Bird Collision Reporting Mobile App
A Partner Project Between FLAP Canada and UBC SEEDS Program

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Executive Summary
Prepared by: Merle Crombie
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Project Summary:

Background –

Bird collisions with urban structures is a widespread phenomenon in North America (and internationally), and represents the 2nd leading cause of bird mortality, killing an estimated 365 – 998 million birds annually (Loss et al., 2014). A recent investigation of bird collision frequencies at the University of British Columbia (UBC) in Vancouver, BC, Canada, showed that birds frequently collide with campus structures (Porter and Huang, 2015). In response to this finding, UBC's SEEDs Program (Social Ecological Economic Development Studies) partnered with FLAP Canada (Fatal Light Awareness Program), to launch a mobile application to facilitate citizen-collected bird collision data with hopes that this information could be used to reduce collision-related mortality in birds, including at UBC. FLAP Canada is a non-profit organization aimed at conserving birds through reducing collision rates with urban structures via education, outreach, research, and consulting (FLAP Canada 2016). The overall goal of this project was to launch a mobile application of a currently existing website hosted by FLAP Canada called FLAP Mapper, which is a web-based tool to report bird collisions. It was anticipated that this goal would be met by the recruitment of a volunteer skilled in app development, and/or by hiring a private app developer, conditional on funding.

Progress –

Through many efforts to advertise this project opportunity to University students, and to subscribers to relevant membership organizations, I was unable to recruit a skilled volunteer to complete this project. I was also unsuccessful at acquiring the funding necessary to hire a private app developer to complete this project.

Future Recommendations –

While the goal of this project was not met by the anticipated deadline (April 2016), efforts are still being made to launch this mobile application. Future directions are detailed within this report, and include proposing this project as a charitable donation made by a private app development company, and/or by continuing to recruit a skilled volunteer to launch a 'simpler' version of the FLAP Mapper mobile app (detailed below under 'Mobile App Options').

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Project Goal:

Turn the current FLAP Mapper bird collision-reporting tool into a mobile application, or into a mobile-friendly platform, for the primary goal of increasing the convenience and user-base of reporting collision-related bird mortality. The hope would be that this information could then be used to reduce bird collisions in urban areas, and ultimately contribute to the conservation of migratory birds. The intended deadline for meeting this goal was April 2016, coincident with the 100th anniversary of the Migratory Bird Act.

Efforts Made/Problems Encountered in Getting this Project 'Off the Ground':

Between Dec 2015 and April 2016, I contacted several private app developers, and advertised the FLAP Mapper app project on several mailing lists in effort to get this project 'off the ground' in a cost-efficient and timely manner (see Appendices 1 – 4 for contact list). While I learned a lot through this process, both in terms of what exactly this project entailed, and the commitment and expertise required in a willing volunteer, I was unsuccessful at completing the goal of this project by April 2016 (as outlined in 'Project Goal' above). The primary hurdles encountered in facilitating this project were (1) garnering enough interest by a willing student/volunteer to apply their expertise toward completing this project, and (2) given that I was not able to recruit a suitable volunteer, there were financial constraints in getting a private app developer to complete this project due to high costs, and because I was unsuccessful at acquiring funding (see Appendix 4). I feel that the amount of advertising I did to recruit a volunteer was sufficient, but perhaps the timing and/or audience choice was poor due to primarily targeting students who had to meet heavy course demands.

Mobile App Options:

In my discussions with colleagues, friends, and private app developers, I learned that there were 2 options for how to pursue the goal of making FLAP Mapper a mobile-friendly application.

Option 1 – Simply 'package' the current FLAP Mapper website as a mobile app. This essentially entails keeping the website as-is, but allowing users to 'download' the FLAP Mapper website as an app from the iOS or Android app stores. After downloading, a button would appear on the mobile device that would directly link with the website and could be used as normal. This option is possible because the current website is already 'responsive', meaning that it can be opened on a mobile device (or any device with different sized screens), and will still function properly. The downsides to this option are that many of the features of the current website may be 'cut off' on certain browsers or mobile devices, and/or some of the menus would be difficult to read or navigate because of font size. It wouldn't be as user-friendly as developing an entirely 'native' app (see Option 2 below). A benefit of this option, however, is that it would be much easier (and cheaper) to implement, and wouldn't require additional maintenance above what the FLAP Mapper website already receives. Any maintenance on the website would automatically be applied to this 'app', because it is just a direct link to the website. From my understanding, the only way this is different from just navigating to the FLAP Mapper website on your mobile browser, is that there would be an app 'icon' you could access directly (seems incredibly easy to do, but I'm not sure it would be user-friendly enough).

