SMART for Health

Rangers Collecting Observations Only

This manual describes SMART for Health for Rangers Collecting Observations Only and explains its proper use.

The current manual applies to SMART version 7. For more information about the Spatial Monitoring and Reporting Tool (SMART) please visit https://smartconservationtools.org/. To learn more about how to use SMART Desktop and Connect please visit https://smartconservationtools.org/.

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INTRODUCTION

The Spatial Monitoring and Reporting Tool (SMART) is an approach originally designed to support law enforcement in protected areas. SMART provides a set of technological tools: SMART Desktop, SMART Mobile, and SMART Connect. SMART Mobile is a smartphone app that supports smooth and standardized data collection in the field, keeps track of the spatiotemporal coordinates of the users and of the data being collected, allows the collection of image and audio data in the field, and allows real-time communication of data to out-of-the-field focal points through SMART Connect when internet connection is available. This real-time connection provides the opportunity to promptly react to detected events.

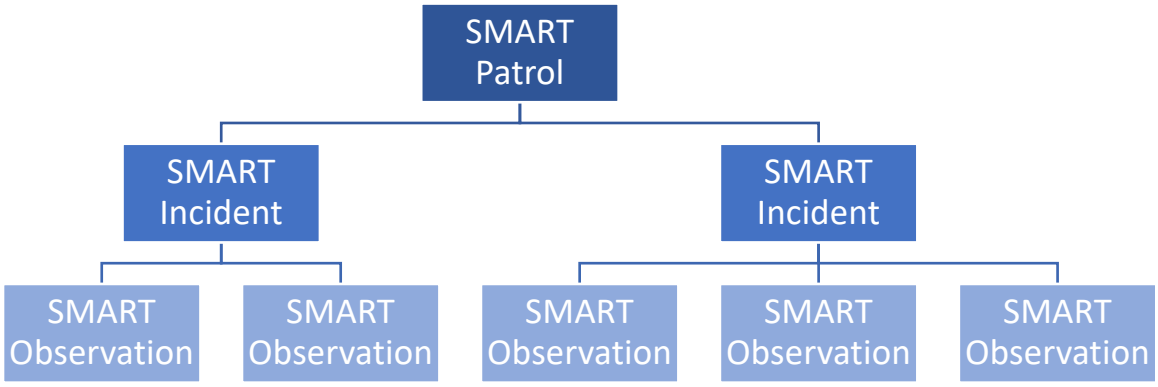
The WCS – Health Program has created a **SMART data model to track wildlife health events** (SMART for Health). This data model **can be extended as a "SMART Patrol Package" and installed in the SMART Mobile app** to support the collection of information from these events (e.g., wildlife mass mortalities or surveillance activities in wet markets). Here we describe how a portion of the SMART for Health data model can be used by rangers using SMART Mobile to record their observations of dead, sick, or injured wildlife. The purpose of this manual is to explain ranger use of **SMART for Health** in the field; therefore, the manual **does not explain** how to install SMART Desktop, Mobile, or Connect or how to load SMART for Health in the mobile devices.

In this manual, we **capitalize** nouns such as **Attributes**, **Categories**, **Event**, and others when they refer to SMART components.

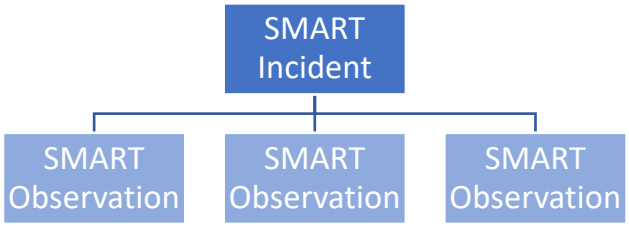
SMART FOR HEALTH STRUCTURE AND DEFINITIONS

A summary of the data structure in SMART for Health is provided below.

SMART Incidents within a SMART Patrol:



Or SMART Incidents outside of a SMART Patrol:



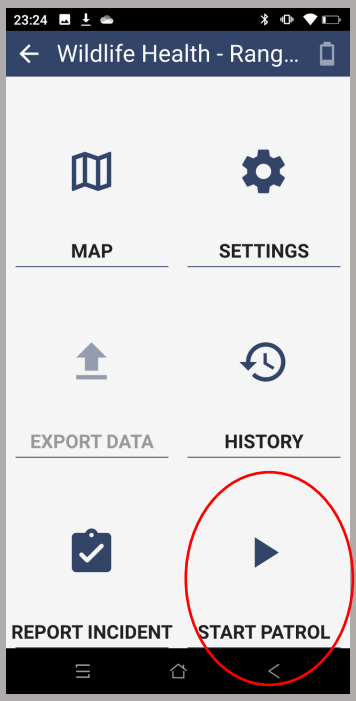
Starting at the bottom of either approach, SMART for Health facilitates the collection of field observations (**SMART Observations**) to describe the categories of information that compose a **Wildlife Health Event**. These **Events** are recorded as rangers find **dead, sick, or injured animals during their patrols.**

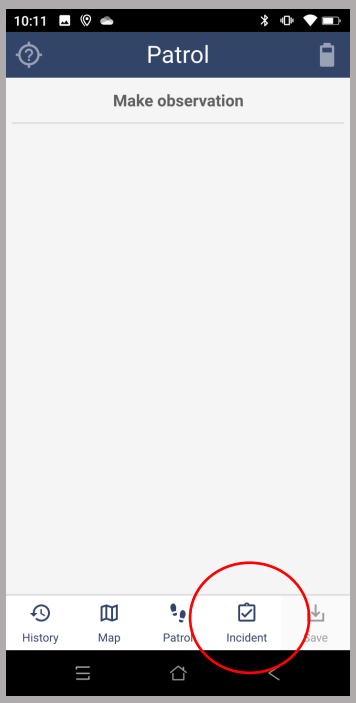
SMART PATROL

SMART Patrol is the period during which rangers are patrolling the protected areas and record data using SMART Mobile. A Patrol is initiated by clicking the "Start Patrol" button and once the information requested in the "Start Patrol" screen is completed. To document a Wildlife Health Event within a SMART Patrol, the user clicks on "Make Observation" or "Add Observation" in the "Patrol" screen.

