Environment Canada
Ontario Region

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GREAT LAKES FACT SHEET

THE FALL AND RISE OF OSPREY POPULATIONS IN THE GREAT LAKES BASIN

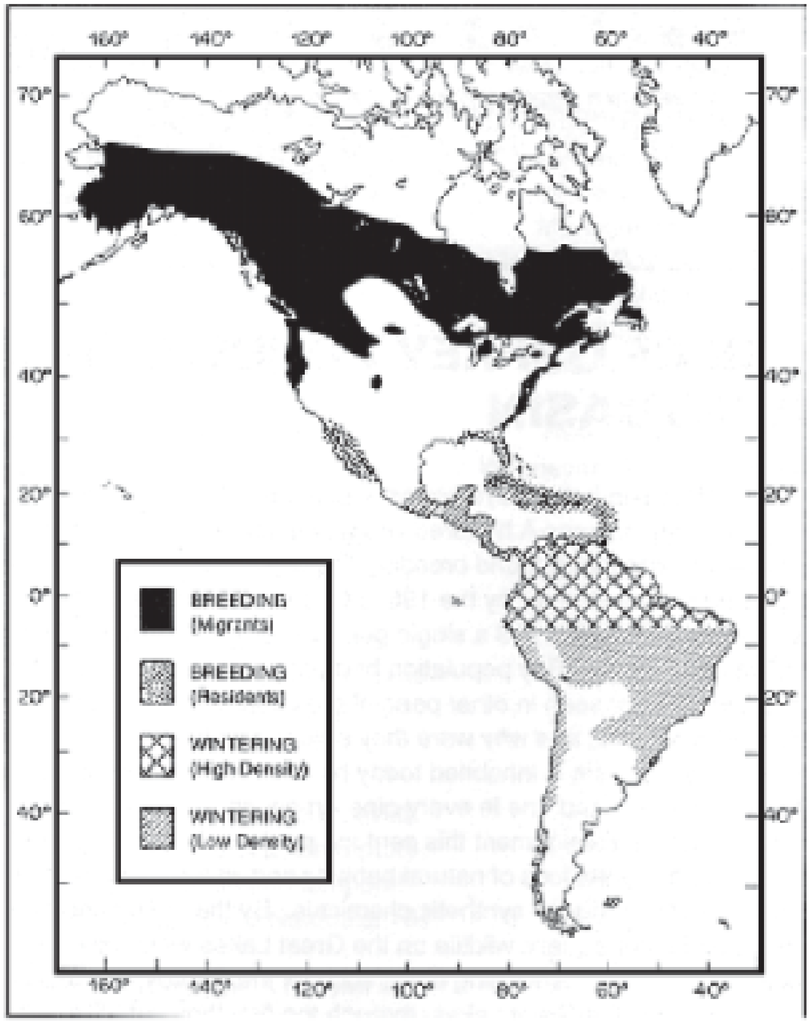
Canada supports at least one third of the world's breeding Ospreys.

Ospreys (*Pandion haliaetus*) were once common along shallow water margins of the Great Lakes. A hundred years ago James Henry Fleming, a famous Canadian naturalist, found breeding Ospreys to be "generally distributed" in Georgian Bay, Lake Huron. By the 1960s Ospreys had vanished from this area as a breeding bird. In 1973 a single pair built a nest on top of a hydro pole, and by 1993 the Georgian Bay population had grown to over 50 pairs. Similar recovery patterns were seen in other parts of the Great Lakes. *What caused these birds to disappear, and why were they able to recolonise?*

The Great Lakes basin is inhabited today by over 36 million people -- one in every three Canadians and one in every nine Americans. Human population growth and industrial development this century, particularly since the 1940s, has been accompanied by the loss of natural habitats and widespread use and discharges of a wide range of synthetic chemicals. By the 1960s and early 1970s, birds and other aquatic wildlife on the Great Lakes were experiencing reproductive problems.   Fish-eating birds, such as the Osprey, are exposed to toxic contaminants in the Great Lakes, through the fish they eat. Since the early 1970s biologists have studied birds in the Great Lakes basin, in order to monitor the levels and biological effects of toxic chemicals. Since these birds are at the top of the aquatic food web, they can serve as barometers or indicators of environmental conditions.

James Richards

This fact sheet examines the problems faced during the 20th century by Ospreys breeding around the Great Lakes. It outlines the effects that various changing factors have had on breeding populations including the dramatic effects of persistent organochlorine contaminants, notably the pesticide dichlorodiphenyltrichloroe-



The breeding and wintering range of Ospreys in North and South America (from Poole 1989).

thane (DDT) and its metabolite, dichlorodiphenyldichloroethylene (DDE), which causes egg shell thinning in many bird species, leading to breakage before they hatch. This fact sheet also describes recent activities to restore Osprey populations, and considers how this species could be useful as a sensitive monitor of the effects of toxic contaminants and other stressors in the Great Lakes basin ecosystem.

