



Movements of grey teal across inland Australia

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in a rice hull

- Small transmitters were attached to 26 grey teal *Anas gracilis* in the rice growing areas and in the Lake Eyre Basin to track bird movement by satellite
- Several birds were tracked for more than a year and up to 879 days
- One individual travelled 978 km in 40 hours while another maintained speeds of 99 km/h for more than three hours
- One individual travelled a total of 9725 km in 16 months
- Individual movement responses varied markedly as birds moved between natural wetlands, the agricultural infrastructure and regions

Since the first grey teal *Anas gracilis*, nick-named Harriet, was released at Fivebough Swamp near Leeton on 2 September 2003 much has changed in our knowledge of waterfowl movements in Australia. Birds fly faster and further in a single day than previously thought possible, and many return to their starting point weeks or months later.

This project set out to determine the movement responses of waterfowl to changes in wetland availability and analyse interactions with habitat at local and regional scales in the rice-growing region of New South Wales and at broad scales across inland Australia. The project began in 2003 with the attachment of lightweight satellite transmitters to follow the real-time movements of waterfowl in two contrasting landscapes: the agricultural landscapes of the Riverina region of southern New South Wales and the arid landscapes of the Lake Eyre Basin.

The transmitters weigh only 18 g. They were solar powered and transmitted location data to a satellite orbiting 850 km overhead. These data were then downloaded from a computer in France while sitting at our desk! Some location fixes were within 20 m, but most often a fix is within 1 km of the true location of the bird. A specially designed teflon ribbon harness was used to attach each satellite transmitter to the back of the duck (Figure 1).

All satellite transmitters deployed on grey teal since September 2003 finally stopped working early in 2006, providing data for more than 2½ years. A total of 26 teal were fitted with transmitters, with 15 released at sites within the Riverina and 11 released at lakes within Lake Eyre Basin between September 2003 and February 2005.

The last of the original deployment of 16 units ceased

operating on the 23 March 2006 and was tracked for about 879 days over more than 6478 km. Two satellite units deployed in November 2004 were tracked for more than a year and travelled 9724 and 7296 km respectively. The longest single flight recorded was 978 km in 40 h from northern South Australia to the Barkly Tablelands in the Northern Territory, while another sustained speeds of 99 km/h for several hours in a six hour flight from near Moree west to the Paroo River (Figure 2).

Patterns of movement

The observed flights of grey teal are not extraordinary in terms of distance or rate of movement when compared to many species of waterfowl that undertake long-distance seasonal migration in northern temperate regions, but



Figure 1: Release of 'Chaser' at Fivebough Swamp, Leeton



these flights have never been recorded before for this species or these regions in Australia.


The insight gained from this study is that long-distance movements vary markedly at the individual level in terms of timing and direction, and that the movements of this so-called nomadic species do not appear to be random wanderings between adjacent wetlands. Many birds moved a large distance (up to 978 km) between occupied sites in a short period (hours), remained in the vicinity of those sites for extended periods (months), ventured up to 900 km from their point of release and travelled more than 6000 km in one year. The observed pattern of movement suggests that grey teal interact with available habitat at broad scales and that movement at these scales is, at least in part, based on experience and spatial memory. Some tagged individuals moved large distances between wetlands, reaches and catchments over regions with a multitude of other natural and man-made wetland resources, to settle on small wetlands or in regions with few significant wetland resources. Once arriving at a new location, individuals have spent periods of eight months or more in the same general vicinity. This pattern of movement may reflect breeding activity and/or previous patterns of habitat occupancy.

To date there has been no significant movement between the Murray-Darling Basin and the Lake Eyre Basin. If this situation reflects the structure of waterfowl populations in southeast Australia it suggests that rice-growers are dealing with regional breeding populations of waterfowl. Anecdotal reports from rice-growers suggest that there are resident and mobile populations of waterfowl. The data so far support

this notion but the origins of individuals in both groups may be local—with some individuals moving out and back in response to rainfall events.

So what now...?

The current set of analyses is examining the movements of the four individuals that were monitored throughout the day and night and how they used the agricultural infrastructure. In November 2004 transmitters were attached and programmed to transmit continuously so that we could gain a better understanding of the movement habits of teal in the rice-growing regions. These birds confirmed that teal were mostly moving at night. All four birds differed in their use of various habitat types with individual preference for natural watercourses in one, irrigation infrastructure in another, natural swamps in another and a range of natural and irrigation infrastructure in the last.