SMART INCIDENT

SMART Incident: corresponds to a set of observations made in the field at the same location. For example, rangers patrolling a protected area find carcasses of wild boars. Depending on the preference of each protected area, **a Wildlife Health Event (see below) is documented as a SMART Incident** within a SMART Patrol or as SMART Incident outside of a SMART Patrol. To document a Wildlife Health Event out of the SMART Patrol the user clicks on the "Report Incident" button on the main screen before a Patrol is started or on the "Incident" button of the Patrol screen (see red circles)





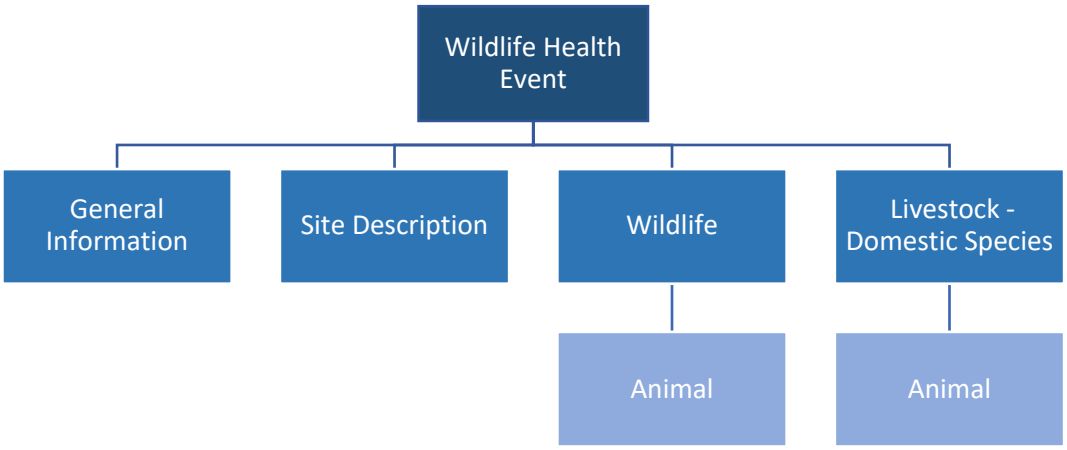
For simplicity, this manual assumes Wildlife Health Events are collected using SMART Incidents outside of a SMART Patrol.

WILDLIFE HEALTH EVENT

Wildlife Health Event: is a discrete spatiotemporal set of field findings that are relevant for the goals of wildlife health surveillance. Wildlife Health Events include the observation of sick injured, and dead animals, as well as any healthy individuals nearby.

A standalone group of healthy animals is not a Wildlife Health Event. However, when rangers find a group of dead, sick, or injured animals, the healthy animals present nearby are important to document.

Event examples include: (1) a group of dead, sick, and healthy waterfowl on the shore of a pond, (2) the identification of poisoned carnivores, and (3) an injured herbivore.



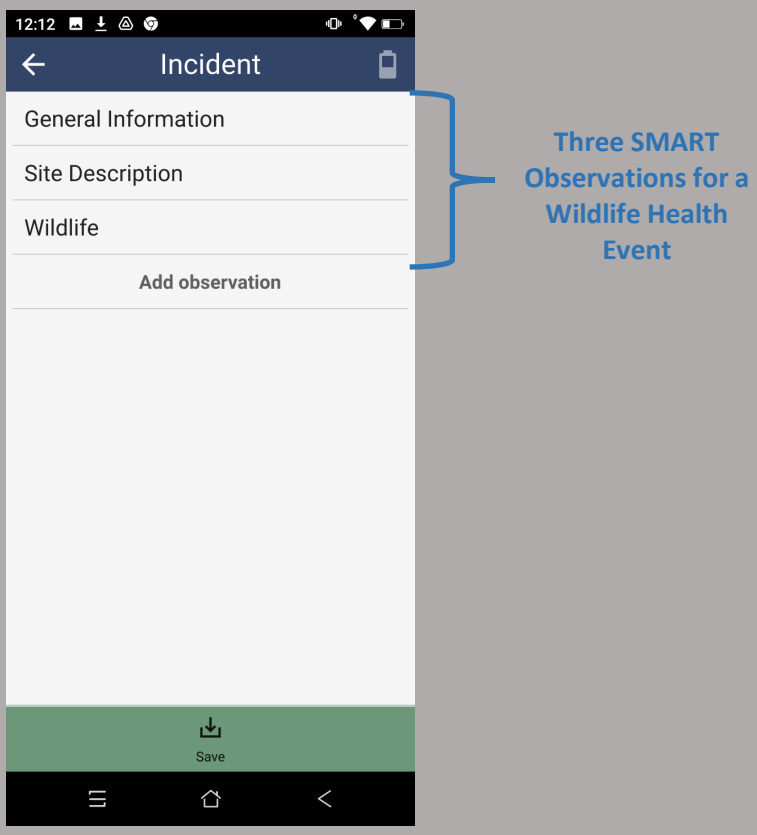
The diagram above shows the categories of information and their hierarchy within a Wildlife Health Event in SMART.

SMART OBSERVATIONS

In SMART for Health, a **SMART Observation** corresponds to information about a Wildlife Health Event. It can include the characteristics of the environment where the Event is taking place and the species observed.

