Call of the Wetland is a citizen science program developed to monitor amphibians as an important biodiversity and wetland health indicator in a large urban municipality in Canada. An important component to citizen science programs is considering quality control measures. For Call of the Wetland, participants may not be trained wildlife biologists increasing the potential to misclassify species or provide false negatives while surveying wetlands.

To assess this issue Acoustic Recording Units (ARUs) were set up at a random selection of Calgary wetlands in order to evaluate observer accuracy. The quality control component provides data validation so results can be used to inform biodiversity planning by the City of Calgary and the Province of Alberta.

Two years of data have been collected by citizen scientists, and at 8 of the 51 wetlands ARUs were set up. Acoustic files were classified to species and then compared with the citizen scientist observation and their accuracy was calculated using an on-line Clustering and Classification Calculator (www.alanfielding.co.uk/multivar/accuracy.htm).

<table>
<thead>
<tr>
<th></th>
<th>YEAR 1 (2017)</th>
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<tbody>
<tr>
<td>True Positive</td>
<td>9</td>
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<tr>
<td>(ARU observed, Volunteer observed) – Good result</td>
<td></td>
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<tr>
<td>True Negative</td>
<td>27</td>
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<tr>
<td>(ARU not observe, Volunteer did not observe) – Good result</td>
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<tr>
<td>False Positive</td>
<td>2</td>
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<tr>
<td>(ARU not observed, Volunteer observed) – Bad result</td>
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<tr>
<td>False Negative</td>
<td>2</td>
</tr>
<tr>
<td>(ARU observed, Volunteer did not observe) – Bad result</td>
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</tbody>
</table>

CORRECT CLASSIFICATION RATE 90%

Volunteer citizen scientists were able to accurately contribute to amphibian monitoring.

Survey methodology required active participation at specified time periods during the amphibian season, but we found inconsistencies in the number of times each wetland was surveyed by volunteers. To address this, in times of low participation, staffed summer interns were asked to survey wetlands that were under surveyed.

Distortion of Correct classification rate: one of the sites did not have citizen scientist surveys conducted during the survey period, potentially creating a underestimate in the correct classification rate. To address this in the future, we ensure recommend ensuring surveys are conducted at all ARU sites during each survey period, OR during analysis, do not include sites were surveys were not undertaken by volunteers.

### Methodology

1. **Create recording schedule**
   - April 1 – June 30 (amphibian breeding season in Alberta)
   - 10 minutes of recording every hour

2. **Randomly select 8 ARU locations from the 51 CitSci survey wetlands**

3. **Setup ARUs**

4. **Analyze recordings to determine Presence/Absence of amphibians**

5. **Compare results from CitSci data to the ARU data**

6. **Make any necessary changes to program design, example:**
   - More training/change survey timing
Now you see them, Now you don’t!

PRELIMINARY FINDINGS AFTER TWO SEASONS

To date, over 375 people have downloaded the Call of the Wetland App

Over the first two seasons 180 people have participated in amphibian surveys and completed 584 surveys

Three amphibian species have been observed: boreal chorus frog, wood frog and tiger salamander

Why Wetlands?

Wetlands play a significant role in contributing to the rain cycle, filter sediments and pollutants, and lessen the impacts of flood and drought. Despite their value, wetlands continue to be degraded and disappear due to habitat loss, fragmentation, pollution and climate change. Wetlands in the City of Calgary are managed in terms of storm water infrastructure, however not for the high levels of biodiversity they support. To maintain and restore wetlands in and around the City, there is a need to promote awareness and better understanding of urban wetland health.

There are two ways to participate in Call of the Wetland:

1. Participants sign up for a planned amphibian survey at one of 51 wetland and report findings on a smart phone application (each wetland is visited 9 times during the amphibian season), and

2. Participants report incidental (chance) amphibian observations on the smart phone application.

How will the data be used?

Three years of data collected by volunteer citizen scientists will be used to determine presence or absence of amphibian species in Calgary wetlands. Occupancy modeling will be undertaken on the species data collected. The results will help inform the City of Calgary BiodiverCity Strategy, and will be shared with City planners.

LESSONS LEARNED

• It takes a village to successfully design, implement and evaluate a citizen science program.

• Inconsistency in number of surveys completed per wetland affected both spatial and temporal representation of wetlands in the study area. These issues were addressed by supplementing volunteer data collection with paid student interns.

• To address challenges of participants accurately identifying amphibian species we developed a suite of mechanisms: training sessions, wildlife ID page, verification of participant observations by uploading photo or audio files, requiring validation (expert) of records where participants noted they were not confident in the identification.

• Engagement strategy identified a variety of methods to recruit volunteers (lunch and learns, field trips, social media campaigns, school presentations, hosting events for volunteer to meet up) – but local media coverage resulted in the most new survey sign-ups!