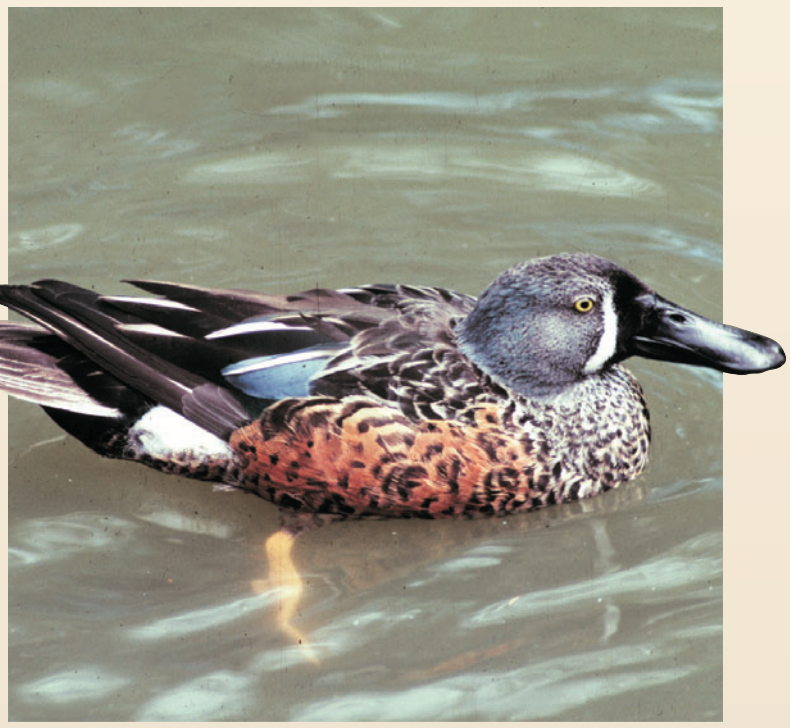
Survival and dispersal of shoveler in New Zealand



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World-wide, shovelers are enigmatic waterfowl that have proved difficult to catch, band and study. In New Zealand, the native Australasian shoveler *Anas rhynchotis* is a widespread and conspicuous inhabitant of lowland and coastal lacustrine wetlands, especially those shallow and eutrophic. A mobile and flocking species, appearing on and departing from wetlands with considerable abruptness, it is exploited as a gamebird with an annual harvest of approximately10,000 birds.

Shoveler were found moulting communally at two southern South Island and one North Island secluded wetland sites where, during 1972–86, almost 4000 flightless adults were captured and banded.

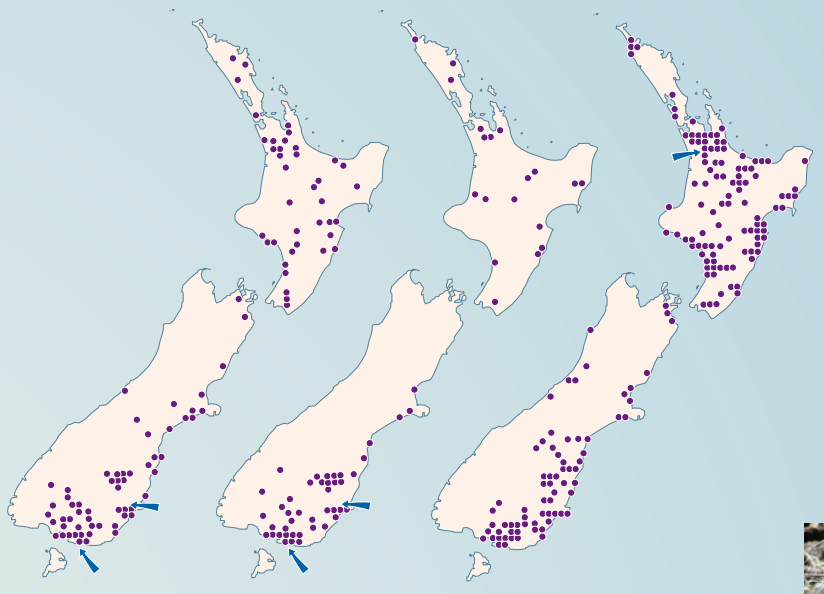
In addition, 881 fledglings were banded at breeding localities near the southern moulting sites.

Recoveries to December 2000 by duck hunters of 726 banded adults and 180 banded fledglings were used to evaluate dispersal and survival.

Dispersal

We used plots of reported recovery locations to compute distances between banding and recovery locations, and test whether dispersal distance was related to age, sex, or banding location of the bird. We found:

- Fledgling and adult shoveler dispersed widely throughout New Zealand, some travelling >1000 km within 3–4 months of banding
- Similar country-wide dispersal by adults moulting at opposite ends of New Zealand
- Year-of-banding recovery distance distributions were similar for fledglings and adults
- Recovery distance distributions were similar for adult males and females



Recovery locations of banded shoveler, arrows indicate banding sites

Methods of capture: dog, fyke net and herding of moulters into pens

Survival

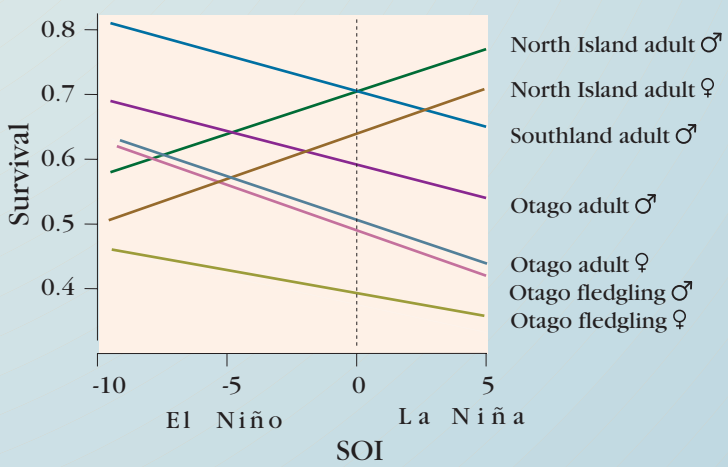
We used band-recovery models in MARK to model survival probability as a linear function of age, sex, banding location and time. We also fitted models where the time-effect was expressed as a function of the El Niño-Southern Oscillation index (SOI).

When SOI was zero:

- Survival of adult male Otago shoveler was 0.61 ± s.e. 0.06, and 18% lower for females; fledgling survival was 20–26% lower than for adults of the same sex
- Survival probabilities of Southland-banded shoveler were 16–20% higher than those of nearby Otago-banded shoveler
- Survival probability for North Island males was 0.71 ± 0.04, and 10% lower for females

For each one unit increase in SOI:

- The odds of survival for southern-moulting shoveler declined by 5.5% and for northern-moulting shoveler increased by 6.6%
- The odds of southern-moulting shoveler being recovered >30 km from the banding site increased 6%; those for northern-moulting shoveler decreased 4.6%



Conclusions

El Niño conditions (SOI) induce higher survival and decrease movements of southern shoveler but decrease survival and increase movements of northern-moulting shoveler. This reflects contrasting regional effects of El Niño in New Zealand.

Intense summer-autumn drought promotes extensive movement of shoveler in response to reduced food availability: fewer feeding sites result in decreased survival.

Shoveler, being dependent on shallow and often ephemeral wetlands, appear especially sensitive to changes in rainfall patterns, and may rely on a national network of wetlands for their survival.

This species also inhabits patchily-distributed wetlands in parts of arid Australia, necessitating extensive dispersal. More modest climatically-induced dispersal within New Zealand is sufficient of a stress to impose detectable survival costs.

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