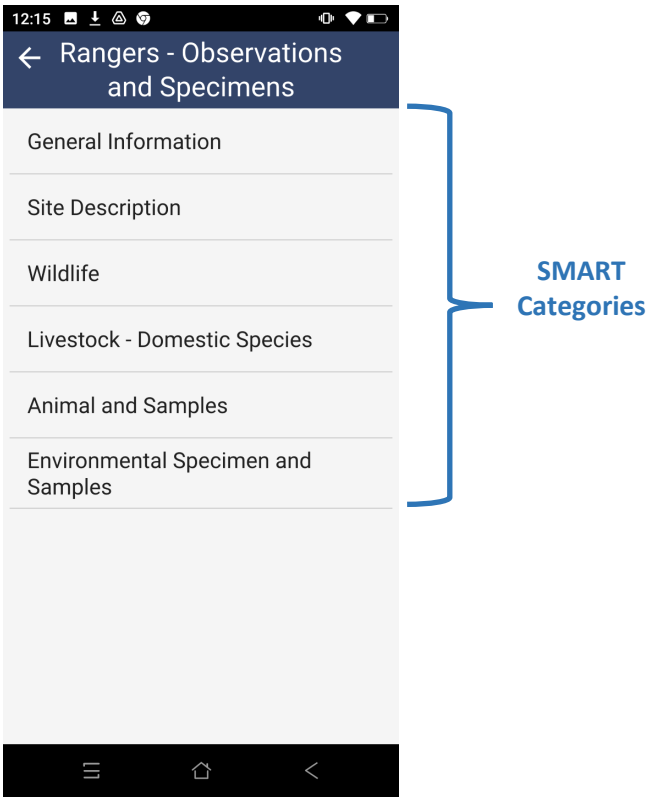
In SMART for Health, a Wildlife Health Event is documented by collecting SMART Observations of an Incident. The SMART Observations of each Incident are saved as unique packages of information from the specific time and location where the dead, sick, or injured wildlife is detected.

In SMART for Health, **Observations are recorded using SMART Categories**.



SMART CATEGORIES

A **SMART Category** is a set of **SMART Attributes** that request information about a specific category of information within a Wildlife Health Event (SMART Incident). In the case of SMART for Health, the Categories are “Site Description”, “Wildlife”, and “Livestock - Domestic Species”.



In SMART for Health, these Categories document different information about the Wildlife Health Event (see figure on page 6 as well):

Category	To document
General Information	The name of the protected area, the patrol leader and their affiliation
Site Description	Characteristics of the site where the Wildlife Health Event is taking place
Wildlife	The species of wildlife present at the Event
Livestock – Domestic Species	The species of domestic animals present at the Event

DESCRIPTION OF THE SMART CATEGORIES IN SMART FOR HEALTH

General Information (Wildlife Health Event level)

This Category is used to collect information on the Protected Area where the Event is observed and the Patrol leader and their affiliation. This information must be collected because SMART independent Incidents do not receive the Patrol information.

Site Description (Wildlife Health Event level)

This Category is used to describe the environmental characteristics where the Wildlife Health Event is taking place and should be filled out only once per Event.

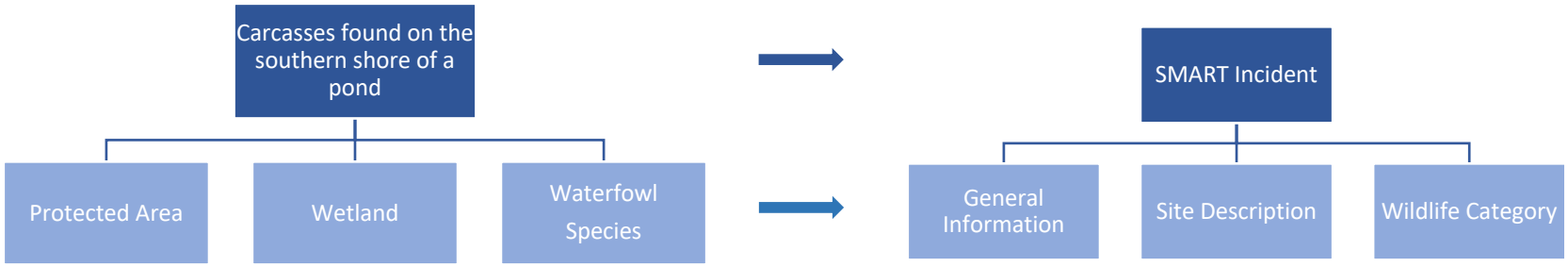
Wildlife (Species level)

This Category is used to describe wildlife species of the Wildlife Health Event. This Category should be use once per species observed per Event. For example, if three species of waterfowl are observed in a Wildlife Health Event, this Category should be used three times to document the species involved in the Event (once per species).

Livestock – Domestic Species (Species level)