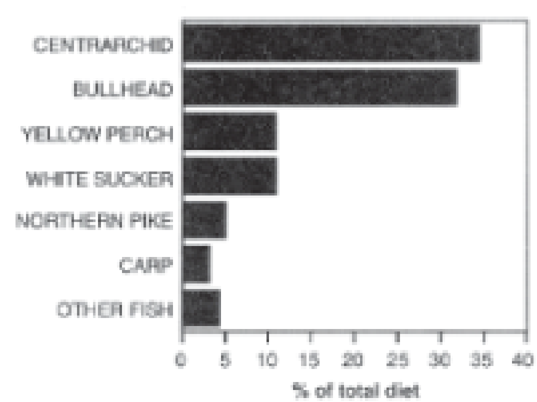
THE OSPREY

Ospreys are spectacular and unique birds at the top of the aquatic food web. They are birds of prey, like eagles, hawks and falcons, and have powerful sharp talons and a hooked beak for handling their prey. Unlike their relatives Ospreys eat fish almost exclusively. They catch fish in a dramatic way -- diving into the water from a height of up to 40 metres. The opposable outer toe (which can be moved to point forwards or backwards), and the sharp spines on the soles of the feet, help the Osprey to grasp the wriggling fish until a safe perch is reached. Ospreys are large birds, weighing 1.5 - 2.0 kg, with a wingspan of 1.6 metres. Males are slightly smaller than females.

There is only one species in the Osprey family (Pandionidae), but it inhabits most parts of the world, except the polar regions. Ospreys breed commonly in parts of North America and most of these birds migrate up to 8000 km to wintering areas in South or Central America (see Figure 1). Populations breeding in Florida, California and parts of Central America and the Caribbean are non-migratory. Canada supports at least one third of the world's breeding Ospreys. Some nest close to saltwater, often in loose colonies, but most nest as scattered pairs throughout the vast network of freshwater lakes and rivers in the interior.

Ospreys are present on Canadian breeding areas from early April to September. Their large stick nest is usually built at the top of a dead tree close to or over water. Ospreys are adaptable birds, often tolerant of humans, and will nest on a variety of artificial structures such as hydro poles, duck blinds, microwave towers and navigation light towers. In the Great Lakes basin the Osprey's clutch of three eggs is laid in late April or early May, about three weeks after the birds arrive, and is incubated for about 40 days. Chicks usually fledge in mid-July when they are about 55 days old, but remain around the nesting areas for another three weeks or so, dependent on the parents for food.

Figure 2



The composition of Osprey diet in the Great Lakes, based upon 609 diet items collected at nests in 1991 and 1992.

Male Ospreys provide virtually all the fish for the family while the females remain at the nest for much of the summer. In the Great Lakes region a variety of fish species are eaten, probably reflecting local availability (see Figure 2). Raccoons are the main predator of Osprey eggs, and Great Horned Owls (Bubo virginianus) sometimes kill Osprey chicks and even adults.

Canadian Ospreys spend their first two years of life in Central or South America, and do not usually make their first breeding attempt until three to five years of age. Surprisingly, although Ospreys are long-distance migrants, the young birds normally return to breed within 50 km of their natal site. Colonisation of new areas is therefore relatively slow.

On average, just over 50 per cent of Ospreys die in their first year of life. About 10 to 15 per cent of adults die each year, giving an average adult life expectancy of six to ten years. However, a few have reached the ripe old age of 25 years. In order for a population to sustain itself the number of recruits into the breeding pool must balance the losses due to adult mortality. In parts of the northeastern United States, biologists have calculated that a pair of Ospreys must produce, on average, 0.8 young each year, for a population to remain stable. This break-even figure will vary with factors such as the availability of suitable nest sites, age at first breeding and mortality rates.

DECLINES

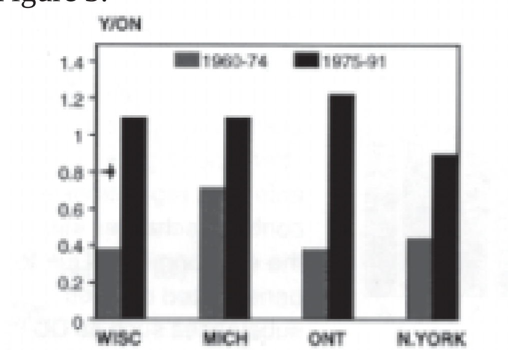
The earliest records of Ospreys from the Canadian Great Lakes are bones found by archaeologists in native sites on Lake Huron, which were occupied during the 16th century. Towards the end of the 19th century Ospreys could be found throughout much of Ontario, except the extreme southwest where many shorelines had already been cleared of large trees, and they bred commonly around Lake Superior, Lake Huron, and probably also along parts of the Lake Ontario and Lake Erie shorelines.

By the 1930s some declines were noticed, especially around the lower Great Lakes. Removal of the larger pine trees for timber probably reduced the number of suitable nest sites for Ospreys and, like many large birds earlier this century, Ospreys were often shot. Unlike the situation in Europe, egg collectors and trophy hunters in North America appear to have had relatively little impact on Osprey breeding numbers.

These earlier population declines were probably fairly slow and small. They were overshadowed by the dramatic decreases which occurred between the 1940s and 1970s around the Great Lakes. Ornithologists in different regions described Osprey population declines with phrases like “alarming change”, and “only a few remain, a sad remnant”. Similar population crashes were seen during this period in populations of the Double-crested Cormorant (*Phalacrocorax auritus*), another fish-eating bird nesting around the Great Lakes.

As is often the case with environmental problems, detailed studies of Osprey populations began after a problem was identified, resulting in no accurate population counts prior to the 1960s. However, the 1960s and early 1970s were periods of critical population decline for Great Lakes Ospreys. Along much of the Atlantic coast of the United States, Osprey numbers also crashed at this time. Elsewhere in Canada declines occurred, but were less dramatic, particularly in remote northern areas.

Figure 3.



Mean productivity (young fledged per occupied nest per year) of Ospreys in parts of the Great Lakes basin and Upper New York State, 1960-74 and 1975-91. The dashed line indicates the supposed ‘break-even’ production level of 0.8 young per occupied nest per year, thought necessary to maintain stable breeding numbers.

