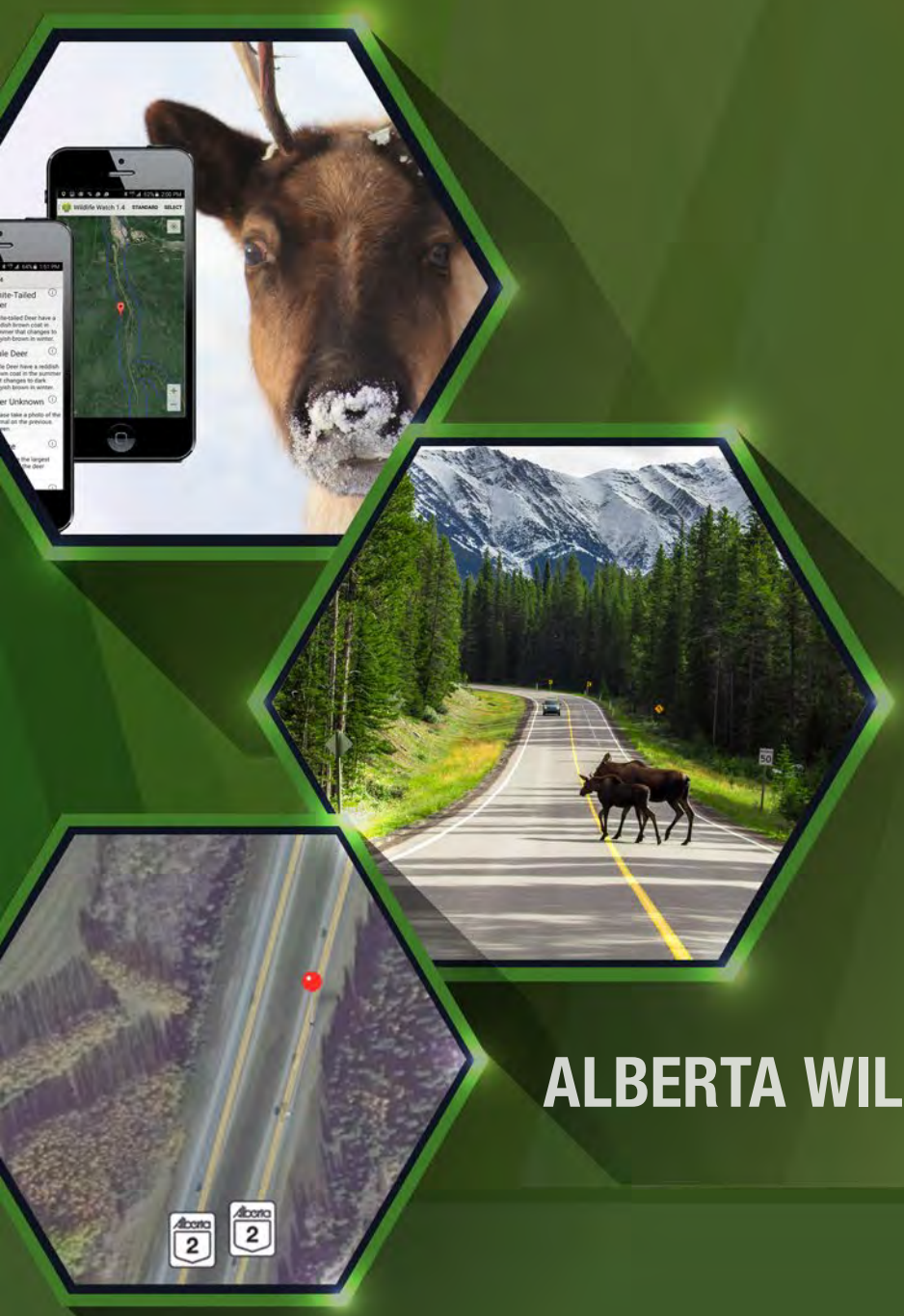


Alberta Government

ALBERTA WILDLIFE WATCH PROGRAM

APPENDIX A

AWW APPLICATION DATA COLLECTION

AUGUST 2017

Cover Photo Credits:

Serena Bos (Caribou)
Corey Myke (Moose)
Alberta Transportation (AWW Application)