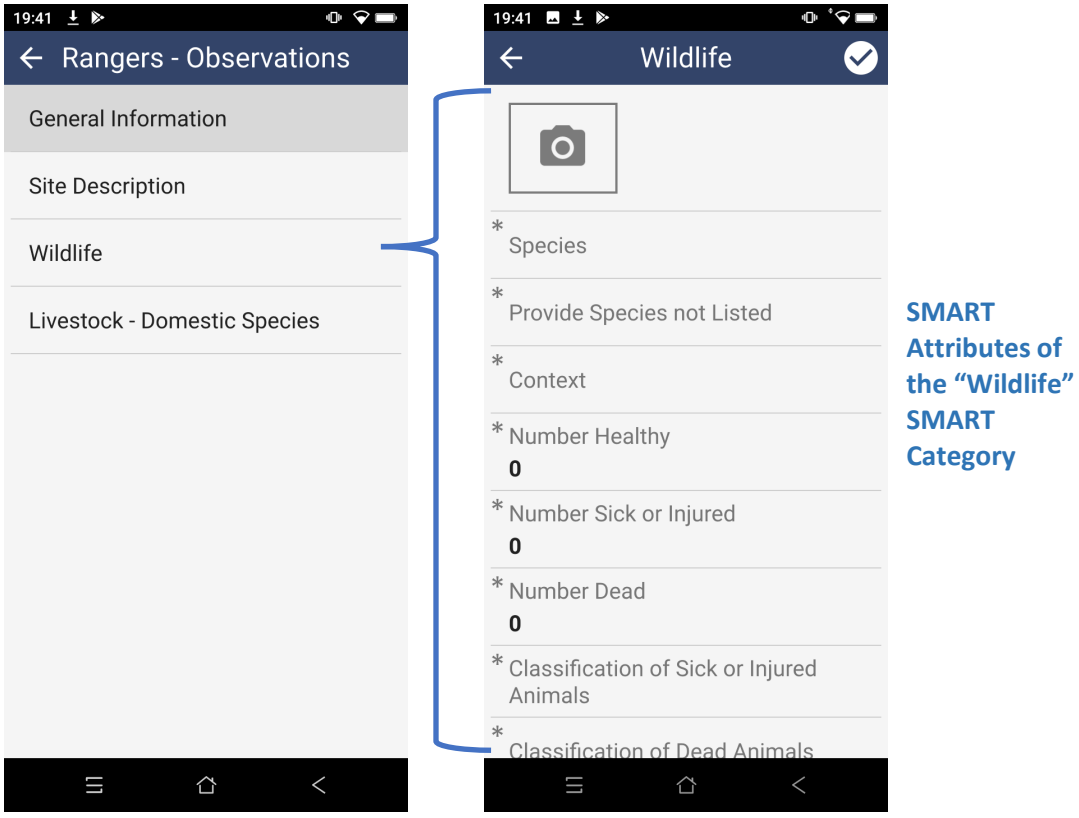
This Category is used to describe all domestic animals observed. This Category should be used once per domestic species observed in a Wildlife Health Event.

In summary, the figure below shows how the structure outlined on the bottom half of page 4 maps to Observations of a Wildlife Health Event collected as an independent SMART Incident (outside of a SMART Patrol):


Carcasses found on the southern shore of a pond
Protected Area
Wetland
Waterfowl Species
SMART Incident
General Information
Site Description
Wildlife Category

SMART ATTRIBUTES AND SUB-ATTRIBUTES

When a **Category** is selected, a set of unique **SMART Attributes** are displayed on the screen. These **Attributes** are the specific fields associated with each SMART Category. For example, once the Category “Wildlife” is selected, the corresponding SMART Attributes for this Category are shown. See below:

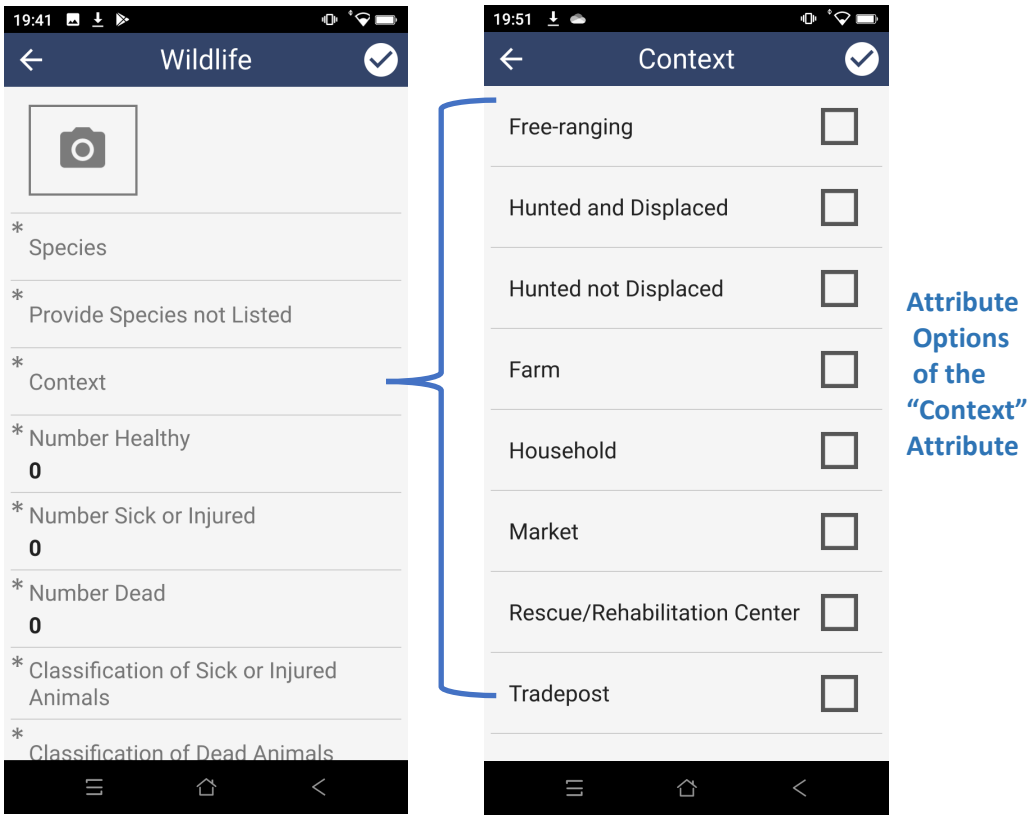


SMART Attributes of the “Wildlife” SMART Category

SMART Attribute: correspond to specific data items requested within a **Category**. For example, the “Species” of the wild animals present in the Wildlife Health Event. Attributes are mandatory or optional. Mandatory Attributes are identified with a grey asterisk and they are required to complete the collection of the SMART Observation. Mandatory Attributes with missing information will turn red if the checkmark symbol on the top-right is clicked on.

