House Committee on Natural Resources Oversight Hearing
Examining Effects of Mismanagement of the Cormorant in the Great Lakes Region.
Written Testimony - Mark Engle

My family owns and operates a seasonal cabin rental resort in the Les Cheneaux Islands. Our place of business is located between Hessel and Cedarville in the middle of the 36 island chain that spans 12 miles along M-134 in the Eastern Upper Peninsula.

My family purchased Les Cheneaux Landing in 1982. Our resort is based on family vacations and sport fishing that includes a renowned yellow perch fishery. We cater to small boat fishing in protected channels and bays along the northern Lake Huron shoreline.

By the late 1980's there was a noticeable increase in the Double Crested Cormorant (DCCO) population that called the Les Cheneaux Islands home.

I participated in a pilot study (MDNR Fisheries Division Special Report No. 17 - ***History, Status and Trends in Populations of Yellow Perch and Double Crested Cormorants in Les Cheneaux Islands, Michigan***, see attached pages referenced.) that began in 1995, concluded in 1996 and was published in 1997. The study was an effort to determine the diet composition of the Double Crested Cormorants (DCCO) in the Les Cheneaux Islands.

By 1995, the DCCO population had begun to increase dramatically. On Goose Island (42 acres) a large DCCO rookery had been established numbering approximately 8,828 ***(page 7)*** nesting birds, not including juveniles and individuals. As part of the pilot study, over 373 feeding cormorants were shot for the purpose of examination of stomach contents. Stomachs were removed, frozen and sent to University of Michigan for analysis. 1995 results revealed 72% ***(page 24)*** of DCCO diet consisted of alewife, while yellow perch made up 4% of the total biomass consumed. At issue for me is that the pilot study was completed before the decline of the alewife population which led to increased DCCO predation on local native fish. Also, there was no follow-up research to determine if dietary habits had changed due to lack of alewife. As stated in the study, the comparison of only two years of mortality data is not sufficient to answer the question of the impact of DCCO predation on yellow perch. ***(Page 55)*** The DCCO population continued to increase from 1995 through 2003 prior to control measures that began in 2004.

By the time the pilot study was published in August, 1997, I believe the DCCO population had greatly increased; the alewife population was declining and predation on yellow perch was on the rise. A major factor in the decline of yellow perch is the fact that the arrival of migrating DCCOs coincides with yellow perch spawning activity. It is obvious that feeding DCCOs impact perch in spawning areas which over a period of years has been detrimental to perch reproduction. It became common to see large flocks of DCCOs (500+) feeding daily in perch spawning areas. ***(See attached Cedarville High School Yellow Perch Skein Study Graph)***

From 1999 through 2008, local high school biology teachers and students conducted a yearly perch egg skein survey in a shallow bay known historically to be a spawning site. By the year 2003 no skeins were recorded, revealing a total crash in the local perch population.

Our resort business suffered from DCCO over-population and the resulting lack of fish in the Les Cheneaux Islands. Local businesses struggled, bait shops closed, resorts closed; fishermen and families cancelled reservations due to lack of fish. Our resort hung on but the vital "shoulder seasons" (spring & fall) became nearly void of customers. We were, economically, just getting by.

By 2002, after much public outcry, discussions and large public meetings, MDNR Fisheries agreed that a management plan was needed to control the DCCO population. In 2004 MDNR Fisheries and USDA/APHIS WS began a coordinated effort to achieve a balance between DCCOs and fish.

As a result of cormorant management, the Les Cheneaux Islands fishery began to rebound and the local economy began to recover. Many fishermen and vacationers returned to the area and we saw a noticeable improvement in our business.

We were shocked by the federal court's decision, on May 26, 2016, to vacate the depredation order that had been in place for 12 years. Since 2016, we have observed an increase in the DCCO population leaving our small business as well as the entire Les Cheneaux area in great jeopardy once again. Cormorant management is necessary in the Les Cheneaux Islands in order to avoid another crash in local native fish populations that are so vital to our economic stability.

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DEPARTMENT OF NATURAL RESOURCES

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History, Status, and Trends in Populations of Yellow Perch and Double-Crested Cormorants in Les Cheneaux Islands, Michigan

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placed on Michigan's first threatened and endangered species list in 1976 as "probably extirpated". Domestic DDT use was banned in 1972.