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

LIST OF FIGURES IN TEXT

ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AWW	Alberta Wildlife Watch
AVC	Animal-Vehicle Collision
AVCPL	Animal-Vehicle Collision Prone Location
GPS	Geographic Positioning System
HMC	Highway Maintenance Contractor
Org. ID	Organization ID
TDRA	TIMS Data Repository Application
TIMS	Transportation Information Management System

DEFINITIONS

Term	Definition
Animal Carcass Data	Animal carcass data collected using the AWW application. An animal carcass report is assumed to represent an animal-vehicle collision.
Traditional Animal-Vehicle Collision Data	This is the traditional police reported data of known animal-vehicle collision incidents.
AWW Application	Smartphone application supported in iOS, Android, and BlackBerry devices.
AWW Program	The Program developed to identify and prioritize animal-vehicle collision prone locations, identify cost-effective mitigation, and to evaluate mitigation performance. The Program includes four components: 1) the AWW System, 2) Alberta Transportation's Mitigation Planning and Design Standards, 3) User Engagement Plan, and 4) Annual Review.
AWW System	Collects, manages, analyzes, and reports AWW data, identifies and prioritizes AVC mitigation locations, and monitors evaluates mitigation performance.
AWW Viewer	Alberta Transportation's stakeholders and partners with view only access to the AWW website tool.
Organization ID	A unique code given to each company and or organization registered as a Principal Contributor to use the AWW application. The code is provided by Alberta Transportation's Operations Manager (for HMCs) or Alberta Transportation's System Administrators within Environmental Management Services.
Principal Contributor	An AWW application user that has been identified as critical for the acquisition of animal carcass and live sighting data. Principal Contributors are Highway Maintenance Contractors and Government of Alberta staff.
Project User	Alberta Transportation's project-specific consultants with primarily view-only (restricted editor) access to the AWW website tool.
Regional Administrator	An AWW website tool manager for designated Region(s). Example Regional Administrators are those with an Alberta Transportation regional consulting assignment.
System Administrator	A supervisor for the AWW application and website tools. Limited to Alberta Transportation staff.

Alberta Wildlife Watch Program Overview

Animal-vehicle collisions (AVCs) are a significant problem in Alberta affecting motorist safety and wildlife populations. Alberta Transportation designed the Alberta Wildlife Watch (AWW) Program as a solution to reduce AVCs on provincial highways improve driver safety, and minimize the impacts of highways on wildlife populations. The AWW Program and its goals are highlighted in a video available at https://youtu.be/baVMLvf7E7E.

AWW Program is designed to:

1. Identify AVC-prone locations (AVCPLs);
2. Provide high-quality data for effective decision making;
3. Develop departmental policy & standards; and
4. Allow for innovation and evaluate long term mitigation effectiveness.

High-quality data is collected using the AWW application[1]. Data analyses to identify and prioritize statistically significant AVCPLs are automatically performed on the AWW website tool[2]. Together, the AWW application and website tools support the decision making process for AVC mitigation.

AVCPLs identified are prioritized for mitigation and evaluated for feasibility. Once approved for mitigation, Alberta Transportation's Terms of Reference for AVC mitigation projects outline the design and tender process including the development of an AVC Mitigation Plan. Alberta Transportation's mitigation standards and considerations are incorporated into planning and design to ensure each mitigation project contributes to the Program goals. Once a mitigation project is complete, the applicable mitigation construction reports and AVCPL records are stored and mapped in the Mitigation Data Repository. This builds an AVC mitigation inventory that is linked to the AWW data and AVCPL analyses (animal carcass data collected before and after the mitigation project) to facilitate mitigation performance monitoring. Its effectiveness at reducing AVCs is evaluated using standardized performance criteria.

Over time, standard performance of the overall AWW Program and provincial mitigations are evaluated to ensure continued alignment with the AWW Program's goals. Lessons learned from this long-term review influences Alberta Transportation's mitigation standards, construction and innovation, evaluation criteria, and all System components.

Figure 1 displays the AWW Program structure.

1 Smartphone application for iOS, Android, and BlackBerry devices.
[2] A modern browser, such as Chrome, is required for the website (Internet Explorer is not recommended).