Option 2 – Build an entire app using 'native' code. This is the ideal method, but would be much more expensive. Instead of just making a carbon copy of the current FLAP Mapper website as in Option 1, this option would be much more user-friendly, with large 'buttons' and simplified maps for reporting collisions. There would also be easy-to-navigate buttons/pages to submit photos of

birds for later identification, and a section to write notes to 'tag' information about the bird or building which could later be queried, etc. This application would send data directly to the server. One downside to this option is that it would have to be maintained separately from the current FLAP Mapper website. Thus, the communication between the server and the app would need to be monitored regularly, ensuring that any updates to the app (ie. to support upgraded versions of iOS or Android software) do not affect data reporting.

Future Directions:

I think that the future direction(s) for this project could follow 1 of 2 paths (or perhaps sequentially involve both paths).

Path 1 – Proceed with Option 1 (as detailed under 'Mobile App Options' above). This would serve as a 'trial' to understand the user-base and functionality of the mobile version of FLAP Mapper, and would be quick and relatively easy to implement. While I was unsuccessful at finding a volunteer to implement Option 1 (through efforts made between Dec 2015 – April 2016), I'm confident that with more free time this summer (and an interested colleague who also has more free time) that Option 1 could be completed by June/July 2016.

Path 2 – Pursue Option 2 (as detailed under 'Mobile App Options' above) for **free** by proposing this project as a 'charitable' donation made by a private app development company. When I originally contacted private app developers, I approached them as a client looking for quote prices etc. Instead, I think a feasible and mutually beneficial approach would be to frame this project as a direct charitable contribution to FLAP Canada that could be used as a tax write-off for a willing and interested app developer. To pursue this approach, I (or someone) would have to emphasize the conservation benefits/potential of building a FLAP Mapper app to facilitate citizen-collected data that could be used to enact conservation initiatives re: bird collisions in urban centers. I'm currently unsure whether this path is a realistic one, but I believe it is worth exploring.

References:

Loss, S., T. Will, S. Loss, and P. Marra. 2014. Bird–building collisions in the United States: Estimates of annual mortality and species vulnerability. *The Condor*, 116: 8-23.

Porter, A., and A. Huang. 2015. Bird collisions with glass: UBC pilot project to assess bird collision rates in Western North America. *Univeristy of British Columbia, SEEDS Library*. https://sustain.ubc.ca/courses-teaching/seeds-program/seeds-sustainability-library Accessed May 9, 2016.

Appendices:

1. Email lists I contacted, complete with personal contact names and email addresses, etc.

2. People I contacted.

3. Private app development companies I contacted, complete with quotes and descriptions of what we discussed in terms of mobile app options.

4. Funding application: Baillie Fund for small grants.

Appendix 1: Email List(s)

Organization: WildResearch

Contact info: Virginia Noble; ██████████████ ; ██████████████████

Background: WildResearch is a local charitable organization (Vancouver, BC) whose mission is to "build, train, and educate a community that contributes to conservation science." They operate a Bird Observatory/Banding Station at Iona Island. They have a wide member base, and send out weekly email newsletters. www.wildresearch.ca

Newsletter advertisement:

"I am looking to recruit a web-development savvy person (ideally with an interest in birds + conservation) to turn the current FLAP Mapper bird collision report website into a mobile platform (either by making the current website more mobile friendly, or creating an app). This is a joint collaboration between UBC's SEEDS program (Social Ecological Economic Development Studies), and FLAP Canada. It would be an excellent portfolio piece and offers wide recognition in the bird conservation community. The intended release of a mobile FLAP Mapper platform is April 2016, coincident with the 100th year of the Migratory Bird Protection Act. Please email Merle Crombie for more information: █████████████████████ "

Organization: e-nEUS, UBC's Engineer Newsletter

Contact Info: http://ubcengineers.ca/eneus/submission-form/

Background: e-nEUS is a weekly emailed newsletter to all UBC engineering students.

