**BIOL 380: Bioacoustics in the prairies: Grassland birds as indicators of biodiversity change**

**Instructors:**

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**Description**

The project seeks up to 5 students who will learn basic bioacoustic methods in ecology and help to run and assess automated sound recognizers for a set of four ecologically and acoustically distinct species inhabiting the prairie grasslands of southern and central Saskatchewan. Automated Recording Units (ARUs) can collect many hours of recordings, but manually processing the recordings to survey data is time consuming and can be inefficient. Several automatic recognizers exist that can identify individual species from raw acoustic signal and thus economize the processing of large volumes of data; however, such recognizes need to be validated for good performance. Data processed by students will contribute to the continued use of HawkEars classifier and the estimation of call density from HawkEars output.

Each student will learn:

* The basics of bioacoustic theory, including biological sound production, transmission, and capture as it pertains to ecological field research.
* The basics of ecological data management in R (optional).
* How to prepare, deploy and troubleshoot ARU in field conditions.
* How to identify four target birds: Thick billed longspur, Sprague's Pipit, Baird's Sparrow, and Chestnut-collared Longspur by sound and visual analysis of spectrograms.
* How to validate recognizer results using the WildTrax platform.
* Conduct preliminary analyses with the data produced as a class.

**Assessment- revised 5 August 2025**

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| **Assessment Metric:** | **Date(s) Grade is to be Assigned:** |
| Practical Research Performance (25%) | Field work - deploying and retrieving ARUs (15%; September 25)Desk work - manually annotating acoustic data (10%; October 07) |
| Annotated Bibliography (10%) | Thesis statement and annotated bibliography due October 14 |
| Research Notebook (25%) | Submit research notebook November 1 |
| Oral Presentation (10%) | December 3 |
| Literature Review (30%) | Final literature review due December 5, 2025 |
| Total (100%) |  |

**Course prerequisites:**

* BIOL 228, 301 and min 9cu of senior BIOL credits 300 level or higher (required)
* BIOL 373 and 458 (recommended)

**Required Reading**

Shonfield, J., & Bayne, E. (2017). Autonomous recording units in avian ecological research: current use and future applications. *Avian Conservation and Ecology*, *12*(1).

Huus, J., Kelly, G., Bayne, E M., & Knight, E. (2025). HawkEars: A regional, high-performance avian acoustic classifier. *Ecological Informatics*, 87.

Knight, E., Hannah, K., Foley, G., Scott, C., Brigham, R., & Bayne, E. (2017). Recommendations for acoustic recognizer performance assessment with application to five common automated signal recognition programs. *Avian Conservation and Ecology*, *12*(2).

Priyadarshani, N., Marsland, S., & Castro, I. (2018). Automated birdsong recognition in complex acoustic environments: a review. *Journal of Avian Biology*, *49*(5), jav-01447.