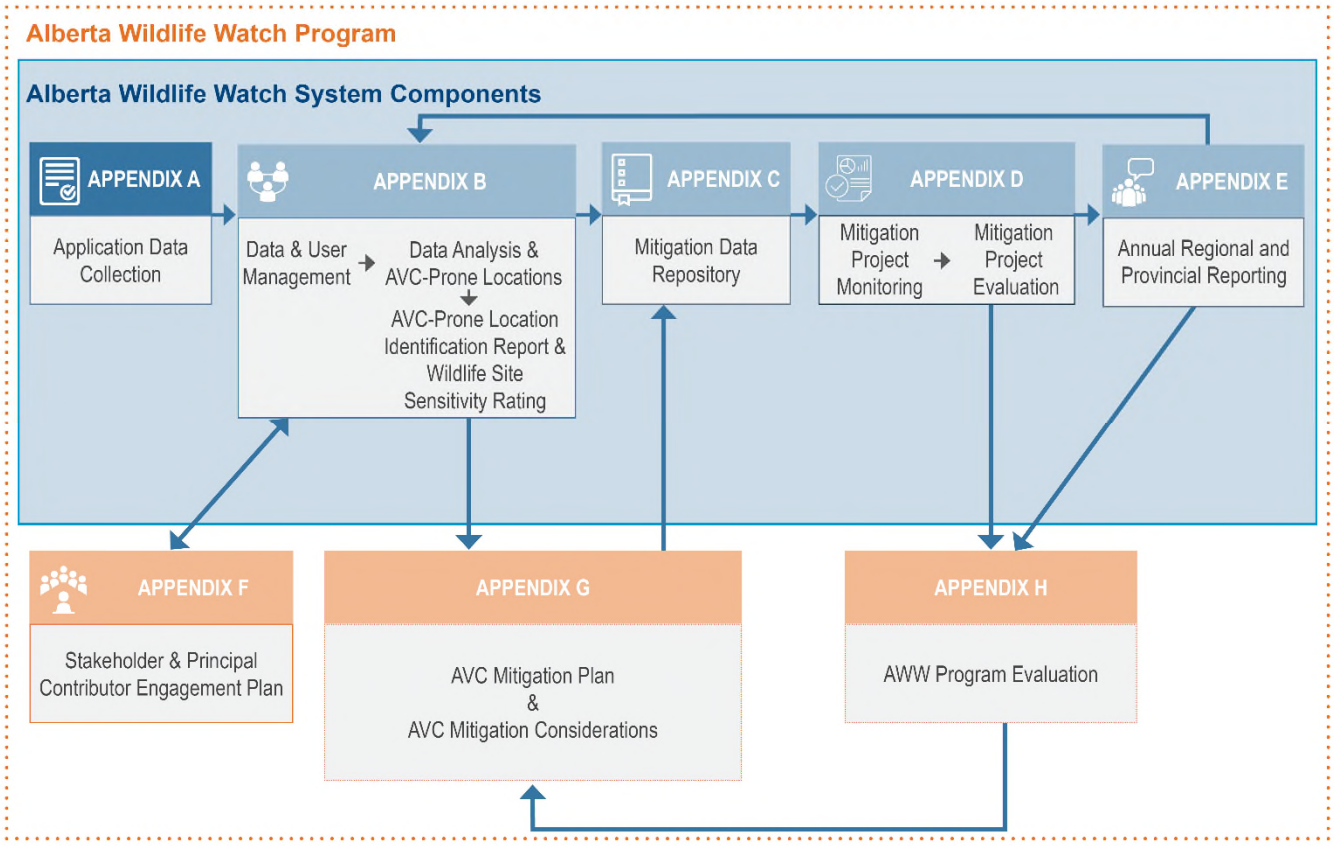


Figure 1: Alberta Wildlife Watch Program Structure

Appendix A: Data Collection

1.0 INTRODUCTION

Collecting high-quality data is a core pillar of the Alberta Wildlife Watch (AWW) Program, as it is the basis for effective provincial animal-vehicle collision (AVC) mitigation decision making and monitoring. The development of the AWW smartphone application is Alberta Transportation's solution to substantially improve the quality of data being collected across the province.