Throughout this period of reduced reproductive success of cormorants due to DDT-group chemicals on cormorants, other less sensitive species were able to take advantage of the vast new food resource of alewife in the Great Lakes. Ring-billed gull numbers had exploded (Ludwig 1974), the Caspian tern population more than doubled between 1962 and 1978 (Ludwig 1965, 1979), and herring gulls seemed to have recovered from the acute but localized impacts of DDT-group chemicals on their population (Ludwig and Tomoff 1966, Ludwig and Ludwig 1969).

As DDT/DDE levels declined rapidly and cormorants reappeared in the late 1970s in the Great Lakes, there was a high food abundance for a foot-propelled diver. The first successful nesting recorded was in 1978 by 24 pairs at Gravelly Island, northern Green Bay, which fledged 29 chicks. This apparently desirable return of a threatened species from near extirpation was soon overshadowed by the explosive increase in cormorant numbers causing damage to vegetation on nesting islands (Ludwig 1984), as well as possible damage to valuable sport and commercial fish populations (Craven and Lev 1987). By 1981, 318 nests were found in seven colonies across the state (Ludwig 1984). By 1986 there were at least 1,094 nests in Michigan (Table 3-1). The 1995 nesting population in Michigan waters of the Great Lakes was estimated to be approximately 18,000 nests (Table 3-2): at least 25 major colonies were occupied. The nesting population in Michigan could have been as high as 20,000 pairs in 1995. The group of nesting cormorants in Les Cheneaux Islands area was estimated at 4,414 pairs, 24% of the surveyed nesting population (18,572 pairs) in Michigan.

For the first eight years of this recovery, the increase in nesting numbers averaged 72% per year. During the nine nesting seasons from 1987 through 1995, this rate of growth decreased to perhaps 25% in 1994 and 1995. However, because the population base on which the rates of increase are calculated is large, the total number of birds added to the population increased, while growth rates decreased. For example, a 72% increase from 318 pairs in 1984 would have been an additional 229 pairs in 1985. However, a 25% increase in 1995 would mean an additional 4,293 pairs added to the population in 1996.

In 1995 there were at least 25 major colonies of cormorants in Michigan, and very likely others, particularly in Grand Traverse Bay and parts of central and western Lake Superior. Table 3-2 lists the colonies known to the authors and estimates their population sizes based on visits made in 1995 where either counts of active nests were made, or banding visits were made to tag chicks. If no visit was made to a known colony in 1995, we predicted the population size in 1995 based on trends in cormorant populations, knowledge of the site, and probable disturbance to occupied sites since our most recent visit: We assume that these colonies comprise between 85 and 95% of the actual breeding population for the state in 1995. We also projected the breeding population in 1996 (21,465 pairs nesting) and 1997 (25,758 pairs nesting) under unsupported assumptions that growth rates will remain at 25% in 1996 and then drop to 20% in 1997. These projections assume that no major diseases will affect the population, and that no control efforts will be started in that time. In addition to breeding birds, there will be one- and two-year olds that migrate to the Great Lakes and frequent the area of the colonies. We project the summertime 1997 population of Michigan cormorants to be near 70,000 individuals, up from an estimated 48,000 birds in summer 1995.

In nearby Canadian waters there are many more cormorant colonies. Those nearby colonies of the North Channel and northern Georgian Bay known to the authors are listed in Table 3-3. For this incomplete survey, we estimated 22 active major colonies and 14,982 nesting pairs. However, we are certain that this is a considerable underestimate of the actual population, perhaps by 25 to 33%.

Table 3-13.–Average percent by weight of fish species in cormorant diets (all locations and dates combined) for different time periods from 1986 to 1995.

Fish species	1986 to 89	1990	1995
Alewife	58	66	72
Sticklebacks	4	3	2
Rainbow smelt	5	5	4
Yellow perch	10	6	4
Sculpins	2	1	1
Suckers	10	10	7
Rock bass	3	3	3
Smallmouth bass	3	2	1
Carp	3	4	1
Whitefish	<1	0	0
All other prey species	2	1	5

Table 3-14.–Ten-year projection of cormorant population numbers for the upper Great Lakes.

