

Foraging biology of the threatened Pārekareka (spotted shag) in the Hauraki Gulf.

Dr Matt Rayner Auckland Museum

Spotted shags historically bred widely in the Auckland region, yet experienced massive population declines in the 20th century and are today restricted to one main breeding site in the Firth of Thames with approximately 300 breeding pairs. Recent research indicates that this isolated northern population is genetically distinct from the rest of New Zealand, adding urgency to understanding the causes of population collapse, likely driven by a combination of human interference (i.e. set nets), habitat degradation and or shifts in prey. Reversing the trend of declining numbers is hampered by a lack of information on foraging behaviour and diet of this population. With BNZRF funding we sought to use GPS tracking, and stable isotope analyses of historic (museum sourced) and contemporary (field collected) feathers, to understand the movements and long-term diet of spotted shags in the Hauraki Gulf to provide better informed management.

Despite the best efforts of COVID-19, in 2020 we were able to deploy solar-powered GPS tags on eight spotted shags breeding on Tarahiki Island and collect hi-resolution GPS tracks of between 30-120 days (67 000 GPS locations to date) in length. Tracked shags foraged south east, south and south west of Tarahiki Island, in the Tamaki Strait, and western and eastern Firth of Thames, travelling up to 50 kilometres from their colony site. Tracking data identified the broad range of resting and roosting sites required by this species, frequently at places vulnerable to human disturbance. During the spring breeding season tracked birds frequently foraged within offshore mussel farms in the Firth of Thames. With the loss of benthic mussel beds in the region through historic dredging and siltation, we hypothesise that this “new” vertical ecosystem promotes a diverse fish life that the birds can exploit. Further research is planned to investigate the ecology of this system

Analysis of carbon and nitrogen isotopes ratios from 40 spotted shag feather samples collected between 1887 and 2020 indicates that spotted shags have undergone changes in both diet and foraging habitat over time. Nitrogen isotope ratios declined significantly over time, indicating the dietary trophic level has reduced by half, shifting from a diet dominated by fish, to one encompassing lower trophic-level prey such as squid. Likewise, feather carbon isotope ratios have become significantly less enriched, indicating that today birds are foraging further offshore than they were doing more than a century ago. Together these results suggest a significant change in the birds’ ecology that requires further investigation.

In the upcoming breeding season, we hope to continue collating tracking data, deploying additional tags and further investigating the ecological dynamics at play in the spotted shags’ chosen foraging habitats.

Project team: Dr Matt Rayner (Auckland Museum), Dr Tim Lovegrove and Dr Todd Landers (Auckland Council).



Pārekareka (spotted shag) at Tarahiki Island © Jennifer Carol, Auckland Museum