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Delivering policy-relevant indicators: South Africa's Data Pipeline for Wetlands and Waterbirds

Extracting relevant information for timely decision making out of increasing volumes of ecological data is becoming a challenge. A possible solution to facilitate the link between raw data and end users is to streamline data processing through data pipelines. South Africa's Data Pipeline for Wetlands and Waterbirds (BIRDIE) uses raw data submitted by citizen scientists, vets the data for internal consistency, statistically analyses the data, and finally, makes decision-relevant outputs available via an online dashboard, and via an API for system integration.

With ever-increasing pressure on wetlands due to the scarcity of freshwater on Earth, there is an urgent need to monitor the status of these ecosystems. In this context, waterbirds often serve as flagship and indicator species for other less accessible taxa. In South Africa, there are two country-wide citizen-science projects that provide waterbird data: the Coordinated Waterbird Counts and the Southern African Bird Atlas Project. BIRDIE leverages these datasets, as well as other opportunistic records, to understand the distribution and population dynamics of waterbird species. Behind the scenes, these citizen-science data are analyzed using a suite of statistical techniques including state-space, and occupancy modelling, to estimate population dynamics and distributions.

The project will contribute to the implementation of international programmes, such as the RAMSAR convention, the Agreement on the Conservation of African-Eurasian Migratory Waterbirds, and the Convention on Biological Diversity. At a national level, the outputs from BIRDIE will contribute to Red-Listing evaluations, National Biodiversity Assessments, as well as to support site management and decision making. Designing a data pipeline that fits more than two hundred species and runs automatically poses many challenges, but we show it is possible, and demonstrate the value it adds for decision makers.