Traditionally, the AVC data collection methods limited the quality and quantity of the data being collected. This restricted its use as a decision making tool. The traditional AVC data poorly represents the actual number of AVCs occurring across the province, is spatially inaccurate, frequently lacks species documentation, and is unreliable for species identification. Alberta Transportation were thus unable to: 1) quickly access the data for analysis, 2) suitably locate and prioritize provincial animal-vehicle collision prone locations (AVCPLs), 3) confidently choose and justify the most appropriate species-specific mitigation for a given site, and 4) accurately monitor provincial AVC trends and AVC mitigation performance.

The AWW application addresses the shortfalls of the traditional data collection method, and greatly improves the quality and quantity of data collected, at low overall project cost. The AWW application is user-friendly to efficiently and accurately collect animal carcass and live sightings data. The AWW application is currently in operation, largely with the participation of Highway Maintenance Contractors (HMCs) and other Principal Contributors.

2.0 USER ROLES AND RESPONSIBILITIES

The AWW data collection solution is provided through the AWW application; under the responsibility of designated smartphone users (i.e., Principal Contributors). Principal Contributors have the primary responsibility of collecting animal carcass and live animal sightings data, and are supported by Regional and System Administrators (Table 1). User access is dependent upon their program authority and their unique identification codes that are determined by a System Administrator.

Table 1: User Responsibilities for Data Collection

User	Access Permission(s)	Data Collection Responsibilities	
		Expand Participation	Collect Data
1. Principal Contributors	Application Tool		✓
2. Regional Administrators	Application & Website Tools		✓
3. System Administrators	Application & Website Tools	✓	✓

Other AWW Program users with no responsibilities for data collection, such as **Project Users and AWW Viewers**, are described in additional appendices, including Appendices B and C.

2.1 Principal Contributors

Principal Contributors currently include HMCs and relevant Government of Alberta staff. Under the AWW Program, their primary responsibility is to collect accurate and consistent animal carcass and live sighting data using the AWW application.

The System Administrator adds new Principal Contributors into the AWW website, and provides the Principal Contributors with their unique Organization Identification (Org. ID) code. An Org. ID is usable for all Principal Contributors within that organization (i.e., Alberta Transportation), and is associated with and credits each wildlife record in the database.

2.2 Regional Administrators

Regional Administrators are selected by Alberta Transportation for regional consulting assignments. Individual Regional Administrators gain access to the AWW application using an Org. ID code and the website using an assigned username and password system. Both the Org. ID code and the user name and password are assigned by the System Administrator. Alternatively, the Org. ID may be requested from Alberta Transportation's Environmental Services, Technical Services Branch.

They have the ability to collect live sighting and carcass data using the AWW application; however, Regional Administrators' primary responsibilities include the analyses, management, and reporting of the AWW data described in Appendices B to E.

2.3 System Administrators

System Administrators are responsible for the overall management of the AWW Program and its users, including the AWW application. This role includes access to the entire AWW System, and is restricted to Alberta Transportation staff. A primary responsibility is assigning and managing AWW application and website user access for data collection purposes, and expanding participation using the AWW application (i.e., Government of Alberta staff).

3.0 COLLECTING DATA USING THE AWW APPLICATION

AWW is a milestone for Alberta Transportation as it is the first operational application to collect high-quality animal carcass and live sighting data throughout the province. As part of its user friendly design the AWW application is available in three different platforms: iPhone (iOS 4.0 and later), Android (Android 3.0 and later), and BlackBerry (BlackBerry 10 and later). Access to the application is via the Apple App Store, Google Play Store, and BlackBerry World.

The AWW application provides a standard method to collect data across the province. Its well-thought out design collects the data that will help meet the AWW Program goals. Importantly, it is designed with the needs of Principal Contributors in mind (i.e., easy and safe reporting along highways), and resolves the traditional data collection challenges by:

- Growing the amount of data collected;
- Increasing spatial accuracy;
- Improving species reporting; and
- Storing data in real-time.

3.1 Growing the Amount of Data Collected

Alberta Transportation chose Principal Contributors (e.g., HMCs) to collect animal carcass and live sighting data with the AWW application while carrying out their routine duties. Principal Contributors provide a relatively equal representation of AWW data and data collection effort across the province. Additional Principal Contributors may be approached if it is determined that additional coverage is required to ensure the highest quality data collection.

