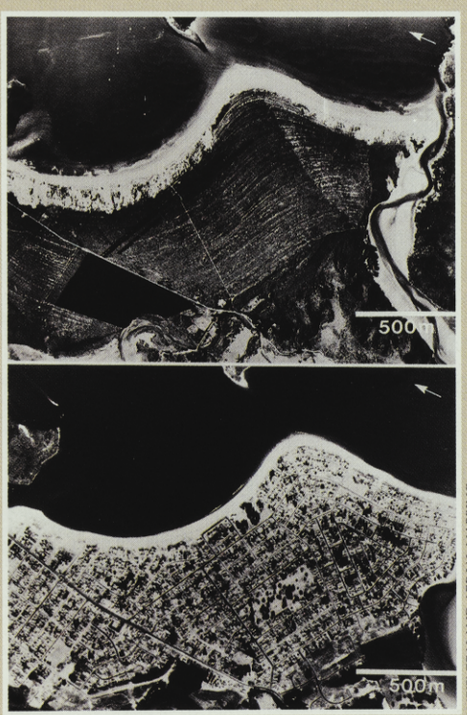
land and property. Vast areas of sand dune country, for example Ninety Mile Beach, have been planted in pine forest. As development reduces the availability of breeding habitat, the dotterel is being squeezed out. In what nesting habitat remains, breeding dotterels are at risk of human disturbance.

Human disturbance is thought to affect shorebird breeding in two ways. Eggs and chicks may be directly destroyed (for example crushed by off-road vehicles) or disturbance can impinge indirectly by interrupting incubation or feeding of chicks. Typically, an incubating or brooding dotterel responds to a perceived threat by leaving the nest or chicks and trying to distract the intruder when it is still some distance away.

The impact of directly crushing a nest or chick is obvious, but the effects of interrupting normal parenting may be just as serious. Repeated absence from eggs or chicks due to frequent or sustained disturbance may result in their chilling or overheating (depending on weather conditions). The number of people on beaches is probably greater on sunny days when eggs may overheat in as little as 20 minutes. When the birds are forced to make frequent trips to and from the nest there are also more opportunities for scavenging birds or other predators to detect footprints or abnormal movements, and prey on unattended eggs. Black-backed gulls, which have increased in numbers with the increase in food supplies from landfills, meatworks and fishing operations, are known to take dotterel eggs or chicks.


BRIAN CHUDLEIGH

*Victims of coastal development. This dotterel sticks gamely to its nest during the building of a container terminal at Tauranga.*




NEW ZEALAND AERIAL MAPPING

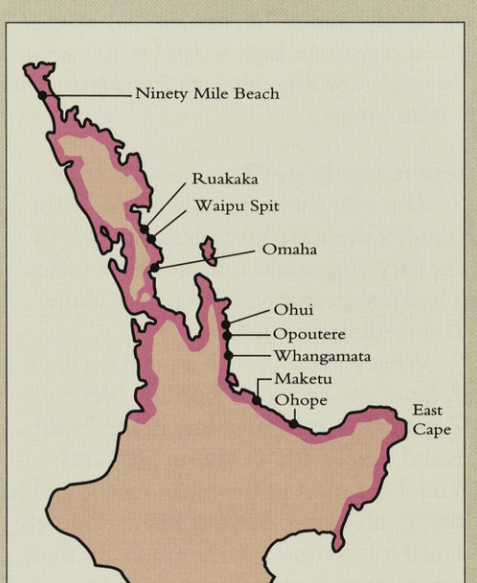
*Aerial photos of Whangamata, 1944 (top) and 1983, document the dramatic changes and habitat loss that are associated with the expansion of human activities along attractive coastal areas. The former wide expanse of dune – prime dotterel nesting habitat – is now covered with housing.*

During the 1989-90 season comparisons of New Zealand dotterel breeding success were made between ten beaches subject to low levels of human disturbance and ten subject to high disturbance. Dotterels at high disturbance beaches fledged, on average, only half as many chicks per pair (0.31) as did dotterels at low disturbance sites (0.62).

BUT THERE IS good news. Breeding dotterels are relatively easy to protect from human disturbance by simply keeping people out of nesting areas (see panel). Habitat protection, however, is more difficult because it requires us to conserve some beaches in their natural state rather than developing them. Important New Zealand dotterel sites were identified in the October 1989 and February 1990 population censuses coordinated by the Department of Conservation. The conservation emphasis at these sites must be on protecting habitat before it becomes degraded. Pristine dune systems are now very rare. Those remaining should be protected from development by law.

A public education campaign is required. DoC's forthcoming recovery plan for the New Zealand dotterel should include liaison with regional councils (which administer coastal areas), local councils, schools, environmental groups, community groups and the general public. Local communities, which have made tremendous efforts to clean up litter in "Adopt a Beach" campaigns, must be encouraged to expand their efforts to also take responsibility for their local wildlife.

The New Zealand dotterel is unique to New Zealand. Let us be determined to see this delightful bird continue to grace our beaches, now and into the future. ❖




*Distribution of northern New Zealand dotterels and locations mentioned. Interestingly, it is only in the last two breeding seasons that dotterels have nested south of the previously noted limit at East Cape.*

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