Reproductive Problems

The first indications that North American Ospreys were experiencing reproductive problems came from New England in the mid-1960s. Few chicks were being produced and when nests were examined they often contained unhatched or cracked eggs, or just eggshell fragments. The same phenomena were seen in Ospreys around the Great Lakes basin.

In the 1960s and early 1970s Ospreys in the Great Lakes drainage basin were producing, on average, 0.4 to 0.7 chicks per pair each year. This was below the productivity necessary to maintain a stable population (0.8 chicks), as shown in Figure 3. Ospreys nesting along the Great Lakes shorelines showed the most significant impacts. Between 1964 and

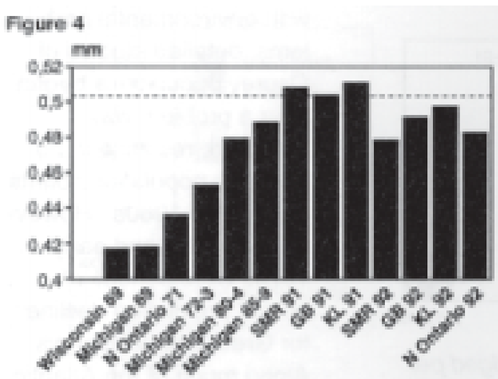
James Richards

1971 Ospreys nesting in inland parts of northern Michigan produced an average of 0.6 young per pair, whereas those nesting within five km of the Great Lakes shoreline produced only 0.3 young. Furthermore, Great Lakes Osprey eggs collected during the 1960s and 1970s had significantly thinner shells than those collected before World War II. Some showed over 20 per cent eggshell thinning (see Figure 4).

Pete Ewins

Toxic Chemical Impacts

A wide range of toxic chemicals is found in the water, sediments and aquatic life of the Great Lakes. Some of these persistent contaminants originated from industrial sources within the Great Lakes basin prior to strengthening and enforcing regulations to control discharges into the environment. Due to bans placed on toxic substances such as DDT and mirex, concentrations of toxic contaminants have declined. Today, atmospheric deposition is another significant source of toxic chemicals in the Great Lakes with toxic pollutants carried from sources well outside the Great Lakes basin. Many of these chemicals break down very slowly in the environment, making their impact a concern many years after they have been withdrawn from use.



Changes in mean shell thickness of Osprey eggs in the Great Lakes region since 1969. Area letters refer to locations shown in Figure 6.

Residues of some organochlorine pesticides and polychlorinated biphenyls (PCBs) are particularly toxic to wildlife. These toxic compounds are lipophilic -- attracted to fat molecules, becoming chemically bound to them. The toxic chemicals will then accumulate in an individual organism through a process known as bioaccumulation. Once absorbed by plankton in the water, these organochlorine molecules work their way up the trophic levels of the food web, from small plankton to large plankton, to crustaceans and other invertebrates, to small fish, and finally to larger predatory fish and fish-eating species like the Osprey, gulls, terns, cormorants, or humans. At each step in the food web the organochlorine contaminant remains bound to lipid molecules, but becomes more concentrated, by a process known as biomagnification. Through this process, minuscule concentrations of toxic chemicals in the water become concentrated in the bodies of wildlife, often ending up at very high concentrations in organisms at the top of the food web.

An Osprey egg provides a snapshot of the toxic contaminants present in the female's body at the time the egg was formed. Chemical analysis of eggs from parts of North America in which Ospreys were reproducing poorly in the 1960s and 1970s detected a wide range of organochlorine contaminants. These included the organochlorine pesticide DDT (first used in the mid-1940s), and its breakdown product DDE. Other pesticides

DDE AND EGGSHELL THINNING

Thinning of eggshells was the first reproductive problem related to contaminants identified in fish-eating birds on the Great Lakes. Eggshell thinning is caused by the presence of DDE in female birds. Eggshells are made of calcium carbonate, which is synthesised from calcium and carbon dioxide in the bird's body. This chemical reaction is assisted by the activity of an enzyme, and DDE inhibits the action of this enzyme. As a result, the eggshell does not contain as much calcium carbonate as it should, and so is thinner than normal and more prone to breakage during incubation by the adult. The density of pores in the eggshell (through which moisture and gases pass) is also altered by DDE contamination of females.

Birds of prey are amongst the most sensitive of species to the effects of DDE. In the United States during the 1970s, the thickness of Osprey eggs was significantly associated with their DDE content. On average, 10 per cent eggshell thinning was associated with two ppm (wet weight) DDE, 15 per cent with four ppm, and 20 per cent with nine ppm DDE. Osprey eggs more than 15 per cent thinner than normal are very likely to break before they hatch, so the critical level of DDE in Osprey eggs appears to be about four ppm.