Year	Growth rate (%)	Breeding population	Possible limiting factors
1995	25	41,000	Nesting habitat
1996	20	49,200	Food in local areas
1997	17	57,564	Disease increasing
1998	14	65,623	NDV, parasites increasing
1999	12	73,498	Adult age-structure changing
2000	9	80,113	Nesting space and food critical
2001	5	84,118	All control factors increased
2002	3	86,642	Birth and death rate equilibrium
2003	1	87,508	Population reaching maximum size
2004	0	87,508	

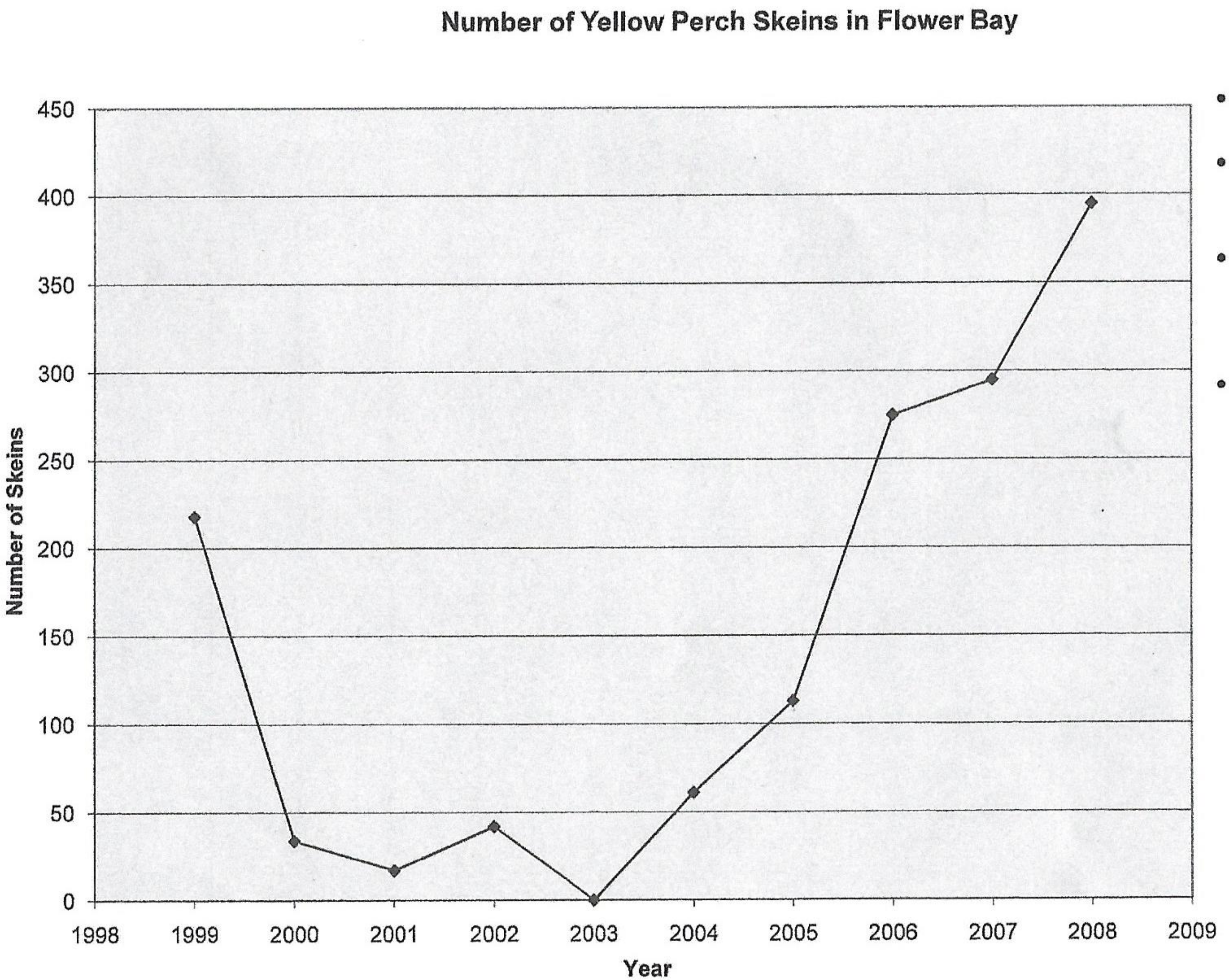
To determine possible impacts of increased predation or altered size selectivity during perch spawning, two calculations were made using the best 1995 estimates for all input variables, changing first only the proportion of perch in the cormorant diet during spawning, then also altering the size distribution to include more large fish. Allowing perch to compose 90% of the diet during the first 30 days, the estimated number of perch consumed was increased by 66% (780,000 perch consumed, compared with 470,000). However, the highest mortality rate was 11.3% (age 3), still small compared with total annual mortality. Allowing the proportion of perch 150 mm and larger to increase from 0.24 (as in 1995) to 0.50 for perch consumed during spawning, the estimated total number consumed fell back to 580,000. Under this scenario, cormorants eat fewer but larger perch. The cormorant-caused mortality rates declined for ages 1 to 3 and increased for ages 4 and older compared with mortality rates from the first 1996 simulation. The highest mortality rate still occurred at age 3 and was 10.7%.

