



Little black shags on their breeding island.

wasteland, which needs to be developed for tourism or commerce. Every summer evening and weekend motorbikes scream up and down the sand and mud. The dotterels fly unnoticed ahead of the bikes, their *chip-chip* call warning chicks to keep their heads down. Unfortunately their breeding area is outside the Wildlife Refuge.

## The overwinterers

The New Zealand dabchick population in the Bay shows a strong seasonal trend. Flocks form in autumn and disperse during the spring. Few remain in high summer. In 1982 the winter flock peaked at 95, while in 1983 about 70 birds used the Bay. The estimated population of this endemic bird in New Zealand (and therefore in the world) is 1,150–1,400 birds (B. Heather, 1978, *OSNZ News* No 8). Sulphur Bay therefore supports at least 5% of the total population in winter, and ranks as a wetland of international importance under IUCN criteria (any area which supports more than 1% of the world population). Dabchick feed along the zone between the Puarenga Stream and Ngapuna Stream currents, and in the evening — when the lake is more peaceful — move out towards Hinemoa Point.

Pied stilts feed, roost and breed around the bay shoreline, mainly at the Puarenga Stream mouth and on the Travelodge flats. A large flock (170 in February 1983) forms after the breeding season in late summer. This declines in autumn, possibly as birds move down to the Bay of Plenty coast. Numbers build up again in May as duckshooters take to our wetlands, and most of this flock disperses in July to farm ponds and lakes in the region to breed.

Welcome swallow are virtually absent from October to February but appear in large numbers in May. In June 1983, over 700 were estimated to be hawking up and down the thermal Puarenga Stream at its mouth. They remain until August. It seems probable that in summer they breed in farm buildings, near ponds and on bridges within 10–15km of Rotorua. They use the bay over the winter period probably because its warmth supplements their body heat and it contains a ready winter food supply of midges.

## Regulars, moulters and shelterers

Other regular users of the bay include black swan, paradise duck, mallard, scaup, grey teal, black-backed gull and Caspian tern. Numbers of waterfowl, especially paradise duck, shoveller, grey teal, mallard and grey duck are highest after breeding, in January and on into autumn. Presumably the bay provides peace for moulting, but few breed there.

Other birds present at different times are little shag, large black shag (up to 60 in December/January, after breeding) and white-faced heron.

## What of the future?

The questions posed in the introduction to this article still need an answer. For the banded dotterel, gulls, pied stilts and other species which breed and feed here, Sulphur Bay provides a large, sheltered, flat surface close to a lake. This habitat type is regionally rare. The black-billed and red-billed gulls and little black shags which have large breeding colonies here mostly feed outside the Bay, and certainly feed outside the thermal section of it.

For all species, freedom from disturbance is a key factor. The bay isn't popular with tourists or anglers, and few visitors walk on the thermal flats.

However tourist interests are keen to make use of the area but for the wrong reasons. A hovercraft company is now considering starting an "airport to accommodation" service, actually running the noisy machine out of the water within 30m of where red-billed and black-billed gulls and banded dotterel nested this year. A jet helicopter also takes sightseers over the bay from vacant land within 200m of the Puarenga Flats. Roosting gulls take to the air as the machine covers the bay. Red-

billed and black-backed gulls are good adapters, but we do wonder at the decline of black-billed gulls on the Sulphur Point Sanctuary. This year a colony of black-bills at the nearby tranquil Lake Rerewhakaaitu fledged over 200 chicks, about four times the chick production at the Sanctuary. Perhaps they're telling us something?

We think there is excellent potential for developing the Sulphur Bay refuge for better viewing by the public, but on foot, not from a hovercraft or helicopter! Unfortunately the message does not yet seem to have reached many tourist operators that bird watching is a very popular activity worldwide. Natural history and activity tourism are the major growth area of tourism in New Zealand today. However it is essential that we safeguard the attractions the visitors come to see.

## References

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- Reid, Denise and Brian, 1965: The Sulphur Point (Lake Rotorua) Gull Colony. *Notornis* Vol 12 (3) pp138–157.

**Editor's Note:** Any readers who sight any of the banded birds described in this article may wish to contact: John Innes, Loop Road, Lake Okareka, Rotorua with their sightings.

**Colour banded red-billed gull chick, with adult, Sulphur Bay.**

**Little black shag nest — a robust structure made of twigs and lined with feathers.**



**25 day old little black shag.**

Photographs John Innes