ATTRIBUTE OPTIONS

Attribute Options are the preset choices used to answer an Attribute. In the case of the Attribute “Context” the Options are “Male”, “Female”, and “Unknown”.



The description of Attributes and Options across the Categories used in SMART for Health is provided in the data dictionary accessible here. Sheet names of the data dictionary are labeled by Category and display the corresponding Attributes and Options.

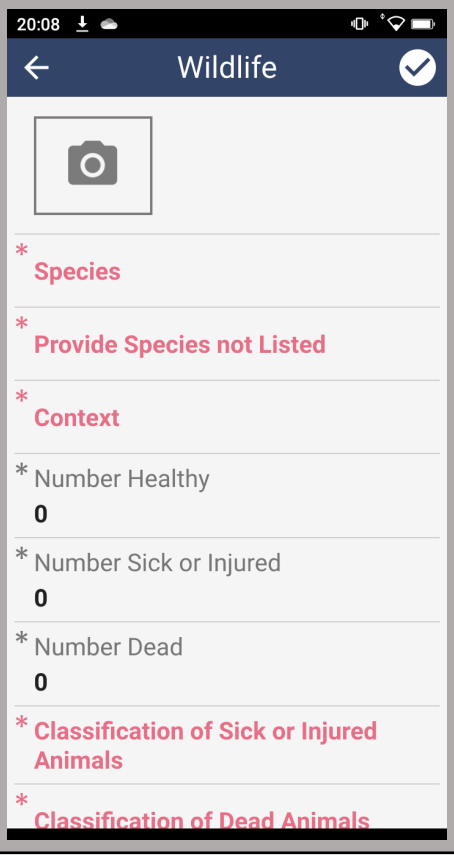
GENERAL SMART MOBILE FUNCTIONS

If the reader is a proficient SMART Mobile user, go to page 17.

CONFIRM OR DISREGARD DATA

As a general rule, the checkmark sign on the screen's top right corner must be clicked to confirm the addition of data to each Attribute and to add the data in a completed Category to the Event. To skip the addition of data and return to the previous screen, select the left arrow on the top left corner.

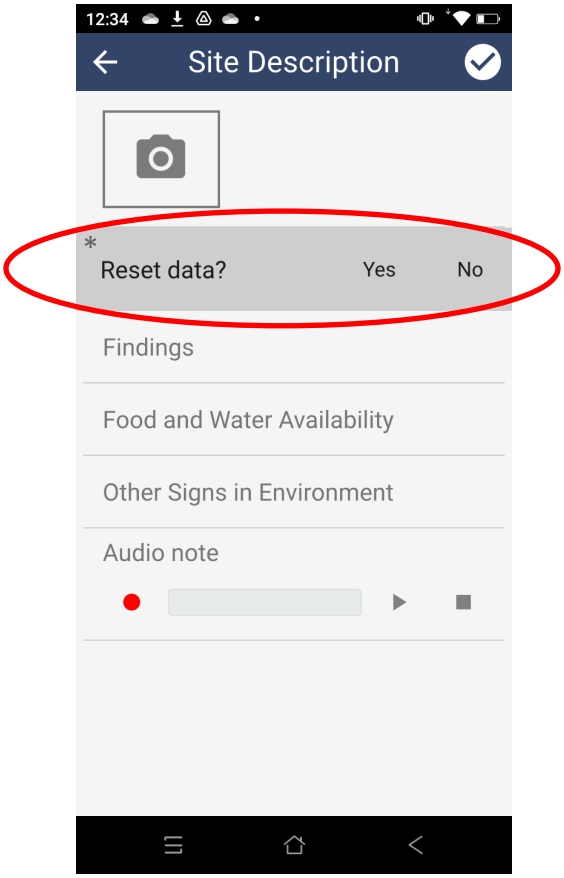
When mandatory Attributes are not yet completed and the checkmark button is clicked on, data in the corresponding Category will not be added to the Event and the missing mandatory Attributes will turn red.



If the user clicks on the checkmark to confirm the data provided in a Category, but mandatory Attributes are empty, then it will not be possible to confirm the information and the missing mandatory Attributes will turn red.

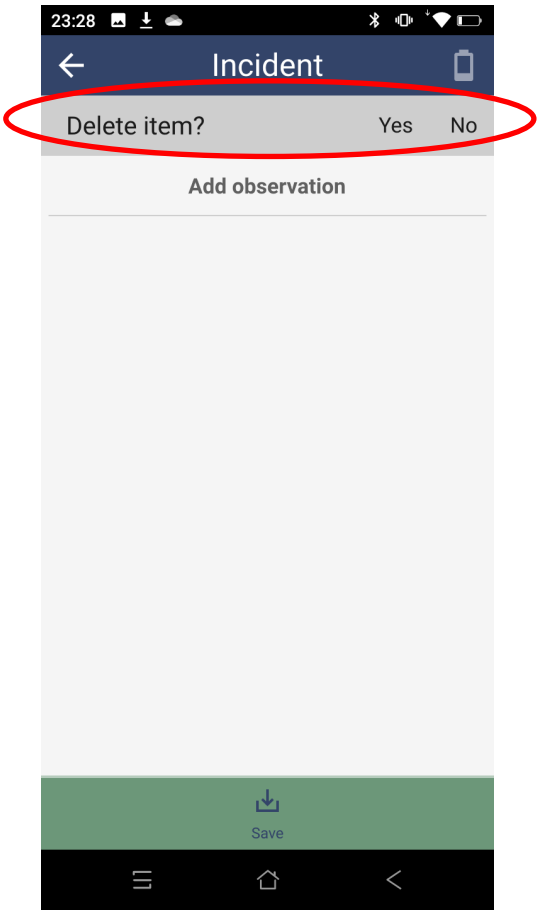
CLEAR THE DATA OF AN ATTRIBUTE

To clear the data entered in an Attribute, click and hold on the Attribute and slide the finger to the left. The question “Reset data?” will pop-up. Select “Yes” or “No” to confirm or cancel the clearance.



