SOME FACTORS IN THE DECLINE OF THE OSPREY IN CONNECTICUT

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THE Osprey (*Pandion haliaetus*) is an inviting subject for ecological study, with its exposed and often gregarious nesting, and its conspicuous feeding behavior. In many parts of the world the Osprey nests in loose colonies of a few to several hundred pairs. One of the best-known colonies in the northeastern United States is at the eastern end of Long Island Sound in coastal Connecticut and New York. The birds on Gardiners Island, New York, have been studied by many people, principally by LeRoy Wilcox, who has banded nestlings for more than 20 years. Until our study started, in 1957, the Ospreys on the Connecticut shore of the Sound had never been studied ecologically. Our goal, to evaluate population-regulating factors and other aspects of breeding ecology, has been only partially attained, but our tentative conclusions may prove of use to others studying the ecology of birds of prey.

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THE STUDY AREA

In southern Connecticut Ospreys nest only in a small area near the mouth of the Connecticut River, in eastern Middlesex County and western New London County. Within the seven years of this study the eastward limit of nesting has been Hatchett Point, four miles east of the Connecticut River, and the westward limit Hammonasset Point, six miles west of the river. Nests have been found as far upstream as Nott Island, six miles from the mouth of the river.

The terrain within these limits is mostly farm land, much of which has reverted to woodland in recent decades. The shore of Long Island Sound is cut by numerous tidal creeks draining large areas of salt marsh. Extensive house building by the expanding human population has reduced the woodland in many areas to a narrow belt of trees about 15 meters wide

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along the edges of the salt marsh. The predominant trees in the marsh-edge region are white oak (*Quercus alba*), red oak (*Q. rubra*), tupelo (*Nyssa sylvatica*) and red maple (*Acer rubrum*). The first three species are extensively used by nesting Ospreys, usually with little regard for human activity. The eastern shore of the Connecticut River consists of a series of marsh islands and peninsulae forming a belt about one-half mile wide, extending about two miles from the mouth of the river. A state refuge, the Great Island Wildlife Area, consists of about 300 acres (120 hectares) occupying the southern end of the marsh belt. Great Island is separated from the mainland by the Black Hall, Duck, and Back rivers, tidal creeks about 100 yards (92 meters) wide. The island's surface is a carpet of foot-high grass cut by numerous natural creeks and by a pattern of drainage ditches at 40-yard intervals. Except during unusually high tides, the marsh surface is mostly out of water, but is always wet. In April and May the island is frequently covered to a depth of eight or ten inches (20–25 cm) by high tides.

During the fall hunting season Great Island is open to duck hunters, who have built about a dozen permanent blinds, roofed structures of wood and wire, thatched with grass. Their slightly sloping roofs provide elevated nesting sites for Ospreys, and at times of high nest density nearly every blind has been occupied. In spring and summer the island is invaded by bathers, campers, and boaters, most of whose activity is restricted to the southeast side of the island, where there is a sand beach. Many people, however, wander across the marsh, visiting accessible nests and handling eggs and young birds.

Because Great Island has the highest density of nesting Ospreys and because the nests are accessible, it has been the focal point of our study.

METHODS

During the first three years of this study, 1957–1959, our attention was directed to locating nests and color-banding young birds. This was done in three or four visits annually, with little surveillance between them. Two days were spent in mid-May locating new nests and checking all sites for activity. No nest trees were climbed, due to the danger of the uncovered eggs becoming chilled, but if an Osprey was sitting low in the nest we surmised that eggs were present. The nests on Great Island were observed from the mainland. In late June and early July we climbed to those nests in which nestlings were visible or the adults appeared to be shading young. Great Island and neighboring marshes were visited in a rowboat.

Our activity was greatly increased in 1960, particularly in April and May. Ames was now living near the colony and Dr. and Mrs. R. T. Peterson became associated with the project. Great Island was carefully searched and many concealed nests were found. By more frequent visits we were better able to evaluate the activities of human and other predators. No attempts were made to climb nest trees in May.

Heavy loss of eggs to unknown predators and tidal flooding in 1960 caused us to introduce elevated nest platforms (Figure 1, A). The wooden platforms are 39 inches

Figure 1. A (top). An occupied nesting platform, photographed 2 July 1963. B (bottom). A female Osprey incubating at a typical ground nest on Great Island, Old Lyme, 7 May 1962. Such nests are easily flooded. From a distance of 50 meters only the female's head can be seen.