Newsletter advertisement:

Interested in using your app-development skills to aid in bird conservation? I am looking to recruit a web-development savvy person (ideally with an interest in birds + conservation) to turn the current FLAP Mapper bird collision report website (http://74.216.225.85/FLAP/) into a mobile platform (either by making the current website more mobile friendly, or creating an app). This is a joint collaboration between UBC's SEEDS program (Social Ecological Economic Development Studies), and FLAP Canada (http://www.flap.org/). It would be an excellent portfolio piece and offers wide recognition in the bird conservation community. This project could also potentially be used as a final project for a related course at UBC. The intended release of a mobile FLAP Mapper platform is April 2016, coincident with the 100th year of the Migratory Bird Protection Act. Possible honorarium dependent on grant funding. Please email Merle Crombie for more information: █████████████████████

PS - Why do we care about bird collisions? For starters, an estimated 9 million birds are killed in Toronto each year during migration. Estimates for North America are much larger, ranging between 100 million - 1 billion deaths per year. Collecting information on buildings/structures that result in high bird collisions can help focus our efforts on where to implement deterrent strategies to mitigate bird mortality.

*Information has been redacted from this report to protect personal privacy. If you require further information, you can make an FOI request to the Office of University Council.

Appendix 2: People

Alistair Calder – Teaches web development and design courses at BCIT.

█████████

Outcome: Replied to my email expressing interest, but never followed up. I originally contacted him Dec 3, 2015 in hopes that a related app course at BCIT in the following semester could use a project like this as a final project, etc.

Richard Hart – Teaches iOS application development for iPhone and iPad. ████████

Outcome: Never replied to my email sent on January 15th, 2016.

Giuliana Villegas – UBC Computer Science Undergrad Student Services Co-ordinator

█████████

Outcome: Never replied to my email sent January 24th, 2016

*Information has been redacted from this report to protect personal privacy. If you require further information, you can make an FOI request to the Office of University Council.

Appendix 3: Private App Developers

Atimi – Mobile App Developer in Vancouver; www.atimi.com; ████████████

Outcome: No response.

14 Oranges – Mobile App Developer in Vancouver; www.14oranges.com; Shane Todhunter; ████████████

Outcome: I spoke with Shane on the phone to describe project aim(s). He was very helpful and provided a quote for this project within 24 hrs. See quote on next page. I did not follow through with 14 Oranges because the cost was too high.

Essential Designs – Mobile App Developer in Vancouver; www.essentialdesigns.net; Scott Jackson; ████████████

Outcome: I communicated with Scott on the phone and via email several times to discuss feasible options re: app development for this project. He was very helpful and provided a cheaper option (relative to 14 Oranges). See quote in pages following.

RMD Studio – Enterprise Web and App Developer in Vancouver; www.rmdstudio.com

Outcome: Replied to email, but said this project was too small for their company. Suggested contacting a freelance app developer.

Lars Hedlund – Freelance Web Developer; ████████████

Outcome: Was not able to help because his expertise lies in web responsiveness, not app development.

*Information has been redacted from this report to protect personal privacy. If you require further information, you can make an FOI request to the Office of University Council.

From	**14 Oranges Software Inc.**
	GST # 84727 8504 RT0001
	295-3820 Cessna Drive **Richmond BC** **Canada** **V7B 0A2**

Estimate Id	**304**		Estimate For	**14 Oranges**
Issue Date	**2015/12/22**			
Subject	**Flap Canada Data Collection App**			

Item Type	Description	Quantity	Unit Price	Amount
Service	**Design** **- UI/UX Wireframes** **- App Design**	**1.00**	**$1,750.00 CAD**	**$1,750.00 CAD**
Service	**Server Side Development** **- API Consulting**	**1.00**	**$375.00 CAD**	**$375.00 CAD**
Service	**Client Side Development phoneGap** **- Base** **- Geolocation Tools** **- Login Screen** **- Data Collection Form** **- API Integration**	**1.00**	**$4,375.00 CAD**	**$4,375.00 CAD**
Service	**Project Management, QA and Training** **- Functional Testing and QA** **- Project Management** **- Training and Support**	**1.00**	**$2,250.00 CAD**	**$2,250.00 CAD**

Subtotal	**$8,750.00 CAD**
Tax (5.00%)	**$437.50 CAD**
Estimate Total	**$9,187.50 CAD**

Notes

Estimate Valid for 90 Days.

OVERVIEW

Essential Designs is quoting to build a mobile app deployment for the FLAP Mapper and Merle Crombie.

The application quoted is to be built as both an iOS application as well as an Android application, to be made available in the iTunes store and Google Play.

Features included in the application:

- Publish the current responsive web based application in both the iTunes store (iPhone) and Google Play (Android)
- Final product will be downloadable as an app to the user's phone, and launched through a mobile desktop icon.
- The app will display the responsive website, so there will be no speed adjustments or performance of the product changes included

Time & Cost:

30 Hours @ $45 = $1350

Essential Designs will manage all phases of the project; from project management, to development and deployment.

