



Monitoring the State of the

St. Lawrence River

WATER

SEDIMENTS

SHORELINES

BIOLOGICAL RESOURCES

USES

NORTHERN GANNET

A Sentinel Species for the Gulf



Photo: Jean-François Riel, Canadian Wildlife Service

Background

The Northern Gannet is a seabird whose expansive feeding grounds and a diet rich in fish can provide information on the abundance of its prey and the degree of contamination of the

ecosystem. That's why it was chosen as a sentinel species (or "bioindicator") of the state of the Gulf of St. Lawrence. This bird can travel for distances of up to 100 km in search of mackerel, herring, capelin and sand lance. There are six Northern

Gannet colonies in eastern North America, including three along the east coast of Newfoundland and three others in the Quebec portion of the Gulf of St. Lawrence (Figure 1). The populations of the eastern tip of Anticosti Island, Bird Rocks in the Magdalen Islands and Bonaventure Island together make up 70% of the North American population.

The Bonaventure Island population of Northern Gannet grew by about 3% annually from the turn of the century until the mid-1960s, when its numbers fell by almost 25% in ten years, at the same time that the Newfoundland colonies were remaining stable. Scientists discovered that high concentrations of residual organochlorine substances detected in gannet eggs, including dieldrin and DDT, were responsible for the low reproductive rate observed during

Figure 1. Location of Northern Gannet colonies

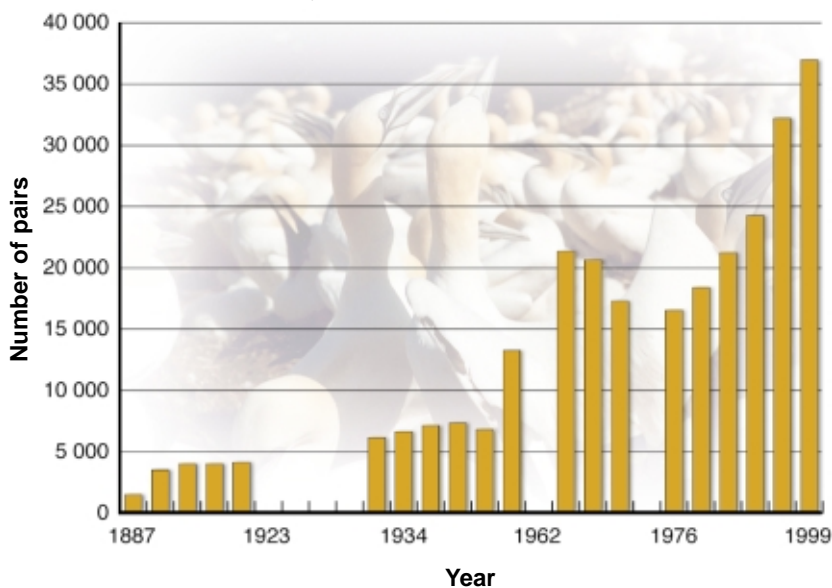


this period. At high concentrations, these toxic substances interfere with the synthesis of calcium carbonate, the main component of eggshells; thin eggshells are even more vulnerable to impact. This reproductive problem, combined with the fact that the species produces only one egg per clutch, led to a spectacular drop in hatching success rates and the consequent reduction, equally dramatic, in the number of breeding adults. Large-scale spraying of DDT in the 1960s to control insect infestations in New Brunswick and the Gaspé region largely explains the high concentrations detected in some species in the Gulf of St. Lawrence.

Overview of the Situation

The population growth of Bonaventure Island gannets remained relatively steady between 1887 and 1966, when the number of pairs grew from 1 500 to 21 215. It was only in 1984 that numbers returned to near-1966 levels, after having reached a low of 16 400 pairs in 1976 (Figure 2). The colony has continued to

Figure 2. The Bonaventure Island gannet population since the turn of the century



grow ever since, expanding from 24 125 pairs in 1989 to a population of 36 936 pairs in 1999.

Figure 3 (A and B) provides a good indication of reductions in DDT concentrations in eggs, expressed here as a percentage relative to the 1968 level, which coincides with the sudden jump in the net productivity rate and in the

Photo: Nathalie Brunelle, © Québec en images, CCDMD



Photo: Pierre Brousseau, Canadian Wildlife Service

number of pairs, after a 5- to 7-year lag (corresponding with gannet breeding age). With the reproductive success rate remaining above 67%, the population continues to grow. Unless the gannets

colonize new sites, however, scientists are of the opinion that population growth will stabilize within the next few years, given that they already occupy almost all the available habitat.