(1 meter) square and are supported by a 12-foot post of 4 × 4 inch red oak. The post is sheathed with a 3-foot band of sheet steel as protection against climbing mammals. We would be glad to provide further details to interested persons. Most of the platforms were readily accepted by the Ospreys, but the nests were more rapidly completed when a base of sticks was nailed to the platform. Besides shortening the construction time, "preconstructing" the nest results in a tighter finished nest, with subsequent reduction in the accidental loss of eggs and young.

As part of the study of nest failure, six eggs were taken in April and May of 1962 for insecticide analysis. The procedure consisted of paper chromatography (after an involved series of extraction steps) and the usual Schechter-Haller colorimetric analysis. In July a late-stage embryo, a two-day-old nestling, and three samples of fish from Osprey feeding perches were analyzed by the same procedure.

BREEDING CYCLE

Much of the Osprey's life history is summarized by Bent (1937), who included two photographs of nests apparently made on Great Island, but did not mention the area in his text.

The first Ospreys return to the Connecticut River area about 25 March. Within a week after the first arrival every pair has occupied its nest site for the season. Nest building starts immediately, little time being lost in territorial disputes. At this time the birds are surprisingly tolerant of their neighbors. On 30 March 1963 we observed one Osprey visit three nests which others were building. This bird, apparently unmated, was treated with indifference by the established pairs, even when it alighted on their nests. A month later such conduct would not be tolerated. Considering the high density of nests on Great Island, it is surprising that territorial disputes are as infrequent as they appear to be. Ospreys on adjacent nests, sometimes as little as 100 yards apart, call threateningly at each other with heads lowered, but chasing is rare.

Most of the eggs are laid betweeen 20 April and 10 May. The earliest laying date in our records is 13 April, the latest initial laying 1 June. Three eggs are the normal clutch, two are frequent, and four quite rare. Actual two-egg clutches are probably less common than our records indicate, for early egg loss is frequent, particularly in low nests. Incubation starts with the first egg, so nestlings may initially vary greatly in size, even differing in age by as much as five days. Even in extreme cases there is none of the sibling fighting found in eagles (Gordon, 1927; Herrick, 1934). Incubation and brooding are accomplished entirely by the female. Details of the nest life of Ospreys are discussed in another article (Ames, 1964). Most of the young in Connecticut are fledged about 10 July, and remain near the nest for another three to eight weeks, after which they gradually disperse.

NESTING SUCCESS

As our familiarity with the study area increased, so did the accuracy of our population estimates. From the start we were able to evaluate the success of individual nests, but these represented only a portion of the whole population. Moreover, the most conspicuous and easily checked nests are usually those most subject to human interference and possible subsequent failure. Conversely, one might expect the most remote and least climbable nests to be the most successful.

1957. In this, the first year, 35 active nests were found, and these produced 13 young birds. We have no accurate data on the number of eggs laid nor do we think that we found all the nests in the colony. The 11 nests on Great Island, all on logs or duck blinds, produced 7 of the fledglings.

1958. The following year 30 additional active nests were located; 26 of the 1957 sites were inactive, so there was a total of 39 active nests. Of these, 25 were in trees on the mainland, and 14 on Great Island and adjacent marshes. The apparent increase over 1957 probably represents the greater thoroughness of our search for nests, rather than a real population increase. The number of nestlings was again 13, of which 7 came from marsh nests.

1959. The number of active nests increased to 46 of which 12 were in sites new to us, while 5 of the 1958 nests were inactive. It is seldom possible to determine that a nest is new unless one knows that the site was inactive the previous year. The rate of annual change in the size of nest appears to be determined by many variables, most of which are difficult to evaluate.

1960. The nesting results of 1960 and successive years are summarized in Table 1. The low hatching rate in marsh nests was due largely to the disappearance of 43 eggs through predation. The majority of the egg losses occurred in ground nests, many of which were so small that had the adult bird not flushed, we would not have found the nest. In such nests the cup containing the eggs was usually not lined, consisting of a mere scrape in the marsh soil often surrounded by a slight circle of twigs and debris. Eggshells were found in many of these and other low nests in the second week of May, with no direct indication of the predator's identity. Those unhatched eggs which did not suffer predation were incubated past their due dates and later buried in nesting material.

The three nestlings lost simply disappeared without a trace, two from one nest, one from another.

