi Flyway, and the formation of an ad hoc committee within the NBTS to develop a framework for such an approach. We also recommend coordination with Atlantic Flyway, Great Lakes Fish Commission and other relevant wildlife and fisheries interests as part of this effort. The product will be a regional DCCO management plan which will be presented to the Service for consideration as an alternative to be included in a Supplemental Environmental Impact Statement on DCCO management to be completed in 2009. Current Depredation Orders expire in 2009.

JUSTIFICATION:

Double-crested cormorant populations have increased significantly in last few decades due to the banning of DDT and unregulated shooting. In addition, the presence of alewives in the Great Lakes and the growth of catfish farming in the south have provided abundant food resources to DCCO's. Approximately 113,000 pairs inhabit the Great Lakes now, with about 1-2 million birds believed to be in the continental U.S. Increasing DCCO populations have led to habitat destruction from guano pollution on nesting islands which are also important to other species of colonial waterbirds. In some instances, the nesting islands have been stripped nearly bare of any vegetation and nesting trees have been destroyed. This destruction has forced other species of waterbirds to nest on the ground, which may result in decreased nest success. Impacts to smallmouth bass, yellow perch, and other fish species have also been noted. Many of these species are important to both sport and commercial fishery interests.

In 2003, the Service issued new regulations for the management of DCCO's consisting of a Public Resource Depredation Order (PRDO) and an Aquaculture Depredation Order. So far AL, AR, MI, MN, NY, OH, TX, VT, and WI have all been involved with PRDO. Total take under the PRDO since 2004 is 35,414 killed and 68,165 nests destroyed. However, management efforts to date have been uncoordinated and have not alleviated conflicts to the extent desired. A coordinated regional approach to DCCO management may allow for more effective control of increasing populations and mitigation of conflicts. Regional population goals and management efforts should be established. Such an approach should also include collaboration with fishery and other relevant interests and seek funding sources to assist states in expanded management efforts.

COUNCIL ACTION: Approved

DATE: 3/20/07

**Brevoort Lake
Walleye Population Estimates
Trap Netting - April 23-27, 2008
Electrofishing - May 9**

Summary

Six trap nets were set on April 22 about 18 hours after the lake became ice-free. Five nets were set on the Black Point spawning reef and one in Christensen's Bay adjacent to some naturally-occurring spawning habitat. There are no other significant spawning sites in the lake. Mid-lake water temperature was 42 degrees F on April 22, rising to 46 degrees on the 25th. Nets were checked daily except on 4/26 when high winds prevented access to the reef. All new walleye were marked with an upper caudal fin clip on 4/23-4/25. All walleye were transported about 0.5 miles from the net site for processing and release. A total of 1767 walleye were captured, (including recaptures) of which 1553 were marked. The Schnabel multiple census method provided population estimates for net-captured fish (see appendix).

Electrofishing by three crews on the night of May 9 covered about 70% of the lake shoreline and provided an independent estimate of the walleye population. Catch amounted to 131 walleye ages III and older of which 20 were recaptures of fish marked during the netting effort. The Chapman-Petersen method provided population estimates (see appendix).

Age/growth analysis (see separate summary) for netted walleye provided the basis for stratification of population estimates by age groups. Ten age II fish were captured and marked during the netting effort but there were no recaptures so the following analysis deals only with age III and older fish as has been the practice in the past.

Overall estimates of the spawning population obtained from net catches were similar whether derived by summing estimates for individual age groups (Table 1), combining all age groups (Table 2) or combining groups based on recapture rates (Table 3). The recapture rate for age IV and older walleye was more than double that of age III fish. Combining all age groups yielded the lowest estimate but it did not differ statistically from the other estimates.