Appendix 4: Funding Application(s)

Bird Studies Canada James L. Baillie Memorial Fund – Small Grants Application

Details: The Small Grants program is intended to provide grants of $250 to $1000 to individuals or non-profit groups for volunteer-based projects that promote the overall goals and objectives of the Baillie Fund. Small Grants proposals are ranked based on the following criteria:

- how and to what extent does the project, as described, advance the goals and objectives of the Baillie Fund;

- is the project volunteer-based? How many volunteers are involved?;

- is the work plan and budget for the project realistic?; and

- is all the necessary information included in the application?;

Outcome: I applied for this award to fund a potential volunteer or app-developer to complete the goal(s) of this project. The Baillie Fund Trustees felt this project had a lot of merit, but were not able to fund a 100% salary-based request for this round of applications. In other words, I was unsuccessful at acquiring this funding. See Application on following pages.

APPLICATION FOR A SMALL GRANT

INSTRUCTIONS: Read the "Baillie Fund Application Guidelines" before completing this form. Applications should follow the recommended format and be a maximum of 6 pages. Answer all questions (adjust spacing of each section as needed). Electronic applications (in .PDF, .RTF, or Microsoft Word format) are encouraged. Completed applications should be sent to the Baillie Fund Secretary by email at ▮▮▮▮▮▮▮▮▮▮▮ or by post to Andrew P. Coughlan, Bird Studies Canada / Études d'Oiseaux Canada, 801-1550, avenue d'Estimauville, Québec (Québec) G1J 0C3). Faxed applications are <u>not</u> acceptable. The deadline for receipt of Small Grant applications is **15 January**. Grant decisions are announced in **March**.

SECTION 1. ADDRESS AND CONTACT INFORMATION

Name of Applicant:	Merle Crombie		
Street Address:	▮▮▮ ▮▮	P.O. Box:	
City:	Vancouver	Province:	BC
Postal Code:	▮▮▮▮		
Telephone:	▮▮▮▮	Fax:	
Email:	▮▮▮▮▮▮	Website:	

SECTION 2. PROJECT INFORMATION

Project Title: Bird Collision Reporting Mobile App			
Project Duration: ~1-2 months	**Start Date:** ASAP	**Completion Date:** April 2016	
Total Amount Requested from the Baillie Fund:		$1000	
Have you been employed on or received any other financial support (grant, contract, etc.) for any ornithological work or project in the past five years? Yes/No: **Yes**			
If yes, indicate the nature and extent of the support: I received a total of $3350 from the Werner and Hildegard Hesse Research Award at UBC for my M.Sc. research.			

SECTION 3. PROJECT PROPOSAL

Objectives: Concisely state the aims of this project (i.e. the objectives which a grant, if awarded, will help to achieve). The specific aim of this project is to modify an existing website (FLAP Mapper) into a mobile-friendly application which will increase the convenience with which people can report bird collisions as they see them. The intended outcome of this project is to increase the volume of citizen-collected bird collision data that can then be used to focus remedial actions in areas identified as being 'high-risk' for migrating birds.

Introduction and/or background information. Give reasons for undertaking the project, preparatory work already completed, relevant experience, etc.

I am volunteer-coordinating the process of turning a current website into a mobile-friendly application. The website is called FLAP Mapper (http://74.216.225.85/FLAP/), a subsidiary of FLAP Canada. The website was launched to begin the collection of citizen-science data in reporting bird collisions. Bird collisions with commercial and residential building windows (especially during migration) is said to be the 3rd leading cause of bird declines in North America, killing ~600 million every year. A primary application of citizen-collected bird collision data would be to focus remedial actions in areas and/or specific buildings identified as having high bird collision rates. Remedial actions already being conducted during spring and fall migration in Toronto include turning off city building lights at night to avoid attracting birds to these high-risk areas, as well as installing window-coverings that prevent bird collisions. The current FLAP Mapper website is an excellent platform for reporting bird collisions as it allows registered users to point-mark locations of birds suspected of dying from window collisions on an interactive map, as well as to provide additional information such as species name, cardinal direction of the collision, and photographs. However, the ability of users to report collisions is currently limited by the inconvenience of having to log onto a computer to visit the FLAP Mapper website. The development of FLAP Mapper into a mobile-friendly application would increase the convenience of bird collision reporting, resulting in more data that can be used to inform remedial actions to decrease the number of bird deaths every year. Personally, I am volunteer-coordinating this project because I am deeply concerned by the declines reported for migratory bird species and feel that the completion of this project would potentially have a positive effect on the survival of migratory birds via remedial action.