There is little evidence concerning the causes of nest failure in the tree nests, but the fact that many birds ceased incubation (determined by observations from a distance) in mid-May points to predation. Addled eggs

TABLE 1

NESTING SUCCESS OF CONNECTICUT OSPREYS

Nest site type	*1960*	*1961*	*1962*	*1963*
Marsh, ground	(16) 40-0-0	(5) 8-0-0	(2) 6-0-0	none
" log	(4) 11-0-0	(2) 4-2-1	(2) 6-0-0	(2) 3-0-0
" blind	(5) 15-4-1	(7) 14-3-3	(4) 12-0-0	(1) 3-0-0
" platform	(none)	(3) 6-3-2	(9) 24-3-2	(11) 33-4-4
Marsh, total	(25) 66-4-1	(16) 32-8-6	(17) 48-3-2	(14) 39-4-4
Trees, total	(46) 138-?-6	(15) 45-?-6	(14) 42-?-6	(10) 30-?-5
Colony, total	(71) 204-?-7	(31) 77-?-12	(31) 90-?-8	(24) 69-?-9

The figures in each column represent, from left to right, the number of active nests found, number of eggs laid, the number hatched, and the number of young fledged. Egg totals for marsh show the number of eggs actually found; those for tree nests are estimated on the basis of 3 eggs per nest. Total eggs for tree nests and for the colony are therefore approximate.

are usually incubated for two or three weeks beyond the normal incubation period.

1961. Although most pairs had chosen their nest sites by the time our platforms were erected, all three of the latter were quickly occupied. Two pairs had nests built and the first eggs laid within 72 hours; the third pair built but never laid eggs. The entire decrease in the marsh-nesting population is represented by the 65 per cent reduction in the number of ground nests. Egg predation did not nearly approach the proportion of 1960, although six of the eight eggs in ground nests disappeared by mid-May, and other losses may have occurred before our count. Early predation is probably responsible for apparent differences in clutch size between ground nests (1.6 eggs), those on logs and blinds (2.7), and the two productive nests on platforms (3.0). 1963 platform nests on sites occupied by 1961 ground nests averaged 3.0 eggs per clutch. Most, if not all of the ground nests were flooded several times by high tides. One bird was flushed off a clutch of eggs which were covered by about an inch of water. Because of the high grass we could not be positive that the bird was actually attempting to incubate. The majority of the eggs which failed to hatch were incubated for six or seven weeks, in both marsh and tree nests.

Of the two young birds lost, one was found dead under a nest platform at the age of four or five days, having fallen through the nest cup; the other was found dead in the marsh near a log nest, at the age of about two weeks.

1962. Of the 45 egg failures in 1962 marsh nests, only 14 are accounted for. Four eggs were found on the ground, having fallen through the nest cups of two platform nests. The open structure of the nest platform requires a more substantial nest cup than does the roof of a duck blind, where the eggs often rest directly on tar paper. In the first year of a platform nest the cup may be a thin web of grass, inadequate to support the eggs. To prevent further losses we added a square of 1 × 2 inch turkey wire to the center of each platform, providing a firm base under even the weakest of nest cups. Ten eggs were lost through predation, none of them in platform nests. The other 31 eggs were incubated beyond their hatching dates and gradually buried in the nesting material.

For the first time in this study, two pairs of Ospreys which lost their first clutches renested. One pair lost their first two eggs through a flimsy platform nest early in May, then moved 200 yards to another platform which had interested them at the beginning of the season. After rapidly building a second nest, they produced two more eggs, which were incubated for six weeks but failed to hatch.

The other pair laid three eggs on a duck blind, ignoring a nesting platform 12 feet away. Two eggs disappeared in the first week in May and the third was taken by us shortly later for pesticide analysis. In the last week of May the birds built a substantial nest on the platform, where the female laid a single egg of normal size. On 12 June the egg was found to be very light, and on being opened, showed no development. The two second clutches are not included in the egg figures of Table 1.

In Virginia Ospreys, Tyrrell (1936) found replacement clutches of two eggs in seven out of eight nests from which he removed complete first clutches. About three weeks elapsed before the second clutches were laid. The fertility of replacement eggs was only slightly lower than that of the initial eggs.

The only nestling lost was found dead under one of the platform nests at the age of five days. It had apparently been killed by the fall, because the crop was full and there were no external injuries. Of the two nestlings fledged in platform nests, one was found dead of unknown causes in late July by fishermen. The bird was within half a mile of its nest.

The pattern shown by tree nests closely duplicated that of 1961.