The current population estimate of 7780 (6633-9413) age III and older walleye is only slightly lower than the highest ever obtained (8518 (7104-10634)) dating back to the mid-1980's (Figure 1) when the lake was heavily stocked. Age III fish (2005 yearclass) resulting entirely from natural reproduction comprise about 90% of the current population and are more than twice as abundant as any previously documented age III yearclass. Following construction of a 2000-foot rock reef in 1984-'85 and verification of adequate reproduction, the lake was not stocked for several years (1990-'96). Fall electrofishing during the 1990's occasionally found good numbers of age 0 walleye but survival to age III and older was so poor that the population declined steadily. Approximately 20,000 age 0 fingerlings stocked in 1997, 2000 and 2003 fared no better (e.g., see the age V population estimate below). The current rebound of the walleye population comes only 3 years after it had plummeted to its lowest level in 20 years, 1233 (1017-1566).

It is likely that the population estimate derived from the netting effort is conservative because over 95% of the age III walleye captured were males. Most females in the lake do not mature until age IV and therefore do not show up in the spawning areas at age III. This behavior favors underestimation of the age III population. The potential for this source of bias to occur was reduced by postponing the electrofishing effort until after most fish had dispersed from spawning areas. Although there were still some walleye in the vicinity of the reef on May 9 they were also well dispersed along much of the northern shoreline including Boedne Bay and Christensen's Bay. The southern shore of Christensen's Bay also produced good numbers of walleye.

The electrofishing catch yielded a population estimate of 9768 (6451-15540) walleyes ages III and older combined or roughly 25% more than the estimate obtained from the net catch (Table 4). However, the estimate of age III fish alone (13543 (7261-27723)) was much higher than that of all ages combined because the age III recapture rate was much lower than that of the older groups (8% vs. 32%, see appendix). The age III estimate was 177% of the estimate obtained from the net catch (13543 vs 7646) while the estimate of age IV and older fish was similar for both capture methods (783 vs 815) as one would expect when both sexes are well-represented in the catch and well-mixed with the overall population. Given the very large confidence intervals on the age III electrofishing estimate, the estimate for ages III and older combined is probably a better number to use for planning purposes.

Although several environmental factors must come together to produce a yearclass of historic proportions, these results suggest that intensive control of the cormorant population that began in 2005 has played an important role in improving walleye survival. Numbers of cormorants feeding on the lake during April and May have been reduced 90% from the peak of over 1000 birds in 2005. Prior to 1990, cormorants were scarce. The control effort sharply reduced the potential for cormorant predation on ages 0-II walleye but other factors related to more than a decade of high cormorant abundance favored survival of the 2005 yearclass to age III:

- Depleted population of ages I and older walleye resulted in low intraspecific predation on the 2005 walleye yearclass and low competition for food.
- Depleted yellow perch population resulted in low predation on walleye fry and fingerlings and less competition with juvenile walleye for food (perch comprised 60-70% of the cormorant diet on this lake during 2005-2007 -Dan Traynor, LSSU study).

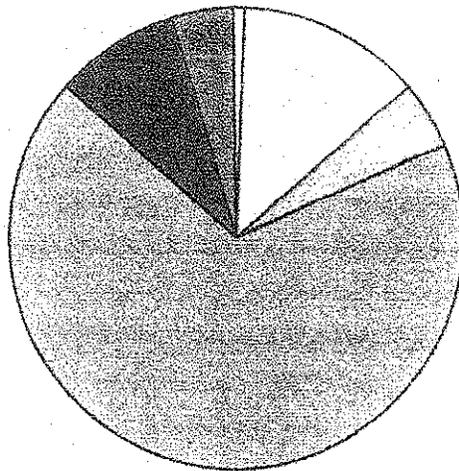
Further support for the value of cormorant control on Brevoort Lake comes from the observation that walleye reproduction in other central and eastern U.P. waters was not unusually high in 2005 (personal communications, MDNR staff). This explosion of the walleye population is an example of how quickly a "vacuum" can be filled when an important limiting factor is diminished and conditions are otherwise favorable. It also demonstrates that the Black Point reef, which was built at great expense, provides adequate spawning habitat for walleye in this 4230-acre lake.