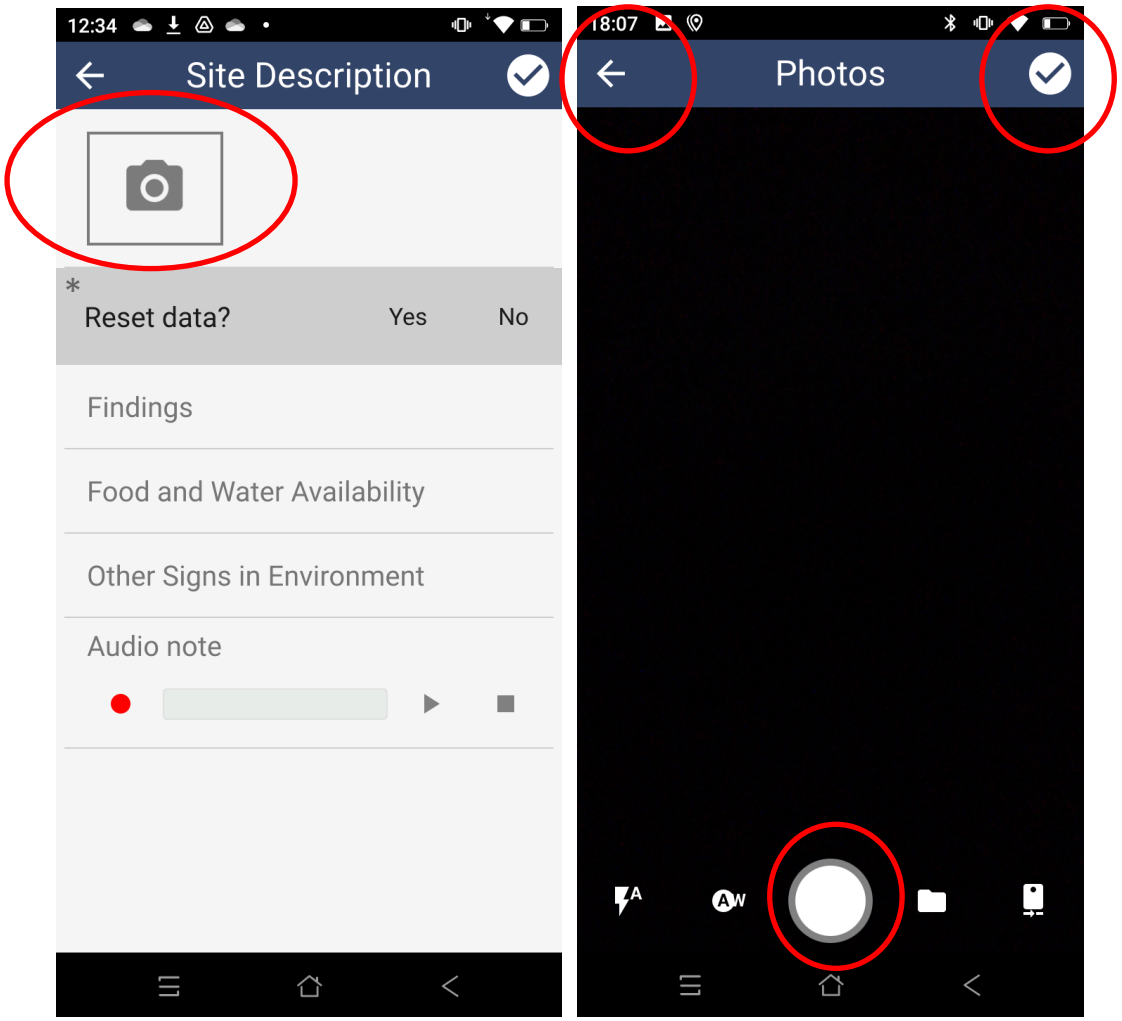
DELETE A CATEGORY ADDED TO A WILDLIFE HEALTH EVENT

Once the data for a Category has been completed and confirmed, it will be included as the part of the Wildlife Health Event's information. If the user wants to clear a specific Category that has already been added to the Wildlife Health Event, click and hold on the corresponding Category, and then, slide to the left. The question "Delete item?" will show up. Click on "Yes" or "No" to confirm or cancel the deletion.



TAKE PHOTOGRAPHS

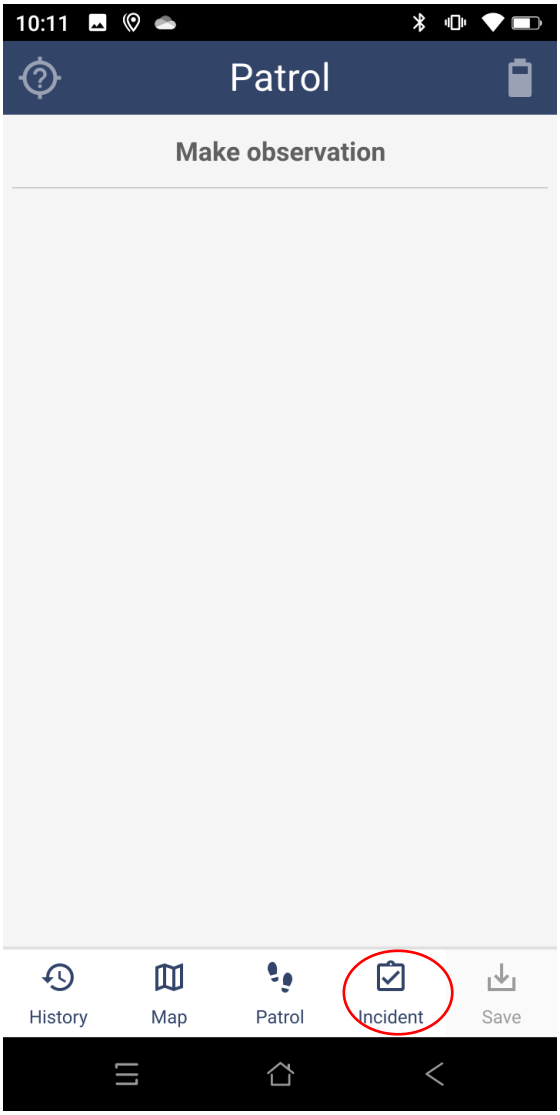
To add photographs, click on the photograph camera icon and use the smartphone as a camera. Click the large white circle bottom-center to take a photograph and then click on the checkmark to accept. The photographs will be added sequentially next to the shutter symbol. Click on top-left arrow to exit the camera. To delete a photograph already accepted, click on the photo and select the trash can.