A potential hazard encountered for the first time in 1962 was lightning. Visiting an unoccupied nest on 8 July, we found the platform in pieces on the ground around the base of the pole, which was splintered at the top and split to the ground. As the most elevated objects in many parts of the marsh, the nesting platforms are vulnerable to lightning, but no more so than many tree nests.

1963. The egg failures in 1963 include 14 eggs taken in mid-May for pesticide analysis. Justification for such interference is found in the low hatching rate of this and previous years. The cause of failure in the remaining 21 eggs is undetermined. Only 3 eggs were lost to predators, 2 in log nests, and 1 in the blind nest. Many of the other 18 eggs were recovered in June for incorporation into the pesticide program, the results of which are not available at this writing.

Three of the Great Island nestlings were reared in the same nest, which produced both the young reared in 1961 and was one of the few in which hatching occurred in 1962. The five young fledged in tree nests were all reared in two nests about one-fifth of a mile apart, isolated from the rest of the colony by about two miles. The nests are located in a small marsh drained by the Menunketesuk River. A part of the projected 1964 work will be the analysis of differences between this area and the main part of the colony. The other eight tree nests, near the Connecticut River, showed the same pattern as in the previous years.

CAUSES OF NEST FAILURE

Harmful agents may be divided into two categories, depending on whether the net effect is egg failure or loss of young birds. Some factors can produce both effects, but their action on eggs is always different from that on nestlings.

FACTORS WHICH PREVENT HATCHING

Human activity.—The most common form of human interference with incubating Ospreys in our area is the prevention of incubation by the mere presence of people near the nest. It is difficult to evaluate the effect of such interruptions without extensive data on the rates and effects of cooling and heating the eggs. In 1960 at least two nests were deserted because picnickers repeatedly kept the birds from incubating. In 1961 a tree nest was deserted when the owner of the property constructed a dock directly beneath it. In the same nest in 1959, however, two young were hatched and reared while a house was being built about 70 feet away.

Speeding motorboats on the Great Island creeks have caused the loss of several eggs. All were in ground nests, where the incubating birds attempt to escape discovery by remaining on the nest as long as possible. In such cases the rapid approach of the offending object causes the bird to flush directly from the position of incubation, instead of first standing up. Eggs are dragged out of the nest or broken by the bird's feet as she leaves. Ospreys do not roll eggs back into the nests, even when the eggs are in plain sight.

It has been suggested that the scent left by visitors at nests draws mammalian predators, particularly the abundant raccoon (*Procyon lotor*). Hammond and Forward (1956) found that signs left by observers did not significantly alter predation losses in duck nests. There is no evidence that human activity has contributed to egg predation in either tree- or marsh-nesting Ospreys.

If human activity were a major factor in low hatchability, one would expect to find greater hatching success in remote nests than in those more exposed to human activity. If anything, the reverse is true. Of the 19 young hatched on Great Island in 1960–1963, 15 were in nests frequently visited by boaters and fishermen due to the broad waterways leading to them. A greater number of nests in the interior of Great Island, less frequently visited, have shown repeatedly low hatchability.

Other forms of human interference—removing eggs, destroying nests, and throwing rocks at incubating birds—do not appear to be significant in the study area.

Other mammals.—The circumstances of egg predation on Great Island in 1960 suggest the work of a mammalian predator. Complete breakage of the eggshells is not characteristic of gull predation, in which the shells are usually punctured and left in one piece. Predation by raccoons is most likely, because they are common in the area and their tracks and droppings are fairly abundant in the Great Island marshes. The heavy predation of 1960 was not repeated in the next three seasons, in which eggs broken in the nests constituted about five per cent of the total laid. There has been no egg loss to predators at any of the metal-shielded platform nests, while tree nests continue to lose a few eggs, suggesting the raccoon as an agent. Other mammalian egg predators seem to be absent from Great Island, as indicated by the lack of prints and other sign.

Gulls and other birds.—During April and May several hundred gulls of mixed species reside on the beach at the southwest side of Great Island. Although they frequently fly over the area used by the Ospreys for nesting, they are not tolerated near the nests. Even when an Osprey is driven off the nest by man, a gull approaching the nest too closely is attacked. An incubating Osprey usually does not leave the nest to attack a gull, but calls warningly to any gull passing within about a hundred feet of the nest. Crows and other avian egg predators are seldom seen on Great Island in the time when Ospreys are incubating. Thus it appears unlikely that Ospreys suffer any large-scale predation by birds.