The 2005 yearclass is so large that it may suppress survival of subsequent yearclasses for a few years. Age 0 production was low in 2006 and 2007. Annual fall electrofishing should continue to track age 0 and age I production. Spring netting and electrofishing assessments should occur at

N=118

Amorphous detritus Unknown fish Yellow perch Northern P White Sucker Walleye Crayfish Nematodes
0.122166 0.043081 0.617531 0.080301 0.040399 0.008647 0.082544 0.00533

Cormorant Diets 2005, Brevoort Lake n=118



- Amorphous detritus
- Unknown fish
- Yellow perch
- Northern Pike
- White Sucker
- Walleye

1 - Northern Pike AT 13"
1 - Bullhead AT 13"

RECEIVED

FEB 04 2008

WILDLIFE SERVICES
LITTLE ROCK, ARKANSAS

*Received from
Larry Meier*

Double-crested cormorants perch on the Mackinac Bridge during summer. Bridge authorities say bird droppings corrode the steel of the bridge.

Cormorants, Mackinac Bridge don't mix

Officials say droppings are corroding the span

BY FRED GRAY
NEWS-REVIEW STAFF WRITER

MACKINAW CITY — Pigeon and sea gull droppings have been eating away at the paint on the Mackinac Bridge for years and now double-crested cormorant poo can be added to the noxious mix, says the Mackinac Bridge Authority's chief engineer.

"We don't want them there," said Kim Nowack, who is looking for new ways to shoo the birds away. "The cormorants are the latest threat to the bridge. The bird droppings corrode the steel, and make maintenance harder by soaking up moisture and putting it against the steel."

She said the annual inspection re-

port said the droppings were a detriment to the coating system but had not risen to the "major problem" category.

Nowack said the authority had put screens on the box beams under the bridge where the pigeons like to nest, mainly toward the Mackinaw City end of the bridge. But the cormorants, which migrate to Michigan from Mississippi and Arkansas in the spring and return in late fall, are much larger and more voracious birds than pigeons and gulls.

Pete Butchko, state director of the U.S. Department of Agriculture's Wildlife Services, said that if he is asked he will make a site visit to the bridge and make a recommendation of things the bridge authorities might try to rid themselves of the menace.

"The bridge is symbolic with the state and anything that happens to

SEE BIRDS, PAGE A8



Kim Nowack, the Mackinac Bridge Authority's chief engineer, says droppings from double-crested cormorants, pigeons and sea gulls have been eating away at the paint on the bridge for years.

FRED GRAY/NEWS REVIEW

COURTESY PHOTO

Executive Summary

Over the last 30 years, the population of double-crested cormorants (*Phalacrocorax auritus*), a large, fish-eating, colonial-nesting waterbird, has increased dramatically in the Great Lakes' region. Recently, the Great Lakes' region population of cormorants was estimated to be 350,000 (Hanisch et al. in review). Studies have documented cormorant damage to recreational fisheries in several regions of the northeastern and midwestern U.S. Recreational fishing is an important socio-economic activity in upstate New York, which includes Oneida Lake, commonly referred to as the "The Walleye Capitol of New York State." The lake supports healthy populations of popular sportfish, including walleye (*Sander vitreus*), yellow perch (*Perca flavescens*), and smallmouth bass (*Micropterus dolomieu*) (VanDeValk et al. 2008). Declines in these sport fish populations at Oneida Lake have been attributed to cormorant predation (VanDeValk et al. 2002, Rudstam et al. 2004).

The major economic impact of cormorants was hypothesized to be a decrease in the number of non-resident anglers visiting Oneida Lake, due to decreased fish populations and negative media surrounding the cormorants' effects at the lake. A management program was initiated in 1998 to control the cormorant population, with the objective of decreasing consumption of walleye and yellow perch.