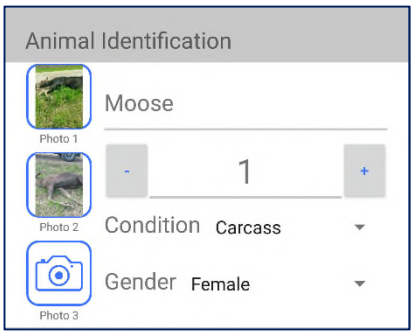
This system of data collection inherently increases the amount of data collected on a regular basis, in the most cost-effective way. By comparison, the traditional data collection approach relied on police reports of AVCs causing $2,000 or more in property damages. Prior to 2011, the reporting limit was $1,000. Due to the monetary reporting threshold, it is estimated that over 50 percent of AVCs went unreported. As a consequence, the true magnitude of AVCs across the province was poorly understood.

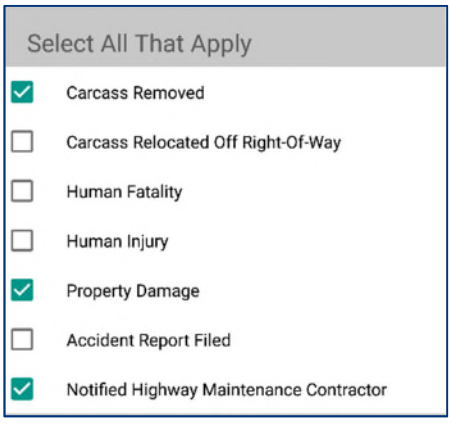
Reporting both animal carcasses and live sightings increases the usefulness of the AWW data. An animal carcass report represents an AVC incident, irrespective of property damages exceeding $2,000. Live animal reports indicate areas of movement, and possibly where animals are currently able to cross the highway successfully.

Additional contextual information about the animal carcass and live sighting is also collected with the AWW application. This provides a finer level of detail appropriate for planning effective AVC mitigation. Additional contextual information includes:

Incident Date and Time: The current date is automatically recorded but may be manually updated by the Principal Contributor. The AWW application also collects the time (i.e., Dawn, Day, Dusk, Dark, Unknown) the animal was hit by a vehicle (if known by the Principal Contributor) or the live animal was seen.

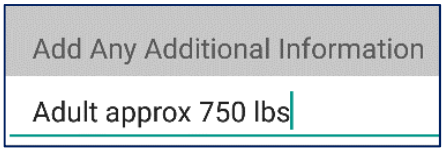
Animal Description and Photo: Additional information about each animal carcass/live sighting is also recorded, including: the number observed, gender (if known), and whether or not the observation was a live animal or an animal carcass. The application also allows Principal Contributors to provide up to three photos of the animal carcass/live animal. The Global Positioning System (GPS) location of each photo is also geotagged to help improve reporting accuracy.





Incident Report: A checklist allows quick identification of information specific to the incident. This includes whether or not the carcass was removed or relocated off the highway right-of-way; if there was a human fatality, human injury, or property damage suspected; if an accident report was filed; and if a HMC was notified to pick up the carcass.

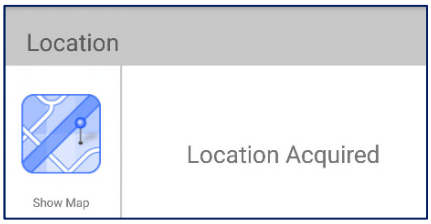
Additional Information: Principal Contributors can manually enter additional information applicable to the report. This may include the species of bird observed (e.g., Great Horned Owl) or the age of the animal (e.g., calf). To date, some Principal Contributors have also recorded the approximate weight of animal carcasses removed from the highway right-of-way.



3.2 Increasing Spatial Accuracy

Increasing the spatial accuracy allows Alberta Transportation to complete fine-scale analyses of where animal-vehicle collisions are occurring. The AWW application provides spatial accuracy within ± 10 metres by using the smartphone's built in GPS. It is designed to automatically record the GPS location and Road Name (if known) at the users' position when submitting the report. Similarly, the AWW application geo-references the location of each photo submitted with the record.

