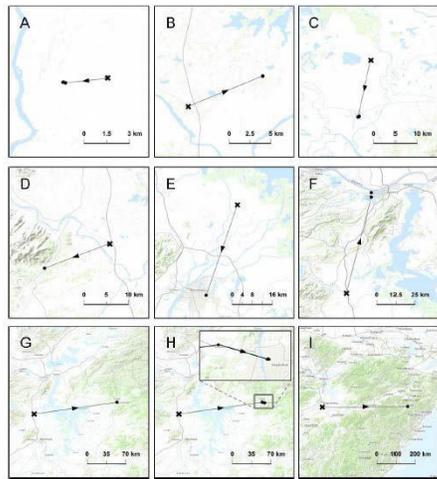


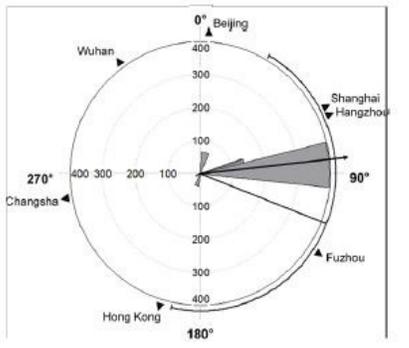
Tracking Domestic Ducks through the Market Chain in China via Telemetry



GPS transmitters deployed on upper back of a small and large domestic duck.



Translocation of GPS-tracked domestic ducks.



Rose graph for direction and distance of transmitter-deployed domestic duck transportations.

The Challenge: Highly pathogenic avian influenza viruses (HPAI) of certain subtypes primarily infect poultry, causing disease outbreaks and negative socio-economic impacts on poultry farming depending on the characteristics of biosecurity and the virus strain. HPAI viruses seem to be adapted to artificial ecosystems including poultry farming, free-ranging duck production, and live bird markets, rather than to natural ecosystems. Although detailed knowledge of the agro-ecological conditions associated with HPAI is still limited, the live bird trade is currently known to be a major pathway for its spread. The Asia-Pacific region has been regarded as an epicenter of new emerging infectious diseases due to the high density of human populations, and the increasing agriculture and livestock production with varying biosecurity levels and integration with human living space.

The Science: To bridge the knowledge gap on quantitative poultry movement and transportation, we introduce a novel approach of using telemetry to document domestic ducks' movements through a market chain at Poyang Lake in China. We deployed newly-developed Global Positioning System & Global System for Mobile (GPS-GSM) transmitters on a number of domestic ducks from 28 farms in January-February 2015. Partners for this project were the Max-Planck Institute for Ornithology, Jiangxi Normal University, the University of Konstanz, Fundan University, the Food and Agriculture Organization of the United Nations (UN FAO), and the University of Oklahoma.

The Future: This study is the first approach that directly and quantitatively documents the movement of poultry to understand the market chain through telemetry. Given the possible role of a single infectious host in disease transmission, telemetry has a great value in the identification of actual translocations of individual hosts which are often invisible and ignored in market chain systems. Information collected from this and possible follow-up telemetry studies is highly applicable to realistic model developments in market chain and HPAI studies, such as social network analysis or agent-based models, which require basic information on movements and transportation collected in real poultry systems.