In 2008, the Economics Research Project at the Wildlife Services' National Wildlife Research Center collaborated with the New York Wildlife Services Program (NY-WS) on an economic assessment of cormorant damage to Oneida Lake and a benefit-cost analysis of the cormorant management program. The objectives of the study were to: (1) estimate the total cumulative impact of cormorants to the Oneida Lake Region (OLR) (1990-2005) in terms of jobs and revenue lost and (2) determine the total cumulative benefits and costs of the NY-WS cormorant management program from 1998-2005, in terms of jobs and revenue saved.

The methodological approach was to value both the direct and indirect economic impact created by the cormorants in the region and to assess the benefits and costs associated with the cormorant management program. The study employed an input-output model to estimate the

indirect amount of revenue and number of jobs lost in the region due to cormorant damage. A benefit-cost analysis was also used to compare the costs of the cormorant management program to the benefits of mitigating cormorant damage to the area. Costs included the total expenditures of the cormorant control program from 1998 to 2005 (i.e., salaries, boat operation, equipment, etc.). Benefits encompassed the potential savings associated with the projected number of non-resident anglers who either continued or returned to fish at Oneida Lake due to the cormorant management program.

Total benefits from 1998 to 2008 were calculated for three levels of non-resident anglers (15%, 30% and 50%). Level 1 estimated that the program saved 15% of the non-resident anglers potentially lost because of cormorant presence, level 2 estimated a 30% savings and level 3 estimated a 50% savings. A comparison of benefits vs. costs provided ratios to evaluate the overall program efficiency and to determine the return per dollar invested in the cormorant management program. A benefit-cost ratio (BCR) greater than 1.0 signified economic efficiency (i.e., savings equaled program expenses).

Our evaluation revealed:

- ❖ The total estimated revenue lost in the OLR due to cormorant damage from 1990 to 2005 ranged from approximately \$120 million to \$540 million. This equates to an average of between \$6.7 million and \$33.3 million annually (in 2008 dollars).
- ❖ The total estimated number of jobs lost in the OLR associated with the presence of the cormorants from 1990-2005 ranged from approximately 3,000 to 12,000, or an average of between 200 and 800 jobs annually.
- ❖ The total cost of the cormorant control program from 1998 to 2005 was approximately \$3.5 million (in 2008 dollars).
- ❖ The programmatic BCRs calculated over the life of the project ranged from 13.58 to 48.37 across different levels of benefit. This means that for every \$1 spent on the cormorant management program (1998-2005) \$13.58 to \$48.37 in benefits was realized.
- ❖ Additionally, it was estimated that the cormorant control program saved between approximately 1,500 and 5,000 jobs in the OLR from 1998 to 2005.

The Michigan DNR still has not come up with a holistic plan between their three components to help in getting the cormorant population reduced even though house and senate bills in '07 indicated that this should be a high priority.

The Michigan Governor again removed the \$150,000 from the State budget because we did not get a heavy push from the Michigan Senate.

U.S. Fish & Wildlife Service have indicated that no cormorant nests can be reduced below 100 on any island or other roosting areas. It will be important that each club note where cormorants have not nested in the past couple of years.

Ugly

The cormorant population on Hat Island increased again and now in the area cormorants are taking over 10,000,000 pounds of fish and they are also affecting the straits area including Brevort Lake. The straits area sportsman club has indicated that the number of birds they are seeing and harassing has increased by a thousand birds this past year, and therefore, are backing a 70% reduction in cormorants in the Beaver Island area.

Saginaw Bay '08 nest count has now reached 1,886 nests. This is 541 new nests from '07. If you put this into perspective, the 3,772 adult birds in '08 produced 6,601 young adults, therefore, equaling 10,373 birds and at a pound and live fish per day they are now consuming 14.4 tons of fish. Perch fishermen are definitely seeing a reduction in their numbers and walleye population will be next. Why do we have to take and wait until the entire fish population has been decimated like Cedarville, Alpena, Ludington, Beaver Island, Brevort, Drummond Island, Escanaba and other areas? Dr. Kurt Newman, of the Michigan Fisheries Division and the Lake Huron Basin Coordinator, can be reached at (517) 242-3623. He has indicated he would like to work with the sportsman clubs under his jurisdiction.

