Developing Standard Methods for Bioacoustic Data Collection and Processing in Alberta, Canada
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**Introduction**
- Acoustic monitoring using autonomous recording units (ARUs) are fast becoming the most common way of surveying avian communities.
- ARUs are being used for bioacoustics surveys by university researchers, government agencies, industry, consulting companies, NGOs, and First Nations.
- The Bioacoustic Unit is a collaboration between the University of Alberta and the Alberta Biodiversity Monitoring Institute (ABMI). Our team is working on solutions to the challenges presented by ARU technology.

**Challenge 1: Data Volume**
- An ARU can record multiple times per day across many days and target multiple species groups. This is particularly useful when surveying species that are rare, nocturnal and/or call infrequently.
- Acoustic recordings can be archived and reviewed later to extract more information.
- However, the large amount of data that ARUs collect raises the challenge of storing large numbers of acoustic files.
- **Solution:** We are investigating how file compression methods affect the quality of the recordings and our ability to detect species (Figure 1).

**Challenge 2: Data Standards**
- Standardized data collection and processing protocols are essential for collaboration and creating the large data sets required for species population trends at multiple spatial scales.
- **Solution:** The BU has developed standardized protocols for ARU field deployment that can easily be used by other researchers, industry, and communities for their own acoustic monitoring projects.

**Challenge 3: Analysis**
- ARU research projects target different species of interest but ARUs record all vocalizing species within range.
- **Solution:** The Bioacoustic Unit analysis method collects detailed minute by minute data for all species present, the number of individuals, as well as information on weather conditions and background noise. This allows researchers to query the data according to their research needs.

**Challenge 4: Staff Training**
- Analysing complex recordings, such as those from the dawn chorus, requires a high level of skill. For data to be reliable, listeners need to be trained to a common standard in both auditory and visual identification of vocalizations.
- **Solution:** The Bioacoustic Unit is developing a standardized listener training program that will assess a listener’s skill level and help them expand their capabilities.
- **Solution:** New technicians are mentored by experienced staff and have a certain percentage of their first recordings proofed to ensure they are meeting identification standards.

**Challenge 5: Distance**
- The amplitude and quality of bird calls captured on recordings provide information on how close the bird was to the ARU.
- **Solution:** Our research group is comparing sound transmission among a wide variety of habitats and range of frequencies. Results from this research will assist in determining the actual sampling area of ARUs for individual species.

**Challenge 6: Processing Time**
- Having technicians listening to individual recordings is time intensive and costly.
- **Solution:** The Bioacoustic Unit has developed recognizers for a number of species and greatly improved processing efficiency by increasing the number of individual detected and amount of data processed.
- **Solution:** Current research is working on developing multi species recognizers that can process data more efficiently.

Visit bioacoustic.abmi.ca for our protocols, reports, and services.
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