

## PLASTIC DEBRIS INCORPORATED INTO DOUBLE-CRESTED CORMORANT NESTS IN THE GULF OF MAINE

RICHARD H. PODOLSKY

*The Island Institute  
60 Ocean Street  
Rockland, Maine 04841 USA*

STEPHEN W. KRESS

*Ornithological Research Unit  
National Audubon Society Research Department  
159 Sapsucker Woods Road  
Ithaca, New York 14850 USA*

Abstract.—We report the incorporation of plastic debris into Double-crested Cormorant (*Phalacrocorax auritus*) nests on three islands in the Gulf of Maine. Of the 497 nests examined during 1987 and 1988, 188 nests (37%) contained plastic debris. Sections of lobster trap line, plastic bags and pieces of fishing net dominated the debris. We discuss the importance of such debris in nests and recommend future monitoring of plastics in seabird nests.

### DESPERDICIOS PLÁSTICOS INCORPORADOS EN NIDOS DE PHALACROCORAX AURITUS ESTUDIADOS EN EL GOLFO DE MAINE

Resumen.—Se informa la incorporación de desperdicios plásticos en nidos de *Phalacrocorax auritus* estudiados en tres islas del Golfo de Maine. De 497 nidos examinados durante el 1987 y 1988, 188 (37%) contenían plásticos. Secciones de líneas para atrapar langostas, bolsas y pedazos de redes para pesca resultaron ser los plásticos preponderantes. Se recomienda en el futuro la monitoría de plásticos en los nidos de aves acuáticas.

The impact of plastic debris on the marine environment is receiving increased attention from marine scientists (Pruter 1987), ornithologists (Conant 1984, Day et al., 1982, Rothstein 1973) and mammalogists (Fowler 1987). Much of this work focuses on the distribution, abundance, and impact of floating plastic in the open ocean (Day and Shaw 1987), with less focus on the deposition and accumulation of plastic debris along shorelines (Merrell 1980, 1985). This is the first report of plastic being incorporated into Double-crested Cormorant nests.

Plastic debris was found in Double-crested Cormorant nests at three Maine coast colonies. Freeman Rock is located in Eastern Maine and Western Egg Rock and Ross Island are located in Mid-coast Maine. Freeman Rock is 2 kilometers south of Steele Harbor Island at 44°27'N, 67°30'W. Ross Island and Western Egg Rock are within 5 kilometers of New Harbor Maine at 43°53'N, 69°26'W and 43°53'N 69°27'W respectively.

During June 1987 we found that 60 (36%) of the 169 active cormorant nests on Freeman Rock contained plastic debris. During July 1988, 70 (39%) of 180 active nests on Ross Island contained plastic. During August 1988, 58 (39%) of 148 recently deserted cormorant nests on Western Egg Rock contained plastic. In total, 188 (37%) of the 497 nests contained

plastic. Except for Western Egg Rock, at the time of observation, the examined nests contained either eggs or nestlings and this prevented dissection of the nests.

In most cases the plastic was woven into the nest and, apparently, was used as nesting material. In a few cases plastic debris was on the surface of the nest cup and may have been regurgitated with food for the young.

At Western Egg Rock, 64 of the nests were dissected in order to examine the amount and type of debris. The total weight of this plastic was 911 g and it was of sufficient bulk to half-fill a 113.4 l (30 gal) garbage can liner. Sections of lobster trap line comprised 98% of the items found in the nests, but the debris also included 2 lobster bait bags and 5 toggle buoys attached to sections of line. A total of 40 sections of line were found in the 64 nests and these ranged in length from 0.5–0.2 m. There was no apparent selection for specific colors.

In Maine, Cormorants return to the same nesting island each spring and rebuild their nests annually. Consequently, the plastic we observed was probably collected in the spring. The origin of the plastic is not known, but is probably from ocean-dumping of trash or from lost fishing gear.

Double-crested Cormorants usually collect nest material at the surface of the ocean, however they also dive to collect seaweed. Surface foraging for nest material and for food entails the risk of coming into contact with floating debris such as plastic (Bourne 1977). Mortality of seabirds caught and drowned in gill and drift nets while diving has been reported (Degange and Newby 1980, Myrberget 1980). Plastic particles have been found in the stomachs of 44 species of seabirds around the world including Double-crested Cormorants (Day et al. 1982). Ingestion of floating plastic seems most prevalent in the surface-seizing and diving guilds which include shearwaters, storm-petrels, and cormorants (Rothstein 1973).

Reports of the biological effects of plastic debris focus primarily on ingestion and entanglement of birds, mammals, and turtles (Laist 1987). No entangled birds were observed in the present study. However, nestling and adult cormorants run the risk of ingesting or becoming entangled in the plastic incorporated into their nests. The question of whether plastic debris is inert in nests, or if it affects the development of young or the survival of adults would reward further study. Also, observations of the proportion of nests containing plastic may, over time, be an important indicator of the amount of plastic in the environment adjacent to the nest sites.

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