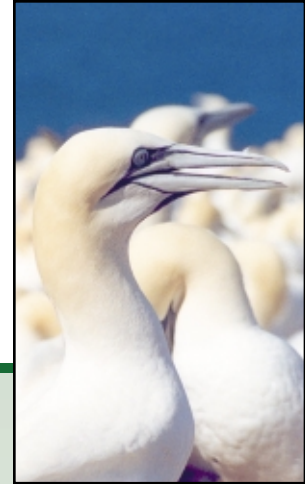
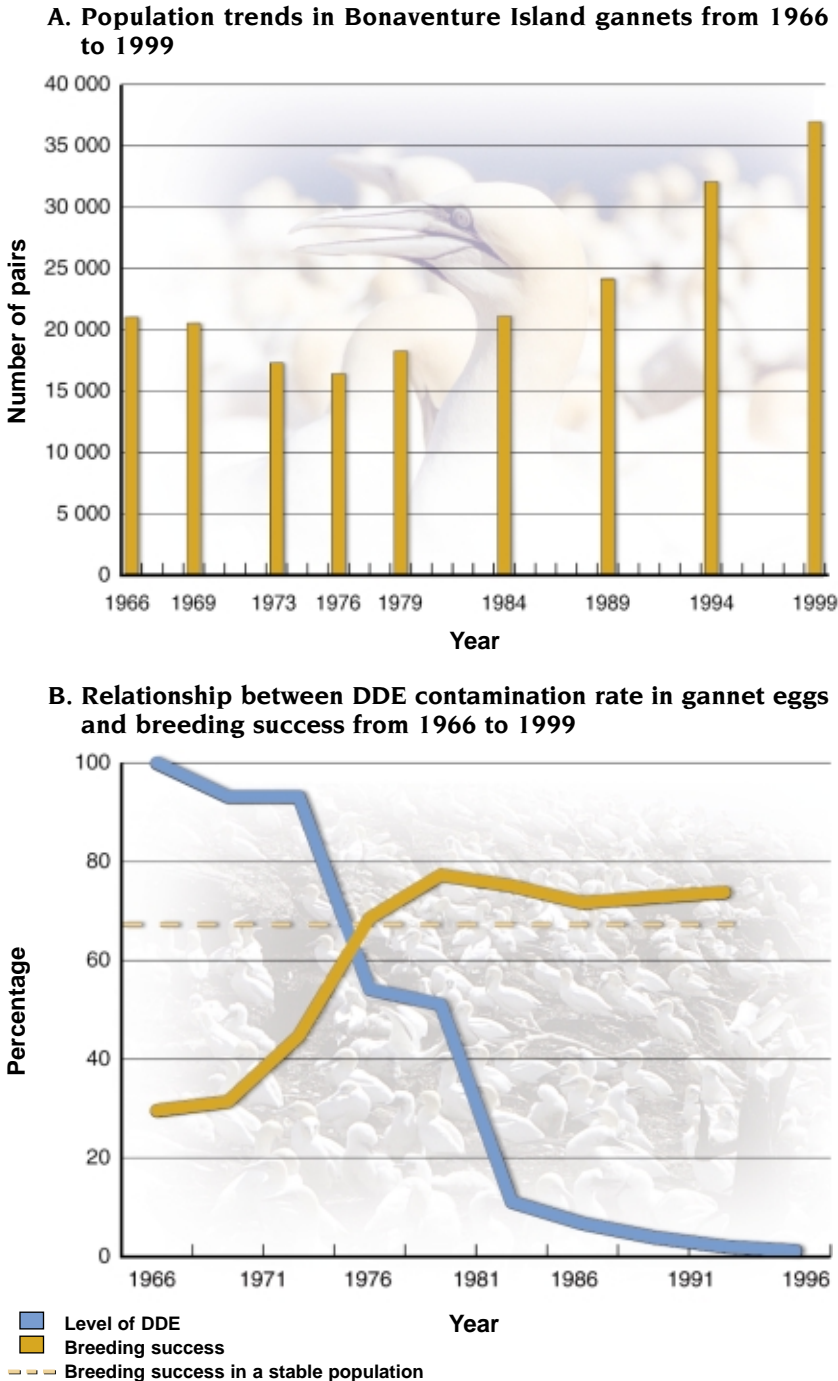


Photo: Nathalie Brunelle, © Québec en images, CCDMD

Figure 3. Population, DDE contamination rate in eggs and breeding success of Bonaventure Island gannets from 1966 to 1999



KEY VARIABLES

A net reproductive rate (or breeding success, expressed as the percentage of fledglings relative to the number of eggs laid) of greater than 67% and the maintenance or growth of the population indicate that the Gulf of St. Lawrence Northern Gannet is thriving.

Outlook

By monitoring the number of nesting pairs, hatching success and reproductive success rates, as well as observing nesting habitat, scientists can readily determine the state of health of a population and identify the pressures that may be acting on its dynamics. The pursuit of the five-year monitoring plan will provide timely

information on changes affecting the structure or abundance of the gannet population, in order to then identify which pressures are being brought to bear on the species, whether in the St. Lawrence system or in its wintering grounds in the Gulf of Mexico.

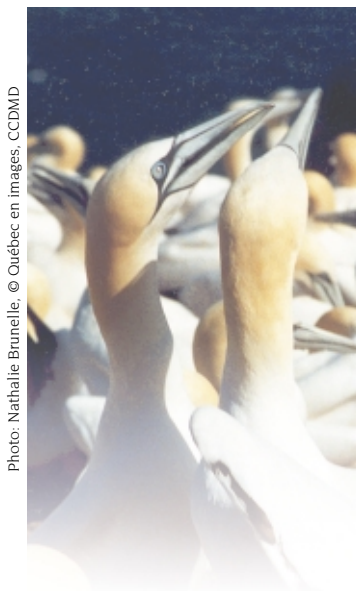


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To Know More

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State of the St. Lawrence Monitoring Program

Four government partners — Environment Canada, the ministère de l'Environnement du Québec, the Société de la faune et des parcs du Québec, and Fisheries and Oceans Canada — are pooling their expertise and efforts to provide Canadians with information on the state of the St. Lawrence and long-term trends affecting it. To this end, environmental indicators have been developed on the basis of data collected

as part of each organization's ongoing environmental monitoring activities. These activities cover the main components of the environment, namely water (quality and quantity), sediments, biological resources (species diversity and condition), uses and, eventually, shorelines.

For additional copies or the complete collection of fact sheets, contact the

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The fact sheets and additional information about the program are also available on the Web site: www.slv2000.qc.ca.

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