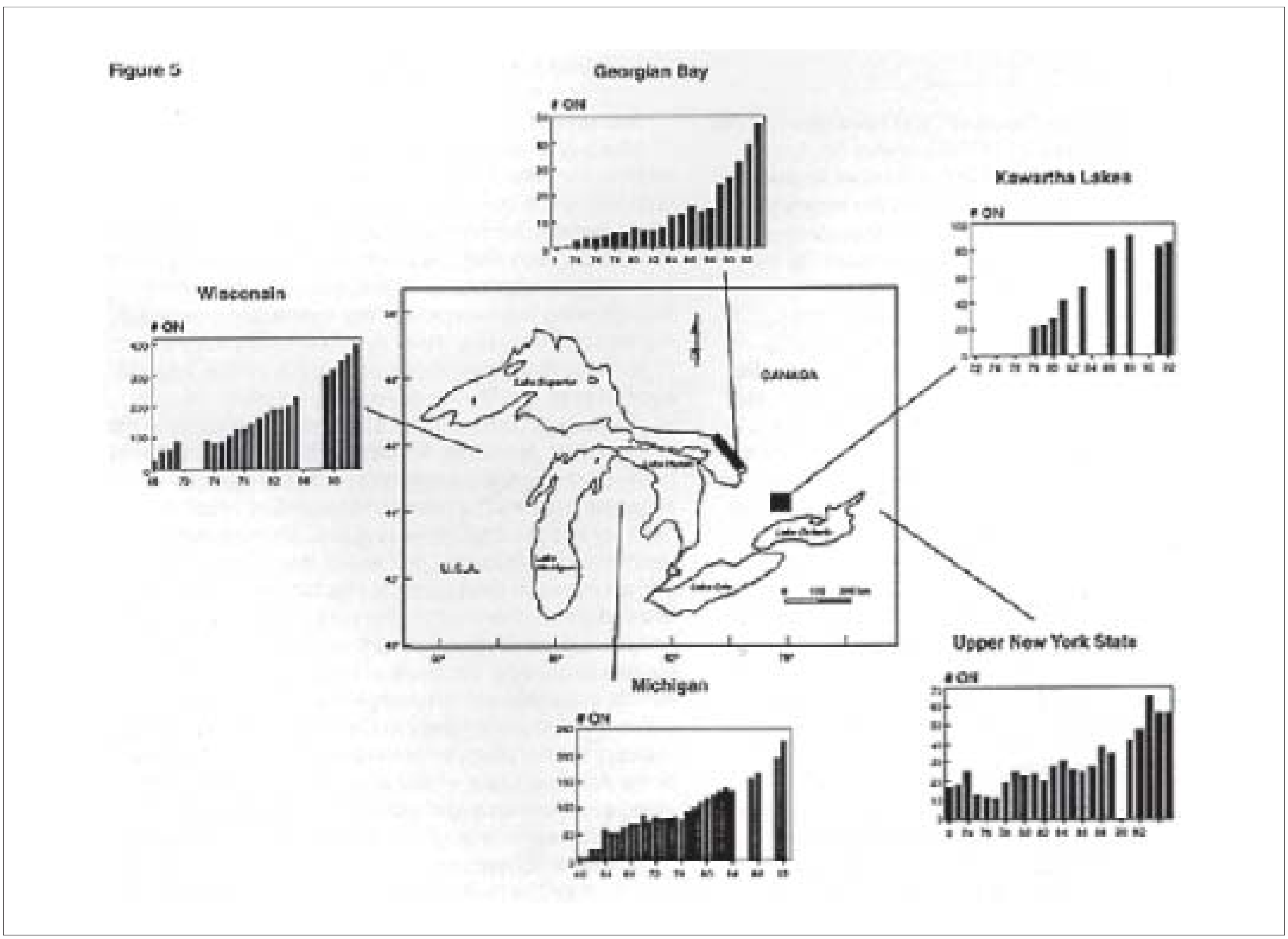
such as dieldrin and chlordane compounds, as well as polychlorinated biphenyls (PCBs) and mercury also appeared in Osprey eggs and various body tissues such as liver, brain and muscle.

Eggs collected in the early 1970s from 20 Osprey nests in northeast Michigan and northwest Ontario contained many of the same contaminants, but for most compounds concentrations were usually below the suspected critical levels. The minimum critical levels of the main contaminants in the eggs of birds of prey (above which adverse reproductive effects are frequently observed) are approximately four ppm for DDE, one ppm for dieldrin, 50 ppm for PCBs, and 0.5 ppm for mercury. However, DDE levels in over two-thirds of these eggs exceeded four ppm — the critical level associated with 15 per cent eggshell thinning and an elevated risk of egg breakage. In other Canadian provinces and territories about three quarters of Osprey eggs analyzed in the 1960s-70s also contained more than four ppm DDE, suggesting that eggshell thinning, and the poor reproduction that resulted, were not confined to the Great Lakes basin.

A single pesticide, DDT, appears to have been largely responsible for

UNITS OF TOXIC CONTAMINANTS

The concentrations of toxic chemicals in the environment are often expressed in parts per million (ppm). When dealing with bird eggs, the concentrations are usually given relative to the weight of the liquid part of the egg - its ‘wet weight’. Therefore, ppm (wet weight) is the number of grams of contaminant per one million grams of egg contents. To help you picture how small some of these concentrations are, one part per million is equivalent to a cube of ice (5 g) in a five tonne block of ice. Unfortunately, some chemicals are harmful to wildlife even at these very low levels.



Increases in numbers of occupied Osprey nests since 1960 in various parts of the Great Lakes basin and Upper New York State.

SELECTED CONTAMINANTS

DDE

Dichlorodiphenyldichloroethylene (DDE) is a "metabolite" (or a breakdown product in an organism's body) of the synthetic pesticide known as dichlorodiphenyltrichloroethane (DDT). DDE is produced in most animals when the body tries to rid itself of DDT.

DDT was introduced for widespread use as an insecticide just after World War II. Most uses of DDT were banned in Canada in 1974, under the Pesticide Control Act. However, the use and sale of existing stocks of DDT products were allowed until Dec. 31, 1990. DDT use in the United States was banned in 1972. It is the levels of DDE, and not DDT, which are routinely measured, because DDE is the most fat-soluble of the DDT breakdown products. DDE is also the most easily measured in the fat of animals or their eggs. Unfortunately, DDT is still used quite widely in parts of Central and South America as an effective control measure for malaria and various insect pests of crops.