USING SMART FOR HEALTH

Now that you have gained some familiarity with the functions of SMART Mobile as well as the structure and terminology used to describe SMART for Health, the following section explains how to effectively use this data collection tool. **Here, for simplicity, it is assumed that rangers document data of Wildlife Health Events using independent SMART Incidents (i.e. outside of a SMART Patrol).**

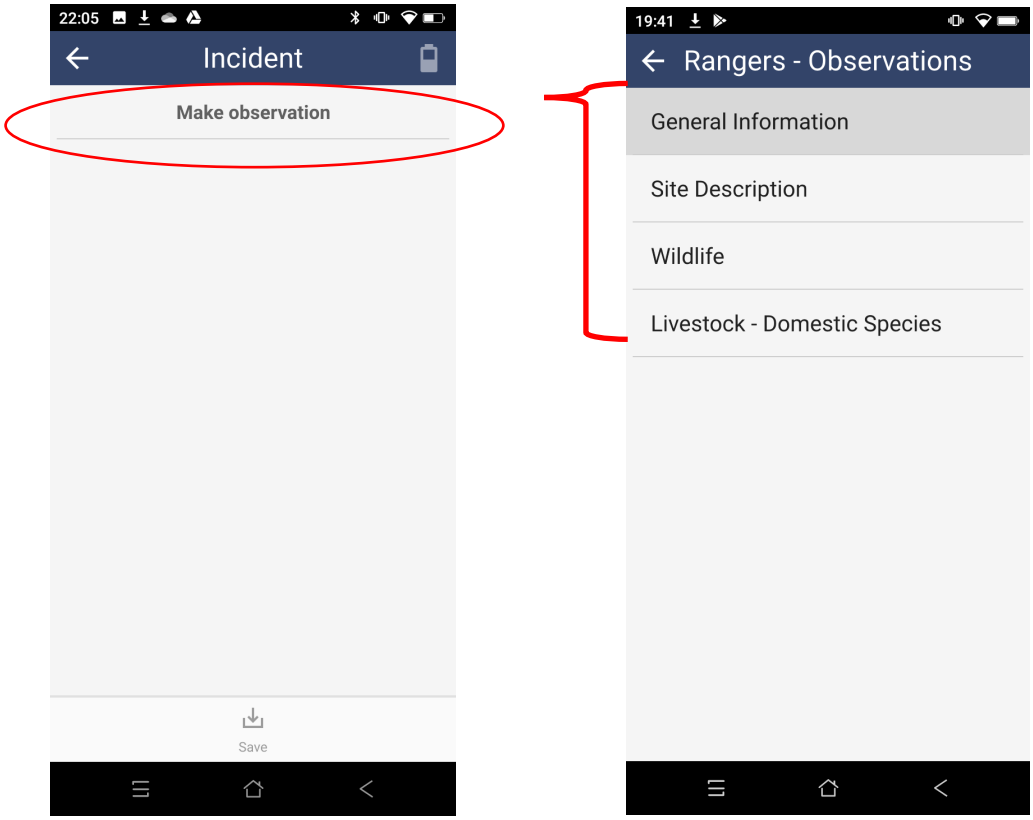
Once a Wildlife Health Event is detected during a patrol, the SMART for Health user should click on the "Incident" button of the Patrol screen.



DOCUMENT A WILDLIFE HEALTH EVENT

To document a Wildlife Health Event, SMART for Health users add Observations using the different Categories:

1. **Click on the "Make Observation"** option of the "Incident" screen. Selecting this option opens the menu of Categories:

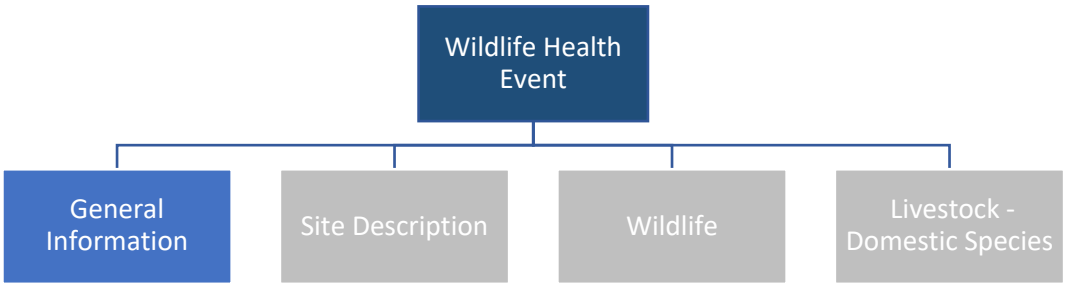


Each Category collects different types of information, including the description of the Event site, species present, and samples collected (see table below repeated from the previous section).

