

Species Identification in the White-headed Gull Complex



Herring Gull, *Larus argentatus*

The Challenge: The Federal Aviation Administration has long relied on the expertise provided by the Smithsonian Feather Identification Lab for identification of bird remains recovered from bird-aircraft (birdstrike) collisions. Recently, these identifications are increasingly reliant on data from mitochondrial DNA. While generally successful in delimiting species, mitochondrial DNA is not sufficiently differentiated in certain groups of birds, such as the white-headed gull complex of species, for successful identification. Unfortunately, these gulls (e.g., Herring Gull, Western Gull, Glaucous Gull) are among the main culprits in damaging strikes to aircraft, accounting for about 25% of birdstrikes to civil aircraft.



Aircraft with wing damaged in birdstrike

The Science: Accurately identifying the species of gulls involved in birdstrikes is a critical first step to designing and implementing measures to help prevent damaging strikes. In a collaboration between the USGS and the Smithsonian, a multi-locus database is being developed to enable DNA identification of white-headed gull species involved in birdstrikes, to increase our scientific understanding of the complex relationships within this group of birds, and, more generally, to provide insight into the genetics of recently diverged or hybridizing species like the species complex of white headed gulls.



Cannon shooting (gull mitigation measure)

The Future: A multi-locus database for 18 species of gull, consisting of data from nuclear DNA sequences and microsatellites in addition to mitochondrial sequence data, is now proving successful in identifying species not previously identifiable by genetic data from mitochondrial DNA alone. This in turn will allow the development of species-specific plans for reducing the incidence of birdstrikes. In addition, these data are providing new insight into the speciation and diversification of these gulls during the climatic fluctuations of the Pleistocene epoch.