PCBs

Polychlorinated biphenyls (PCBs) have been in use since 1929. There are 209 PCB isomers (ie. types), which differ from each other in the number and relative position of the chlorine atoms on the biphenyl molecular frame. A small number of these isomers are particularly toxic and are thought to account for the bulk of PCB-induced toxicity in animals.

PCBs are extremely stable molecules, which makes them desirable for industrial uses, but also means that they persist for a long time once released into the environment. The low flammability of PCBs made them useful as lubricating oils and fire retardants in insulating and heat-exchanging fluids used in electrical transformers and capacitors. They also were used as plasticizers and waterproofing agents and in inking processes used to produce carbonless copy paper. Industrial manufacturers voluntarily cut back PCB production in 1971. In Canada, PCB use was regulated in 1977 under the Environmental Contaminants Act. PCBs have not been manufactured in North America since 1978. Importation of all electrical equipment containing PCBs was banned after 1980, and their use was restricted to existing equipment.

2,3,7,8-TCDD

Dioxin is the popular name for a class of chlorinated hydrocarbon compounds known as polychlorinated dibenzo-*p*-dioxins (PCDDs). PCDDs, along with polychlorinated dibenzofurans, or PCDFs, are produced as by-products during some chemical reactions involving high temperatures in the presence of chlorine. Only a few of the 75 PCDD and 135 PCDF isomers are highly toxic; others are practically harmless. The most toxic dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), but animal species vary considerably in their sensitivity to this chemical.

Elevated levels of 2,3,7,8-TCDD in the environment are linked closely to effluent from previous 2,4,5-trichlorophenol manufacturing (for wood preservatives), and to toxic waste disposal sites associated with this manufacturing, such as Love Canal along the Niagara River. Atmospheric deposition of 2,3,7,8-TCDD, either bound to dry airborne particles, or in rain or snow, is now a major source of this and other organochlorine compounds, particularly in the upper Great Lakes. The original sources of atmospheric PCDDs and PCDFs today include municipal incinerators which burn a wide range of chlorinated compounds put out with the trash, and exhaust from vehicles burning leaded gasoline or diesel (both of which contain chlorinated hydrocarbon compounds). Chlorine bleaching of kraft wood pulp is another source of 2,3,7,8-TCDD, but this has not been identified as a major source of the compound in the Great Lakes aquatic ecosystem.

MERCURY

Mercury is usually found within the natural environment in very small concentrations. Like the organochlorine compounds, it is soluble in fat and blood, breaks down very slowly, and bio-accumulates in the aquatic food web. At low background levels it is not a problem to animals, and birds get rid of mercury in their growing feathers, which are eventually moulted. At higher concentrations mercury is extremely toxic to animals, and concentrations of only 0.5 ppm in eggs of birds of prey can kill the developing embryo.

Mercury occurs naturally at low concentrations in the environment. However, flooding of large areas of forest (such as during the construction of hydro-electric schemes) causes the release of large quantities of mercury into the aquatic ecosystem. Mercury has been used widely in industrial processes this century, including: ammunition manufacture; machinery manufacture; separation of other metals; the pulp and paper industry; and, as a seed dressing in agricultural areas. In response to growing evidence of chronic and acute effects in wildlife, the discharge and use of mercury was regulated more tightly in Canada during the 1970s. Mercury is now used, in increasing quantities, in parts of the Amazon basin where prospectors pan for gold along small streams and tributaries. Atmospheric deposition is now a major source of mercury in the Great Lakes ecosystem.

the dramatic population declines in Ospreys and many other bird species. Although other toxic chemicals may also have caused biochemical and physiological stress to Ospreys at this time too, their sub-lethal effects are less clearly understood than for DDT.

Not all manufactured chemicals are toxic to wildlife. Many species possess biochemical defence systems which can detoxify some of these foreign substances. However, the organochlorine pesticides and some PCBs are relatively toxic to animals, and birds of prey have relatively inefficient mechanisms for eliminating these lipophilic contaminants.

