



A thermal oasis in the banded dotterel breeding habitat behind the Travelodge Hotel.

coming in the spring and summer to breed or in late summer/autumn to moult or wait out the winter.

The summer breeders

Nationally significant colonies of red-billed and black-billed gulls and little black shag occur in Sulphur Bay. Also, the banded dotterels which nest on the silica flats behind the Travelodge Hotel are special for the Rotorua region.

Red-billed gulls:

Red-billed gulls are common coastal breeders throughout New Zealand but there are few inland breeding colonies. They have been known to nest in Sulphur Bay since at least 1939–40, and their numbers on the Sanctuary colony have steadily increased — from 27 nests in 1945 to 150 pairs in 1956/57, to 400 pairs in 1961/62 to about 1,000 nests in the 1982/83 and 1983/84 seasons. First eggs are laid in early October and the usual clutch is two. The red-billed gulls prefer to nest on the rocky edges of the colony, while the top flat section is used by black-billed gulls.

Red-billed chicks fledge in about five weeks. The foods we've observed them regurgitate include dragonfly larvae, beetles, bullies and smelt. The adults rarely feed in the sulphurous water, but a common sight is several hundred red-bills wheeling and diving for smelt in a line along the margin between the sulphurous water of the bay and the cleaner water of the open lake. Smelt spawn mostly in the spring and early summer in Lake Rotorua. Dr Peter Mylchrest, Fisheries scientist in Rotorua, has suggested to us that smelt may be rendered groggy by the sulphurous water in the Bay, which could explain why the gulls constantly work the mix-zone.

Chicks fledge steadily from about mid-December to mid-February. Except for the odd chick that falls into a steaming hole, the nesting birds don't seem to be affected by the thermal nature of their colony. From the time they leave the Sanctuary the newly flying gulls can be seen wherever the adults feed and roost. This includes the local

rubbish tip — 10km away — and nearby parks, especially the Rotorua Lakefront where tourists, children and birdwatchers can all get very close to them.

One day in late February or early March, the entire colony will vacate as you enter. The intense site attachment shown during breeding is finished, and another season is over. Some gulls always remain during winter but banding has shown that some fly to Maketu, a Bay of Plenty beach. This year we have put orange bands on the legs of over 300 red-billed gull young to improve our knowledge of their movements.

Black-billed gulls:

If the red-billed colony can be called "unusual", then the black-billed gulls are extraordinary. O'Donnell and Moore (1983) grouped this endemic species with the wrybill plover and black-fronted tern as having "... specific adaptations for breeding and feeding on riverbeds". Although it sometimes breeds in association with red-billed gulls in the South Island, it is typically a South Island braided river breeder. Other North Island colonies — some recently discovered — also exist, but the Rotorua breeding population is largest.

Black-bills have bred here since the early 1930s and perhaps longer, but their numbers on the Sanctuary are declining. In 1951/52, they outnumbered red-bills three to one (Black, 1954). In 1961/62, they just held their majority, having 460 nests to 400 of red-bills (Reid and Reid, 1965). In 1982/83, only 310 pairs built nests, compared to about 1,000 pairs of red-bills; the number had dropped further to 230 pairs during the 1983/84 season.

This species commences nesting three weeks later than the red-billed gull and deserts three weeks earlier. Their rapid synchronised breeding is one of several behaviours adapting them to the flood-prone South Island riverbeds. In the South Island, the gulls lay "almost as soon as a nesting site is secured", and "the adults and young move away from the nests within a few days of hatching of the eggs..." (Beer, 1966). There is already evidence that the Rotorua black-bills are learning new ways, more in keeping with a stable colony site that isn't washed away with each flood. At Rotorua, many gulls are on the colony two months before first eggs are laid, and the chicks don't leave the site until they are almost ready to fly. However the nesting period is the same length — about 10 weeks.

Few black-bills are seen around town where their red-billed cousins are scrounging food, and we have never seen them at the rubbish tip. They feed on pasture around Rotorua or on lakes in the region.

Winter movements of the black-billed gulls which breed at Rotorua are a mystery. It is likely that many go to the Firth of Thames, although this has yet to be proven. Some remain in the Bay of Plenty. Birds banded on the Sanctuary have been seen on Lakes Rotoehu and Taupo in winter. Fifty Sulphur Bay black-bills were banded with orange leg bands this year to find out the movements of the birds.

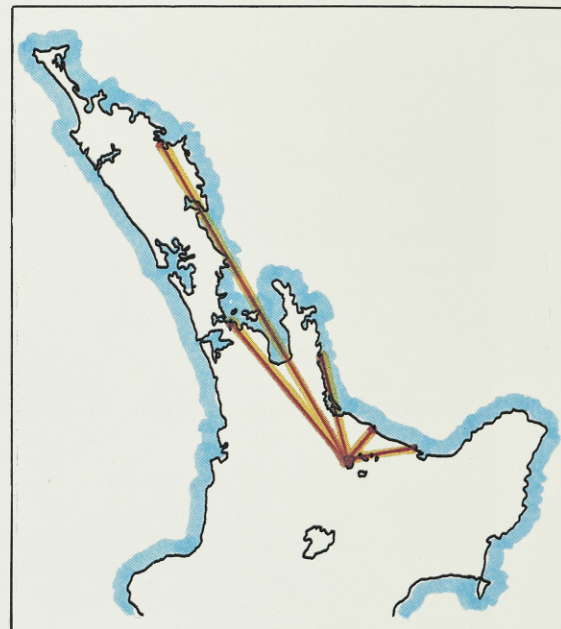
Little black shags:

Six years ago, no little black shags nested in Sulphur Bay. In 1982/83 there were 980 nests crammed onto the small Island off

Motutara Point — most of the New Zealand population. Until recently little was known about the species in New Zealand. A few little blacks arrive from their wintering grounds in September, but most appear in early October. First eggs appeared in mid-October in 1982/83 but the next year not until 4 December. Incubation takes 26–28 days and the usual clutch is four eggs. Chicks are ugly but lovable! At fifteen days the chicks can be banded and are fully fledged within seven weeks. Juveniles are distinctively brown-plumaged.

As with the gulls, these shags don't feed in the sulphurous water. Hundreds of them fly to the northern bays of Lake Rotorua daily to dive for smelt. Their feeding is characteristic — hunting in groups, they herd smelt ahead of them by diving repeatedly in front of each other to reach the small fish.

Little black shags banded in Rotorua in the 1982/83 season have been seen or captured in winter at Bay of Plenty beaches; at Oputere on the east coast of the Coromandel Peninsula; near Panmure and on the Waitemata Harbour in



Movements of young little black shags banded in Rotorua.

Auckland, and much further north, near Kerikeri.

In the 1983/84 season only 300 shags nested on the small island. Red leg bands have been put on 160 young to identify them more clearly as being Rotorua-born.

Meanwhile the few trees — old manuka — on the island are long dead. But it doesn't matter, since 90% of the nests are on the ground.

Banded dotterel:

Banded dotterel are rare in the Rotorua Lakes district. Ten pairs still nest atop Mt Tarawera, in scattered localities and despite the airstrip there. The only other known breeding site is on the thermal silica flats of Sulphur Bay between the Travelodge Hotel and the Puarenga stream mouth. The dotterels breed there from August to February, then depart until June or July. In 1982/83 up to 12 were present and four pairs nested. Seven chicks hatched with probably four fledging.

The biggest threats to the continued survival of these banded dotterels are motorbikes and "development". Many people see the flats as unproductive