General Plan and Procedures. Outline your methods for attaining the stated objectives in as much detail as possible. Include a step-by-step description of tasks to be undertaken and a timetable for their completion.

1. Obtain project quotes from several mobile application development companies to learn and compare estimated completion timelines and total project costs (~2 weeks of emailing, scheduling phone-call meetings, and discussing logistics/details of project. I have already completed this task).
2. Using information collected in step 1, hire a specific company to complete the project (I have decided on a company, but cannot hire them until I am certain of available funding).
3. After hiring the decided company to complete the proposed project, maintain communication to ensure project timeline is being met, as well as to provide any insight/information related to the project (~1 week of communication until the project is completed. This estimate is based on project quotes I have already received and reviewed).
4. Test the final product to ensure that it meets the original proposal (~1 day)

SECTION 4. BUDGET SUMMARY

	Total for Project[1]	Amount Requested[2]
Equipment		
Materials and supplies		
Travel[3]		
Living Expenses[4]		
Salaries[5]		
Other (please specify) **Cost to hire mobile app developer**	1350	1000
Total	**$1350**	**$1000**

Notes
1. Budget for the project is the overall budget for this project for the period covered by this grant.
2. Amount requested from the James L. Baillie Memorial Fund.
3. Mileage costs will only be paid if the need is fully justified. Rate claimed must not exceed $0.45/km.
4. Living expenses should not exceed 25% of the grant request. Per diem claims for food and lodging should not exceed $35.00/day per person. See Guidelines for exceptions.
5. Salaries should not exceed 25% of the grant request. See Guidelines for additional restrictions on salaries.
6. Total amount requested must be the same as stated in Section 2.

Provide details of all proposed expenditures. For example, estimated cost of each item of equipment, details and justification of proposed trips included in travel, basis for estimation of living expenditures, give details of requested salaries, etc.

If I were a successful applicant of the Baillie Fund application for small grants, I would hire a mobile application development company in Vancouver, BC called Essential Designs, to complete this project. I came to this decision after comparing project quotes from several mobile application development companies, and concluding that Essential Designs provided exceptional customer service and the lowest quote price for this project.

The quote was simply an estimated 30 hrs of work at a rate of $45/hr, amounting to a total cost of **$1350.00 CAD.**

SECTION 5. PROJECT PERSONNEL

Give names, qualifications and relevant experience of project leader(s) and any other key personnel.

I am the 'middle person' volunteer-coordinating this project as a joint endeavour between FLAP Canada, and the University of British Columbia's SEEDS program (Social Ecological Economic Development Studies). I am reporting my volunteer activities to George Patrick Richard Benson (project coordinator for the UBC SEEDS program), and discussing project goals, logistics, etc. with Michael Mesure (executive director of FLAP Canada).

I am currently a M.Sc. student at UBC studying the factors that influence nest failure in song sparrows.

How many volunteers will be involved in the project and what role will they play? Will a Baillie Fund grant support volunteer involvement in the project?

I am the only volunteer involved in this project (Merle Crombie). I am coordinating the development of the existing FLAP Mapper website into a mobile-friendly application. I personally will not be financially supported by the Baillie Fund grant, but it would support the completion of a project aimed at bird conservation, which would support my well-being.

Will paid staff be involved in the project? If so, give names and/or position titles and describe what they will do.

Yes, paid staff will be involved in this project. Scott Jackson, vice president of Essential Designs, will have one of his company employees complete this project.

SECTION 6. ADDITIONAL INFORMATION

How did you hear about the Baillie Fund?

I heard about the Baillie Fund through the WildResearch weekly newsletter. (www.wildresearch.ca)

Do you participate in the Baillie Birdathon?

No, but I am interested in doing so.

How does this project further the objectives of the James L. Baillie Memorial Fund? (See Application Guidelines).

This project would further the objectives of the James L. Baillie Memorial Fund by:
1) Enlightening a wider audience of naturalists about the causes of North American bird declines
2) Empowering individuals by providing an easy mechanism with which they can contribute to our understanding of where bird collisions are most prolific, thus increasing our ability to make informed decisions about remediating the negative effects of collisions
3) Engaging with a new generation of scientists where data collection via mobile devices is the norm, allowing for large volumes of data collection that can be used toward bird conservation

Use this space to include letters of support or any other information you wish to present in support of your application. Note that the entire application should be no more than 6 pages.

Attached is a partial project quote from Essential Designs (did not include full quote due to application page constraints).