Dave Fielder, Fisheries Research Biologist, Michigan DNR, after his 5 year study reports, "I examined trends in perch reproduction, weather variables, water levels, and fishing activity. None of those factors were as influential as cormorant predation in contributing to the collapse of the perch population." He further tested a possible hypotheses for perch population in the presence of cormorant control. His findings were as follows:

- Declining total annual mortality rate. **Yes, this is happening**
- Increase in sport fishery catch rate, ultimately an increase in fishing pressure & harvest. **Yes, this happening**
- Increase in survey net catch rate of perch in Hessel Bay, possible increases in other stations as well. **Yes, this has happened**
- Greater longevity of year class in age structure (i.e. increasing mean age)
Yes, this is happening
- Decline in growth rate as density increases **Yes, this is happening**

On April 30, 2009, the current Fish and Wildlife Service Depredation Order will expire.

**CORMORANTS ON HAT ISLAND
NATIONAL WILDLIFE REFUGE
BEAVER ISLAND, MICHIGAN**

2007

7,942 nest (2 adults each)

=15,884 adult birds

3.5 young/nest (average 4-6)

= 27,797 young birds

Total = 43,681 feeding birds

Each bird eats 1.5lbs of live fish/day

43,681 X 1.5 lbs = 65,521.5 lbs/day

DCC in the area 150 days

65,521.5 X 150 = 9,828,225 lbs. of live fish

This is the Area that
The (MICH) USDA WS. HAS
Been working on for
3 yrs. with the local
Sportsman club.

Lake Huron By Dan Donarski **GREAT LAKES**
Drummond Island's Yellow Bellies **ANGLER**

If last fall is any indication, then the ice fishing on Potogannissing Bay at Drummond Island this winter should be nothing short of superb. Credit cormorant control and a number of good years with above average spawning conditions for a great perch comeback.

Specific areas to check out in this expansive body of water are Maxton and Scott Bay. Start working the isolated weedbeds in 5 to 8 feet of water. If nothing shows, head deeper in 5-foot increments.



The Fish Point area of Saginaw Bay produced this walleye for Doug Demming last February. Near-shore areas of this massive Lake Huron Bay usually have safe ice in January. Demming caught this one with a Jigging Rapala in 12 feet of water. Fishing info: Fish Point Lodge, 989-674-2631; fishpointlodge.com

ABOVE PHOTO BY CHIP GROSS • PHOTO BY MARK ROMANACK

mich JAN-08

House supports Sheltrown's cormorant control

In a move designed to give Michigan more aggressive control of its double-crested cormorant population, State Rep. Joel Sheltrown (D-West Branch) Jan. 16 announced that the House passed his resolution urging the federal government to remove the voracious bird from the list of protected species under the Migratory Bird Treaty Act.

"In order to protect our vital fisheries, Michigan must have the capacity to deal with problem cormorants," said Sheltrown, a longtime advocate of eliminating outdated federal cormorant protections. "Fishing has an enormous impact on our local economy, and if we continue to lose fish, we will also lose tourists and businesses. The cormorant population in Michigan has expanded significantly, and federal protection is no longer needed."

Once an uncommon species, the birds can now be found throughout the Great Lakes. The double-crested cormorant's numbers are at historic highs in the Great Lakes region, with an estimated population of over 600,000 birds in 2005. Each adult cormorant can consume 1 to 1.5 pounds of fish per day, including small steelhead, salmon, and walleye.

In addition to the devastating effect that cormorants have on fish populations, manmade structures have also been damaged by cormorants, increasing maintenance costs of both the public and private sectors. The cormorants' acidic droppings have been cited as a significant contributing factor to the deterioration of the paint on the Mackinac Bridge.

"We don't need people in Washington telling us what's best for Michigan," Sheltrown said. "We can't allow cormorants to continue destroying our fisheries and precious natural resources, and I call on the federal government to turn over management of cormorants to our state, so we can deal with them appropriately."

From Larry Meier

2-8-08