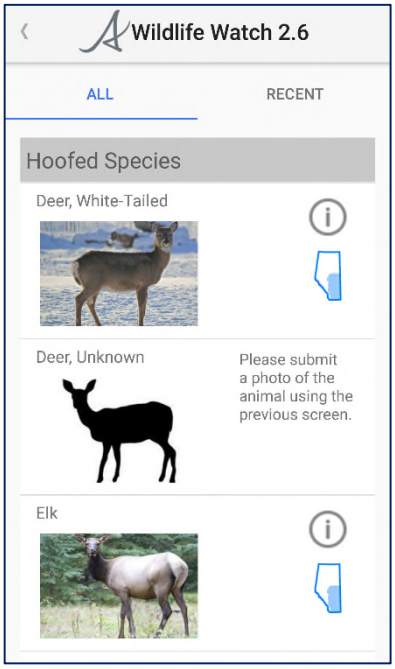
In the traditional reporting system, the location of the AVC was reported as the nearest highway kilometre marker, if known. Improved spatial accuracy allows Alberta Transportation to identify AVCPLs with higher accuracy, and subsequently target mitigation efforts appropriately.



The GPS location continues to update automatically until the report is submitted. Users can also open a map to manually select the location of the observation. Satellite, standard, terrain, or hybrid map options are available to help the user locate local landmarks on the map and increase spatial accuracy of the observation record.

Locational services work in the event that there is no cell signal or the device has no cell plan. The GPS will acquire the location; however, the manual map entry function will not work without cell signal.

3.3 Improving Species Reporting



Species reporting helps Alberta Transportation understand seasonal and spatial patterns and the species most involved in animal-vehicle collisions. This supports the development of species-specific mitigations. The AWW application improves species reporting and identification. Traditionally, the identification of species was not included in the standard accident report form. Consequently, AVCs were recorded in the TDRA as an "animal strike" with the species infrequently recorded in the comment field.

The AWW application simplifies the recording of provincial animal species. The AWW application provides a well-organized list of main species likely to be observed and recorded by Principal Contributors. Principal Contributors can select provincial species/species groups from a list of all options or, most efficiently, from a shorter list of the ten most recently observed species. The application's quick select button to automatically enter the species name also eliminates spelling errors later in the database. If the species is not on the list, or grouped together, users can manually type in the specific species name in the Additional Information field of the AWW application.

Similarly, the AWW application groups together species that are less likely to be reported/seen (i.e., waterfowl) and those difficult to identify at the species level (i.e., weasel family) by Principal Contributors. This minimizes the number of provincial species/species groups available for Principal Contributors to choose from, and facilitates quick selection without being overwhelming to the user.

In addition, the AWW application assists in species identification. It has an embedded electronic species identification guide specific to Alberta. This includes multiple photos that highlight the physical characteristics (i.e., coat colour and pattern) of each species for quick identification. Species range maps are also included as an identification aid.

3.4 Storing Data in Real-time

AWW application records are stored within the smartphone until a network connection is available. Once available, the application record(s) are automatically transferred to a secure database, thereby eliminating the need for manual data entry, and avoiding common data entry and lag-time problems.

Data from the AWW application is uploaded to the AWW website near live-time. This allows animal carcass and live sighting data to be analyzed in a timely manner. The traditional AVC data can take up to two years for the paper forms for each AVC (with damage ≥ $2,000) to be manually entered into the TIMS Data Repository Application (TDRA).

Quick access to the data allows for more appropriate analysis and timely AVCPL mitigation decision making.

4.0 PREVIEW: DATA & USER MANAGEMENT AND ANALYSIS

Collecting and storing high-quality data is one goal of the AWW Program to help reduce AVCs on provincial highways, improve driver safety, and reduce the impacts of highways on wildlife populations. Subsequent steps to reach all the Program goals are outlined in the following Appendices' documents (Appendices B-H).

Once stored on the AWW website, animal carcass and live sighting data is accessible to Alberta Transportation and other select users. This provides the ability to quality control the data, complete data analyses in a timely manner, and suitably locate and prioritize provincial AVCPLs for mitigation design and tender. These next steps are outlined in Appendix B (*Data & User Management and Analysis*).