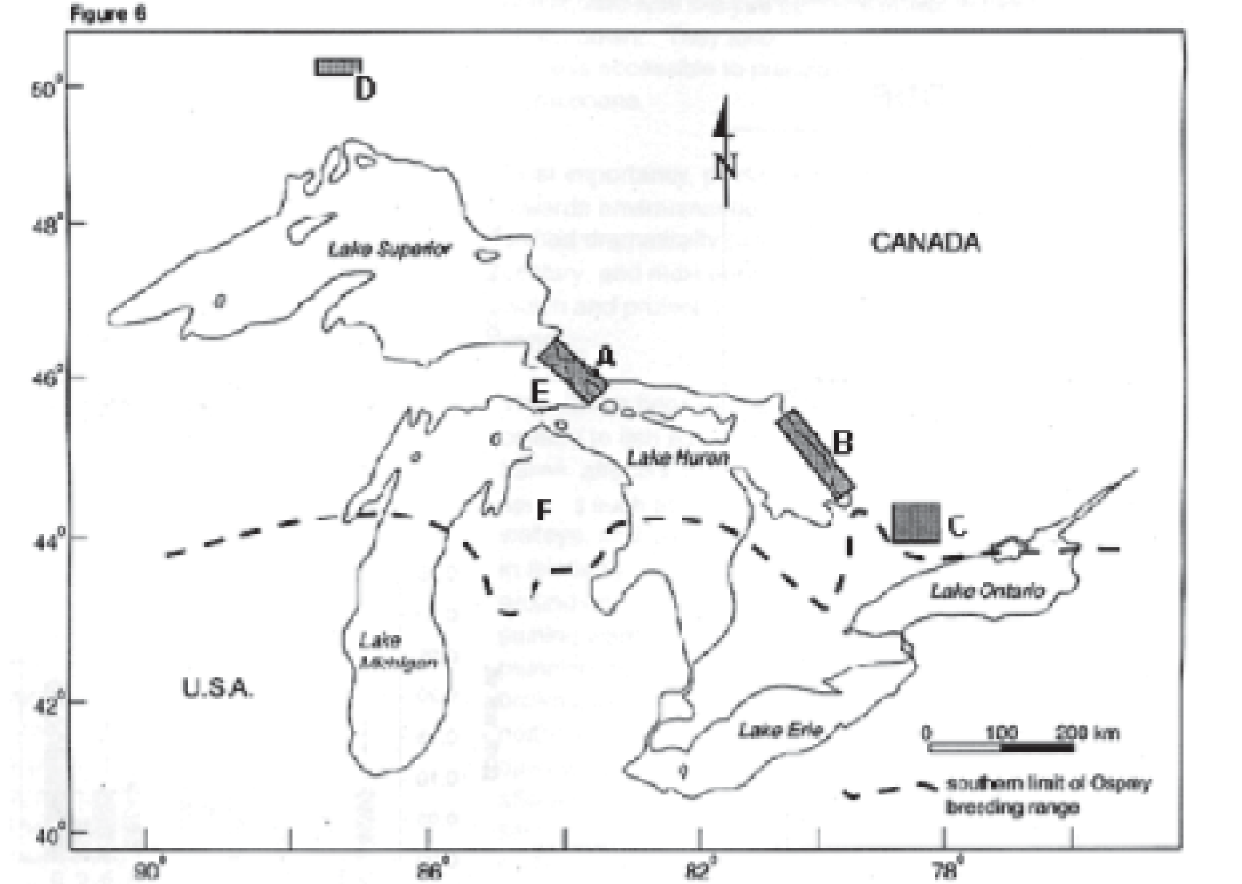
RECENT RECOVERIES OF OSPREY

POPULATIONS

The mid-1970s represents a turning point for Ospreys in the Great Lakes basin, and in other parts of North America. Since 1972, DDT use had been severely restricted, and Ospreys have been able to increase their reproductive output to above the break-even point of 0.8 young per pair. These levels of production have been sustained generally in many parts of the Great Lakes basin and have often reached average values of 1.0 - 1.2 young per pair in some areas (see Figure 3). Consequently, Great Lakes Osprey populations have increased dramatically up to the present day (depicted in Figure 5). In the early 1990s, surveys in all U.S. and some Canadian parts of the Great Lakes basin recorded at least 750 occupied Osprey nests. The actual population is even larger since most of northern and central Ontario was not surveyed.

The average annual rates of population increase vary from seven per cent in northern Michigan and eight per cent in Wisconsin, to 10 to 15 per cent in southern Ontario, and 10 per cent in Upper New York State. These rates of

Figure 6



The current breeding distribution of Ospreys in the Great Lakes basin. Letters refer to study areas referenced in Figures 4, 5 & 7. A = St. Marys River; B = Georgian Bay; C = Kawartha Lakes; D = Ogoki Reservoir; E = NE Michigan; F = central Michigan.