I conclude that reasonable year-to-year variation in cormorant predation of perch during perch spawning does not appear to drastically alter age-specific mortality rates, provided perch and cormorant population sizes are comparable to 1995 estimates. Over the long term, changes in predatory behavior of cormorants, ecological plasticity in the timing or location of perch spawning, and population fluctuations for either cormorants or perch may influence the importance of cormorant predation on perch survival. The cormorant population in Les Cheneaux Islands area is predicted to continue to expand for at least the next few years (Chapter 3), and depending on the type of functional response involved, this may result in greater consumption of perch.

The relative contributions of different sources of mortality of perch, as well as total annual mortality, may also vary annually. Lucchesi (1988) and Schneeberger and Scott (Chapter 4) used comparable techniques to estimate total annual mortality in 1986 and 1995, respectively. Total mortality was 55% in 1986 and 45% in 1995. These differences may represent a gradual decline in mortality over the last decade, substantial yearly fluctuations in mortality rates, or differences in sampling bias. The composition of these morality rates has changed substantially, in that Lucchesi (1988) estimated that in 1986 fishing mortality for adult perch may have been as high as 40%, whereas in 1995 fishing mortality was estimated to be no greater than 5%. Furthermore, although cormorant predation has not been shown to cause high mortality rates in 1995, in 1986 Les Cheneaux cormorant population was two orders of magnitude smaller and therefore accounted for a negligible amount of perch mortality. The larger, more important, question underlying these issues regards the additivity of sources of mortality on perch. In other words, does mortality from cormorant predation or angling occur in addition to other sources of mortality (additive) or does it replace other sources (compensatory)? The comparison of only two years of mortality data is not sufficient to answer this question.

There may also be variation in total annual mortality of perch across ages. Since different factors affect mortality at different ages, it seems likely that age-specific total mortality rates will differ. Catch curve analysis (Chapter 4), a standard fisheries technique, only examines mortality for older fish and assumes that mortality rates do not differ by age. This assumption may not be unreasonable for older fish, which are less size differentiated, less affected by physical factors, and more uniformly susceptible to predation, all of which may result in similar and stable mortality rates. Mortality for younger perch is likely to be higher, more variable, or both. Cormorants may occasionally be a more prominent source of mortality for these ages, depending on their density and the relative additivity of all sources of mortality. All of these questions regarding variability in mortality of perch will be addressed in a forthcoming mathematical model of Les Cheneaux Islands yellow perch and cormorant interaction.

We know little about the indirect or higher order effects that cormorants have on target populations (such as perch) or on other components of these aquatic systems. For example, cormorants prey on northern pike



- **Perch skeins were collected by Environmental Science/Biology classes from Cedarville High School, Cedarville, MI**
- **GPS was used to replicate the site each year.**
- **Instructors monitored water temperature and watched for spawning activity.**
- **Flower Bay is a shallow, dark bottom bay. Students waded in the spawning area carefully counting perch egg skeins.**
- **Cormorant control began in 2004.**

—◆— Number of skeins

Number of Skeins

1999	218
2000	34
2001	17
2002	42
2003	0
2004	61
2005	113
2006	275
2007	295
2008	395