Tide and weather.—With the shift to more elevated nest sites in recent years, few, if any, nests have been flooded by high tides (see Figure 1, B). The effect of flooding in earlier years cannot be evaluated, for most of the eggs in low nests were destroyed by predators before they were due to hatch. If tidal chilling were the primary cause of egg failure one would expect an improvement in hatching rate when the nests are raised onto platforms, an improvement not realized in most nests.

DDT and metabolites.—The detection of DDT or its metabolites in eggs that did not hatch cannot be taken as conclusive proof that the compound caused the failure to hatch. Despite the wide use of DDT and the many years since its introduction, many aspects of its role in the metabolism of higher animals remain unknown. Considerably less is known about the

TABLE 2

RESULTS OF DDT ANALYSIS

Eggs

Sample	*Date*	*Incubation time, days*	*Condition of contents*	*DDT (micrograms)*	*DDT metabolites* (micrograms)*
a.	25 April 1962	5–7	fresh, no development	trace	976
b.	25 April 1962	12	fresh, no development	trace	549
c.	25 April 1962	8	fresh, no development	trace	423
d.	29 May 1962	39	completely dried out	trace	485
e.	29 May 1962	37	liquid, putrescent	trace	395
f.	25 May 1962	39	completely dried out	trace	498
g.	4 June 1960**	29	normal development	trace	556
			Mean of eggs:	trace	555

Nestling

Sample	*Date*	*Age*	*Condition*	*DDT (micrograms)*	*DDT metabolites (micrograms)*
h.	1 June 1962	5 days	normal development	trace	624 (15.9 ppm)

Food fish samples

Sample	*Date*	*Source*	*Type of sample*	*DDT (parts per million)*	*DDT metabolites (parts per million)*
i.	4 June 1962	nest c	whole fish, *Alosa* sp. less head and viscera	1.8	7.4
j.	12 Aug. 1962	nest f	4 inches of intestine, with fat attached; species unidentified	0.7	1.8
k.	12 Aug. 1962	nest k	muscle tissue, few bones; species unidentified	1.4	3.9

* Includes all identifiable physiological products of DDT giving red color on Schechter-Haller test, and TDE (DDD), which gives blue reading.

** Preserved in 10 per cent formaldehyde from collecting to testing.

specific effects of DDT metabolites than of those of the parent compound, and neither DDT nor its metabolites have been studied extensively in embryos. The amounts in our Osprey eggs are not great (Table 2), about 35–100 parts per million (based on assumed dry weights of 8–10 g, determined from 1963 samples). Genelly and Rudd (1956) reported that DDT levels as high as 150 ppm caused no significant drop in the hatchability of pheasant eggs. Most of the metabolites have lower adult avian toxicities than DDT, but the physiology of the embryo differs so greatly from that of the adult that one cannot use the effect of DDT in the adult as a basis for speculation on its effect in embryos. Bernard (1963) found great interspecific and individual variability in tolerance to and excretion of DDT. In evaluating the effect of the insecticide on Ospreys we are reluctant to rely on data gained in other species. Rather than attempt a series of laboratory tests, we hope to clarify the role of DDT by careful sampling during the next few years.

FACTORS CAUSING THE LOSS OF NESTLINGS

Human activity.—In 1960 five young Ospreys disappeared under circumstances suggesting that they were taken by humans. All of the nests were conspicuous and accessible. Two of the nestlings were in a low tupelo to which slats had been nailed in a previous year. In May, 1961, two boys removed one of the nestlings from a prominent nest on a log opposite the state boat landing, but were apprehended by one of us (Ames) and persuaded to return the nestling. The subsequent death of the bird does not appear to be connected with this incident. The shift of marsh Ospreys to platforms has eliminated the loss of nestlings.

Other predators.—Some of the nestling losses might be blamed on Great Horned Owls (*Bubo virginianus*) or raccoons. We have no conclusive evidence to support or refute this suggestion. The owls, which breed on Great Island in March, usually have moved inland by the time the young Ospreys have hatched.

Accidental death of nestlings.—We know of only two cases in our area in which nestlings have been lost through natural accidents. In both instances the young birds had fallen from the nests. Apparently the number of nestlings lost by falling and other inanimate causes is small.