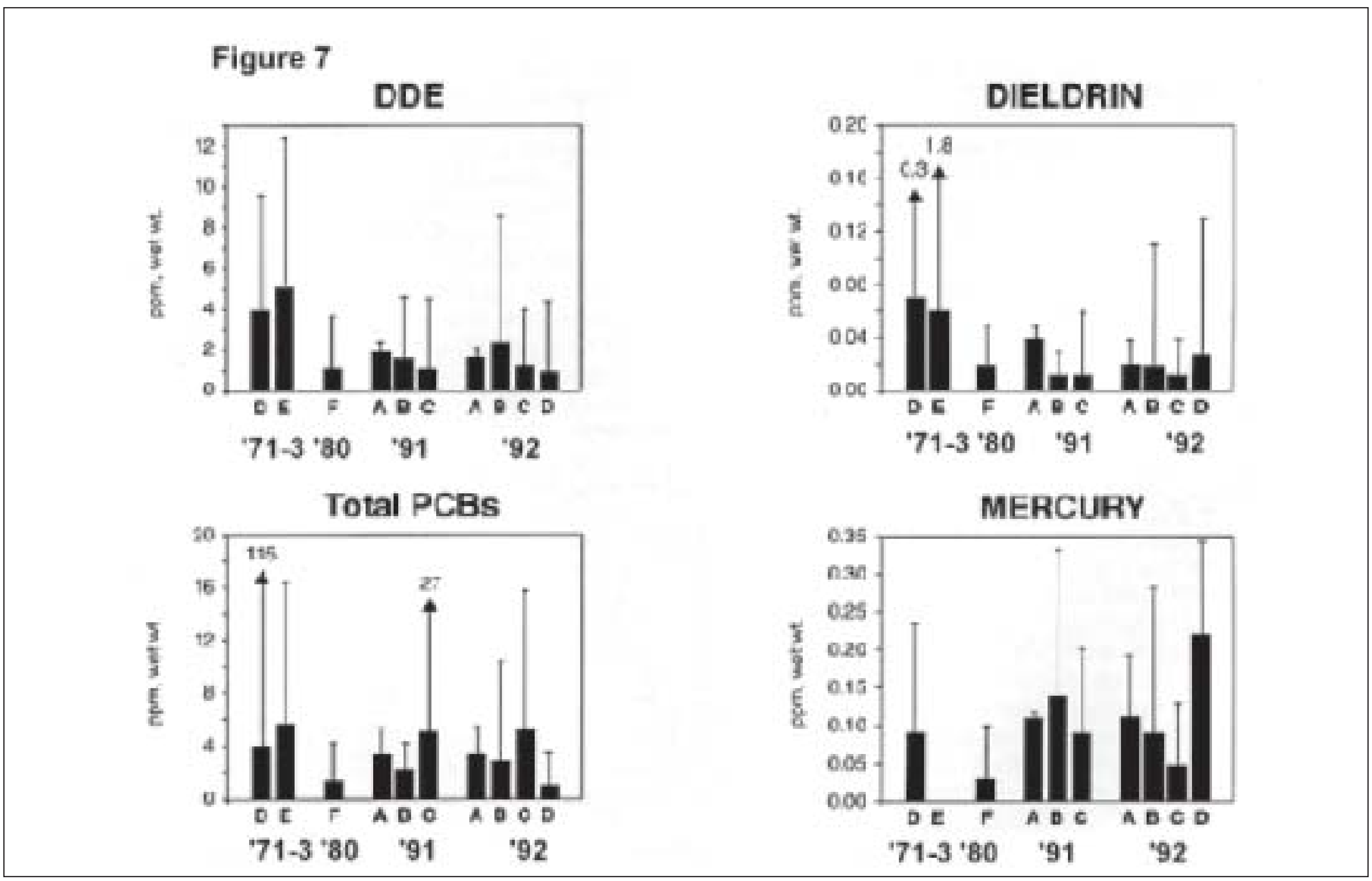
population increase are very similar to those seen for Ospreys in other parts of North America which also were badly affected by DDT. Some former nesting areas around the shorelines of Lake Huron and Lake Michigan are being recolonised. Unfortunately, Ospreys have not yet returned to breed along the lower Great Lakes. The current breeding distribution in the Great Lakes basin is shown in Figure 6.

Toxic Chemicals -- Recent Findings:

A wide range of persistent toxic chemicals is still found in Osprey eggs and chicks from all parts of the Great Lakes breeding range. Declining DDE levels since the early 1970s have accompanied increasing eggshell thickness. Studies in the early 1990s found very few eggs contained more than four ppm DDE, or had eggshells more than 10 per cent thinner than those prior to the introduction of DDT. Broken eggs are no longer a regular sight in Great Lakes Osprey nests.

As Figure 7 shows, levels of most organochlorine pesticides in Osprey eggs from the Great Lakes basin have declined over the past 20 years, although a few eggs today still contain contaminant residues at similar levels to those seen in the early 1970s. In contrast to other chemicals, PCB concentrations in eggs have declined only slightly. Other compounds, such as polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), may have much greater toxicity even though they occur at much smaller concentrations. At this time the sub-lethal effects of many contaminants are poorly understood.

Recent studies indicate that most contaminants occur at below suspected critical levels in Osprey eggs, but eggs and chicks in Great Lakes nests are usually more highly contaminated than those further inland. Fish and other fish-eating birds show similar patterns of geographic



Contaminant levels (geometric mean, and maximum , ppm wet weight) in Osprey eggs from various parts of the Great Lakes basin, 1971-92. Area letters refer to locations shown in Figure 6.

variation of these contaminants, suggesting that Ospreys are accumulating toxic chemicals from the local food web. In 1992, concentrations of the most toxic PCDD (2,3,7,8-TCDD), and PCDF (2,3,7,8-TCDF), were generally higher in Osprey eggs from Lake Huron than from those further inland. Recently, much higher levels of these compounds have been found in Osprey eggs from the vicinity of pulp mills in British Columbia, and in eggs of Herring Gulls and Bald Eagles on the Great Lakes.

Mercury levels have changed relatively little over the past 20 years, and have not exceeded the critical 0.5 ppm level in any Osprey egg from the Great Lakes basin. Average levels were highest at Ogoki Reservoir, north of Lake Superior, which had been dammed after World War II. When reservoirs are created the flooding of forests results in the release of relatively large quantities of mercury, contained naturally in trees, into the aquatic environment as the vegetation decomposes.

Other factors affecting Great Lakes Ospreys:

- Humans activities and interventions have assisted the recent increases in Osprey breeding populations. These increases have occurred due to restrictions on the use and discharge of DDT and other toxic chemicals into the environment and through the construction of stable, artificial platforms for Ospreys on which to build their nests. Local conservation groups and concerned individuals, often assisted by government programs to improve wildlife habitat, have installed a variety of customised nesting platforms over the past 10 to 15 years. In fact, Osprey platforms have been so successful in many areas that even the rich and famous have been placed on a waiting list before they could have one installed within view of their holiday cottage!
- In Wisconsin, 67 per cent of the 364 Osprey nests in 1992 were located on artificial sites, mainly platforms or hydro poles. In southern Ontario the figure was about 40 per cent. The preferred larger, older nesting trees found next to the water are now scarce in many areas, due to extensive selective logging, drainage of wetlands, and shoreline development. Suitable nesting platforms built on small rocky islets, or at the edge of cattail stands, have often been occupied by nesting Ospreys within a year of installation. This evidence indicates that a shortage of natural habitat and nesting sites limits population size and breeding range in parts of the Great Lakes basin. In addition, nests located on platforms or poles are relatively stable, and less likely to be blown down. They also are less accessible to predators such as raccoons.

