# Project title

Acoustic Monitoring for Migratory Birds in Lithuania – Land of the Storks

# Project summary

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| National Geographic grant No. | EC-KOR-53792R-18 |
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| Project timeline | * Plan for fieldwork: 2025 Jan - April * Data collection: 2025 May – July * Data summary and draft report: 2025 Aug – Dec * Final project deliveries: 2026 spring |

# Background and Relevance

Lithuania is a particularly watered region with more than 3,000 lakes, mostly in the northeast. The landscape is dominated by meadows, dense forests, and fertile arable lands ([cite](https://www.ceicdata.com/en/lithuania/environmental-land-use-oecd-member-annual/land-use-total-area)). With the highest elevation less than 300m, Lithuania is home to a terrestrial biome “temperate broadleaf and mixed forests”, according to the WWF classification ([cite](https://pmc.ncbi.nlm.nih.gov/articles/PMC5451287/)), or “temperate-boreal forests and woodlands”, according to IUCN ([cite](https://global-ecosystems.org/)). The mixed forest occupies around one-third of the country’s territory ([cite](https://web.archive.org/web/20210623222205/http:/files.gamta.lt/aaa/pranesimai/Lietuvos_gamtine_aplinka_bukle_procesai_ir_raida.pdf)), with the dominant tree species being pine, birch and spruce. In contrast, the freshwater biomes includes rivers and streams, lakes, and wetlands, which cover around 7.9% of the country’s territory, although most of the wetlands having been lost due to drainage and human activity between 1960 to 1980 ([cite](https://web.archive.org/web/20210623222205/http:/files.gamta.lt/aaa/pranesimai/Lietuvos_gamtine_aplinka_bukle_procesai_ir_raida.pdf)).

Protected areas, of all protection levels, occupy 17% of the total area of Lithuania. There are five National Parks, including Curonian Spit National Park, the one with the most diversity of bird communities. There are also six Strict Nature Reserves, including [Zuvintas Biosphere Reserve](https://en.wikipedia.org/wiki/Zuvintas_Biosphere_Reserve), which is an important breeding ground and migration halt for waterbirds.

Many birds fly through Lithuania as part of the Baltic Flyway, one of the world's most important migratory routes, bounded by East Atlantic Flyway and Black Sea Mediterranean Flyway ([cite](https://flyway.waddensea-worldheritage.org/flyway-conservation)). The avifauna of Lithuania include a total of 387 species (bird list by [Lithuanian Ornithological Society](https://birdlife.lt/sarasas), LOD; v2024 April), including thirteen globally endangered specie such as Ferruginous Duck (*Aythya nyroca*), White-tailed Eagle (*Haliaeetus albicilla*), Corncrake (*Crex crex*), Great Snipe (*Gallinago media*) and Aquatic Warbler (*Acrocephalus paludicola*). Named in 1973, the White Stork (*Ciconia ciconia*) is the national bird of Lithuania, symbolising harmonious coexistence of humans and nature ([cite](chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https:/www.birdlife.lt/upload/user_uploads/Dokumentai/ciconia_svetainei/Annex_50_FR_EN.pdf)). The bird spring migration in Lithuania starts as early as March/April, bringing huge concentration of geese, swans, ducks and other waterfowls. The breeding season in May/June provide the most species observed (150 ~ 200 species). Most passerine (aka. songbirds) arrive at end of May ([cite](https://fatbirder.com/world-birding/europe/lithuania/)).

Although being rich in bird diversity, only few publicly available resources are available regarding to the Lithuanian bird sound documentation, and most of them focus on single bird species vocalization:

* Website of Žuvintas Biosphere Reserve ([link](https://www.zuvintas.lt/gamtos-garsai)) – a collection of bird sounds from lakeshore, forest, and meadows.
* A CD recorded by Vidmantas Blažys ([link](https://www.discogs.com/release/3294443-Vidmantas-Bla%C5%BEys-Novarais%C4%8Dio-Balsai)) – a collection of bird sounds in the Novaraistis region.
* A Youtube video channel Asvidea ([link](https://www.youtube.com/watch?v=BHPpjs8NnCU)) – a comprehensive which includes 400 bird sounds – however, the recordings are likely from other countries instead of collected in Lithuania locally.
* Xeno Canto ([link](cite)) – a worldwide bird sound library, including recordings shared by citizen scientists for about 140 bird species across Lithuania (accessed on Jan.2024).

Documenting single bird species vocalization is crucial in understanding the behaviour and sound variation, while a long-term soundscape monitoring, by autonomous recording units (ARUs), is also important in understanding the interaction between the species and the environment. A very recent study inventories passive acoustic monitoring (PAM) datasets targeting biodiversity globally, indicating that very few, if any, effort has been made for passive acoustic monitoring in Lithuania ([cite](https://www.biorxiv.org/content/10.1101/2024.04.10.588860v2.full), see the [interactive map](https://ecosound-web.de/ecosound_web/collection/index/106)).

In this research, I am going to conduct fieldwork in Lithuania, specifically in Žuvintas Biosphere Reserve and Curonian Spit National Park area to document the bird diversity in the area. The goal of this study is to 1) set up autonomous recording units (ARUs) for large scale passive monitoring for soundscape and 2) conduct active recording to collect vocalizations from as many bird species as possible. The ultimate goal is to explore the sounds of the ecosystem in Lithuania and enhance the documentary of the local birds, hence increasing the local connection between people and ecosystems

# Goals and Objectives

1. Using autonomous recording units (ARUs) for sound monitoring: I will bring about 10 ARUs to the Curonian Spit National Park and put them up in the field. These ARUs could be left in the field for the whole breeding season (May - July). The goal is to survey the bird community, and understand the vocal activity pattern of the birds in the region.

2. Collecting species-specific vocalization: I will bring a parabolic microphone to collect species vocalization in the field. The goal is to collect as many species as possible and construct a "bird sound library" for Curonian Spit National Park. All the sound recordings will be processed and uploaded to Xeno-Canto, a global sound library.

# Methodology

Study area (The pick of the two study areas)

Žuvintas Biosphere Reserve

Lake Zuvintas, in the south, is an important breeding ground and migration halt for waterbirds. The largest wetland area in the

Curonian Spit National Park

The Lithuanian seacoast area and Curonian spit - is a bottle-neck where the migration of wildfowl along the Baltic is impressive with huge flocks of migrant geese, swans, ducks and passerines.

Recording equipment (ARUs, battery, SD cards, SD card reader, harddrive, portable recording equipment, camera)

Audio interpretation (BirdNET processing – soundscape project ; manual processing – Xeno-Canto publication)

Fieldwork plans

# Contributions of the project

* To collaborators, Lithuania and NG (general report for the fieldwork, sharing of the experience by talks)
* To general public (Xeno-Canto recordings, public science articles)
* To science (upload sounds to the soundscape project, scientific articles)