Tide and weather.—Because none of the eggs in ground nests has hatched within the years of our study, we think that tidal flooding has not caused nestling mortality. In Virginia, Tyrrell (1936) found several nestlings dead from exposure to the sun. No nestlings in our area have died from exposure to sun or rain. The adult female provides shelter for the young at all ages, but the young at a nest under observation on Great Island in 1963 seldom took advantage of maternal shade. Once the contour feathers have grown out the young are remarkably resistant to the elements.

DDT and metabolites.—Whatever the effect of insecticide residues on the eggs, they appear to have little direct effect on the nestlings. The level of intake (0.7–1.8 ppm of DDT and 1.8–7.4 ppm of metabolites) is so low that one would not expect effects during the few weeks that the young are in the nest.

CONCLUSIONS

There are no positive data on the peak population of Ospreys in Long Island Sound. Bent (1937) wrote that the first few decades of this century saw a considerable drop in the number of active nests in southern New England, yet in 1938 John Chadwick (pers. comm.) counted over 200 active pairs in the area covered by our study. About the same time Wilcox (pers. comm.) found about 500 pairs on Long Island, including those on Gardiners Island. It is doubtful that the two areas combined ever had more than twice the 1938 total of 700 pairs.

Within the years for which accurate figures are available (1960–1963) the number of breeding Ospreys in our study area has decreased at the rate of about 31 per cent annually. A similar decrease has occurred in the Long Island population (Wilcox, pers. comm.) and in the Rhode Island birds (Emerson and Davenport, 1963). At the present rate of decrease the Connecticut population will be reduced to one or two pairs by 1968.

A positive conclusion gained from our data is that the recent decline is due to the small number of young fledged. The normal rate of nestling production in Ospreys is about 2.3 young per pair per year (Tyrrell, 1936). Wilcox (pers. comm.) found an average of 2.2 young per nest on Gardiners Island in the early 1940's. In the last four years of our study 157 nestings have produced 36 young birds, an average of only 0.29 young per nesting. Wilcox (pers. comm.) notes that in recent years annual production by Long Island birds has been about 0.5 young per nest. Mrs. A. G. Davenport (pers. comm.) has found similar productivity in Rhode Island Ospreys over the last 12 years.

Whatever the causes elsewhere, the main factor in low fledgling production on the Connecticut shore is egg failure. The use of elevated nest platforms effectively eliminated tidal flooding and predation as causes of low hatching rates, but chilling or overheating through human activity have not been conclusively eliminated. It is possible that two or more agents share the blame for low hatching rates, but we are unaware of factors, other than toxic substances, which would produce the patterns of nest success and failure shown by birds on Great Island. Identification and elimination of injurious agents are lengthy tasks, and the results are slow in appearing. If pesticides are at fault, there is a small likelihood of cleansing the food chain in the immediate future, as it is certainly contaminated at many levels and the input of pesticides continues. If, on the other hand, the small amounts of DDT compounds present in eggs are not lowering hatchability, the conservation aspects of the problem are somewhat simplified.

The outlook for the Osprey in southern New England is bleak. Our present program is aimed at clarifying the role of DDT in the ecology of this and other populations of the species. Perhaps by documenting and analyzing the decline in one area we may provide information which will prevent other colonies from suffering the same decline.

SUMMARY

The breeding population of Ospreys along the Connecticut River in Middlesex and New London counties, Connecticut, has decreased from about 200 pairs in the early 1940's to 71 pairs in 1960 and 24 pairs in 1963.

The use of elevated nesting platforms has effectively protected marsh-nesting birds against egg losses from predation and tidal flooding.

The main factor contributing to the decrease of the population has been the failure of a high percentage of the eggs to hatch. Nestling losses have been small.

Seven eggs analyzed for the presence of DDT compounds averaged 555 micrograms of metabolites (about 35–100 ppm) per egg, and traces of DDT.

A five-day-old nestling, killed by a fall from the nest, contained 624 micrograms (15.9 ppm) of metabolites and traces of DDT.

Three samples of fish tissue from Osprey nests contained 1.8–7.4 ppm of metabolites and 0.7–1.8 ppm of DDT.

Available evidence does not provide conclusive proof that DDT compounds have contributed to the failure of Osprey eggs to hatch. The role of DDT is expected to be clarified by a more extensive 1963–1964 testing program.

Low nestling production, comparable to that found in our study area, appears to be a major factor in the decline of Ospreys in other parts of southern New England and on Long Island. With a continued annual decrease of 31 per cent the Connecticut River colony will be reduced to one or two pairs by 1968.

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