Larry Benner

- Most importantly, public attitudes towards environmental matters have shifted dramatically since earlier this century, and most people now want to watch and protect birds such as Ospreys.

- There have been major changes this century to fish populations in the Great Lakes, affecting mostly open-water species such as alewife, rainbow smelt, walleye, and lake trout. Ospreys feed in relatively shallow water, usually around one to two metres deep, consuming warm water species such as pumpkinseed, sunfish, rock bass, brown bullhead, yellow perch and northern pike (Figure 2). Changes to open-water fish stocks may not have affected Osprey populations to the same extent as other fish-eating birds such as gulls, terns and cormorants.

- This century, shallow waters and inshore habitats have been greatly altered due to shoreline developments and general loss of natural vegetation,

Broken eggs are no longer a regular sight in Great Lakes Osprey nests.

especially in the more densely inhabited areas. Although these changes may have caused the loss of fish spawning habitat, other changes, such as eutrophication (nutrient enrichment largely due to fertilizer run-off from farmland), fish stocking, and damming of lakes, may have actually improved feeding conditions for Ospreys in some areas.

- Raccoons are serious predators of Osprey eggs in some areas, and their numbers and range have been increasing steadily in recent years. Raccoons will swim out to Osprey nests in shallow lakes, and even climb 15 metres trees or hydro poles to plunder a clutch. Sheet metal anti-predator guards at the foot of poles or trees have proved to be an effective way of reducing such predation.

Many people simply enjoy the sight of an Osprey fishing, tending its nest, or wheeling around high in the sky.

- Bald Eagles (*Haliaeetus leucocephalus*) are usually dominant over Ospreys, ousting them from nest-sites and stealing fish from them. Their numbers are slowly recovering, in the Great Lakes basin, which may lead to Ospreys being forced out of some areas into more marginal habitats. Unlike Ospreys, however, Bald Eagles are extremely sensitive to human disturbance near their nests, especially during the incubation period, and are unlikely to recolonise Great Lakes shorelines having a high density of cottages and recreational activity.

- Weather conditions can have dramatic effects on Osprey reproduction. Strong winds blow down some nests, particularly those balanced on dead snags or on flimsy hydro poles in exposed sites. Heavy rain, low temperatures and strong winds during the early nestling stage can cause heavy mortality amongst Osprey broods, and often reduce the male's foraging success. Such conditions occurred in June and July of 1992 resulting in unusually high nestling mortality in most parts of the Great Lakes basin.

Michael Miller

SIGNIFICANCE OF THESE CHANGES

Ospreys, like some other animals at the top of the aquatic food web, seem to have responded quite rapidly to the presence of certain toxic chemicals in their food. The most obvious effects have been the eggshell thinning caused by DDE, and subsequent population declines and local extinctions. The decline of Ospreys in New England during the 1950s and 1960s was one of the first signs noticed by naturalists that something was going terribly wrong in the environment, and this ultimately led to the identification of DDT in eggs as the main source of the problem. Only a few years after DDT was banned from use, Ospreys began to reproduce more successfully, and to recolonise some former breeding areas in the Great Lakes. When examining DDT levels, the Osprey was an effective barometer of environmental quality.

Does this recent recovery of the Osprey population indicate a healthy Great Lakes basin ecosystem? There are still a large number of persistent toxic chemicals present in Great Lakes Ospreys, fortunately at lower concentrations than in the 1960s and 1970s. The biological effects of many of these contaminants are still poorly understood. Ospreys are still absent as breeding birds from the lower Great Lakes shorelines, even though suitable nesting and feeding habitat appears to exist. Only further careful research and monitoring will allow biologists to explain why.

Three years ago, scientists knew virtually nothing about the ecology of Great Lakes Ospreys. Recent studies have concentrated on a few key areas, but results from these areas do not necessarily apply to all parts of the Great Lakes. At this time biologists have insufficient information concerning key parameters such as adult and immature survival rates, the age of first-breeding, and whether or not birds raised in more highly contaminated areas along the main Great Lakes shorelines return to their natal areas to breed.

A species at the top of a food web can tell us a great deal about the quality of the habitat in which it lives. Ultimately it may serve as a useful indication to humans of undesirable effects certain activities are having upon the natural environment. The Osprey is a good indicator species in this sense because, unlike some other top predators such as Bald Eagles and River Otters, it is remarkably tolerant of humans, and will often nest near houses and in areas of relatively heavy recreational pressure. Today, Ospreys are highly regarded by the general public as a symbol of a healthy and productive ecosystem.

Many people simply enjoy the sight of an Osprey fishing, tending its nest, or wheeling around high in the sky. As the Osprey becomes more common in the Great Lakes basin, some people are witnessing this spectacular bird, diving from great heights into the water, for the very first time. Community and naturalists' groups have worked together with government agencies in various parts of the Great Lakes basin to provide artificial nesting platforms for Ospreys, and to install anti-raccoon guards on Osprey poles. These efforts are promoting the successful recovery of Osprey populations, particularly in areas where there seems to be a shortage of natural nest-sites. These cooperative partnerships are a positive way of bringing the community together, working towards improving the overall quality of the environment which we share with a wealth of wildlife species.

A species at the top of a food web can tell us a great deal about the quality of the habitat in which it lives.

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For further reading

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FOR FURTHER INFORMATION

Additional information on the Osprey program and monitoring programs for other fish-eating birds and wildlife in the Great Lakes basin may be obtained from the following addresses:

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