Analyses of movement data are continuing in collaboration with colleagues in Canberra and The Netherlands, including comparisons of movement paths in Riverina and desert birds, the timing and length of movements attributable to environmental cues (eg rainfall and wetland inundation/ environmental flows) and the energetics of movements. 

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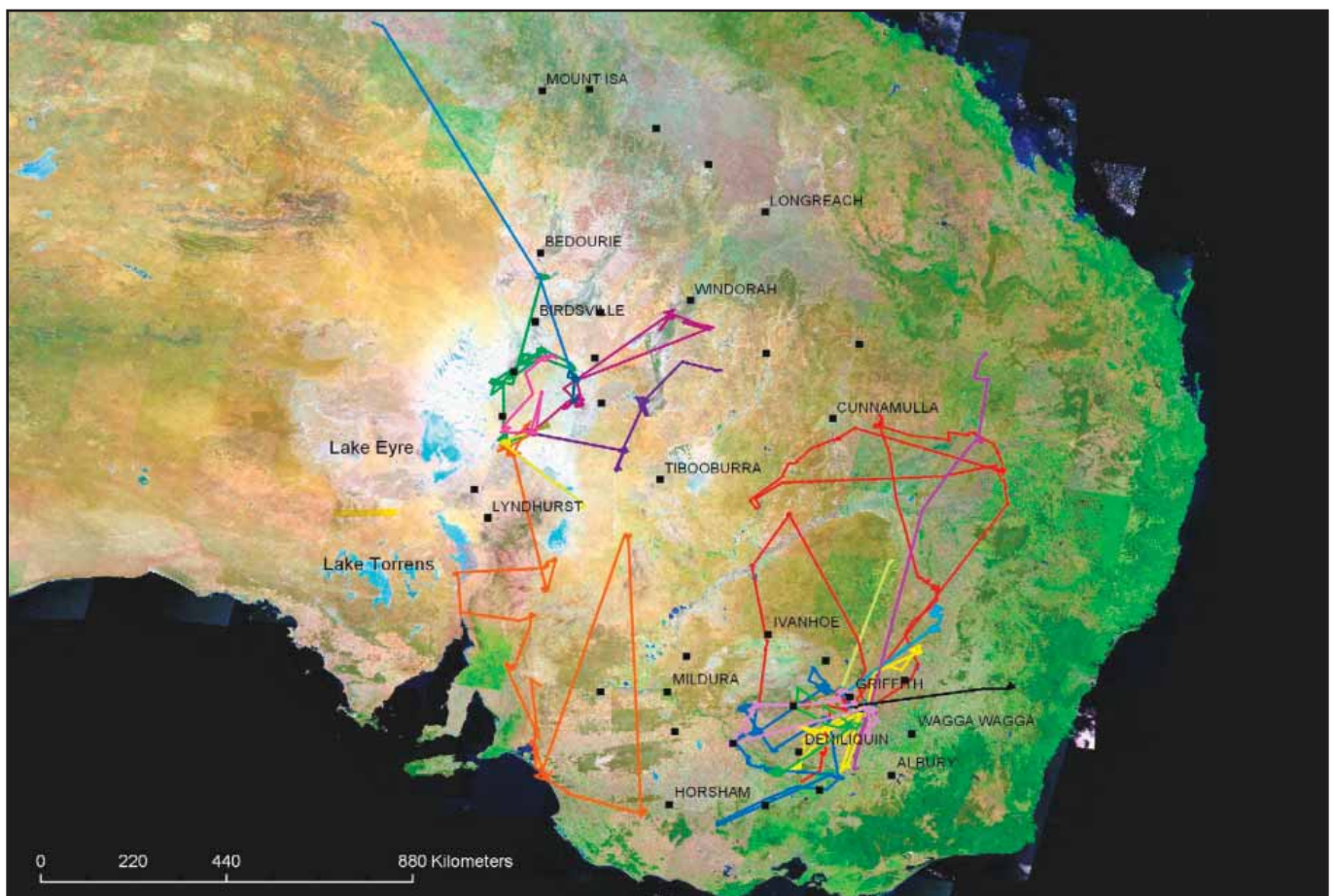


Figure 2: A map showing movement paths of all grey teal deployed between September 2003 and February 2005.