Category	To document
General Information	The name of the protected area, the patrol leader and its affiliation
Site Description	Characteristics of the site where the Event is taking place
Wildlife	The species of wildlife present at the Event
Livestock – Domestic Species	The species of domestic animals present at the Event

COMPLETE THE SITE LEVEL DATA

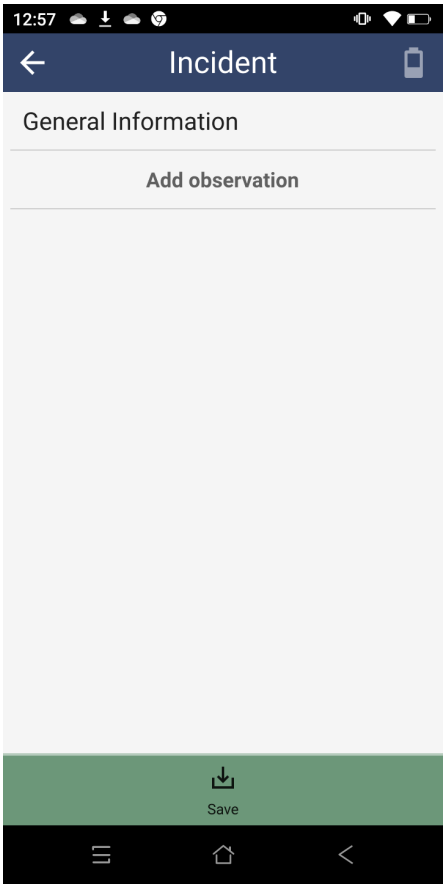
Following the diagram on page 6, the first Category within a Wildlife Health Event is the General Information:



- Click on the **General Information** Category and complete the Attributes

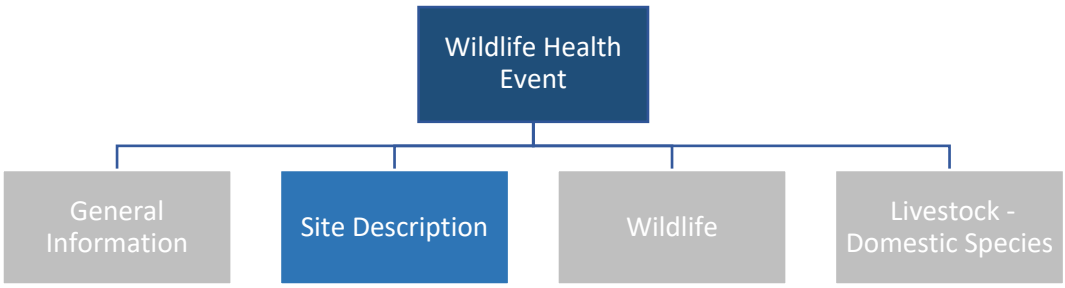
- Once the Attributes are satisfactorily completed, click on the checkmark. Clicking on the check mark will take the user back to the “Incident” screen again and the new Observation (“General Information”) will be listed for the current Event.

- If you enter but then want to exit the Category, select the top-left arrow



- Now, the screen will read “Add observation” instead of “Make observation” (see above)

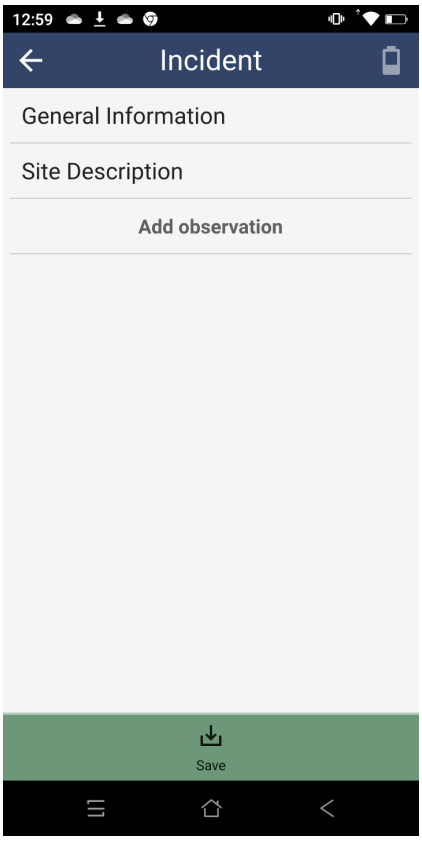
- Click “Add observation” to add more Observations to the current Event



- Click on the **Site Description** Category and fill in the various Attributes. Take photographs of the area if relevant.

- Once the Attributes are satisfactorily completed, click on the checkmark.

- If you want to cancel a completed Category, select the top-left arrow

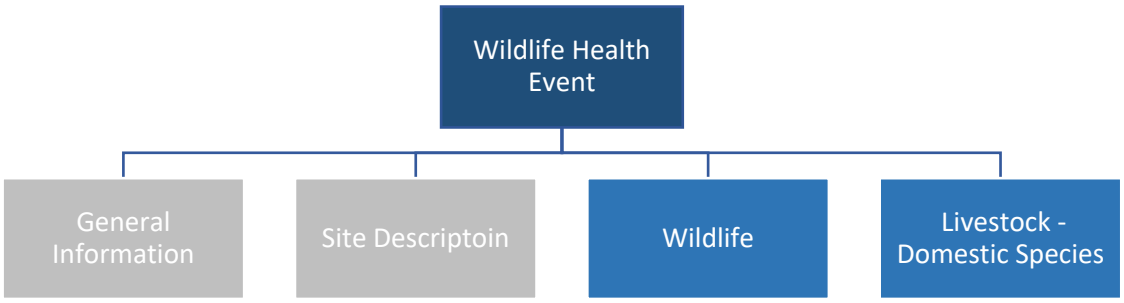


Remember, the record of a Wildlife Health Event requires the "General Information" and the "Site Description" Categories. The use of remaining Categories will depend on the user's findings and specimens collected.

COMPLETE THE SPECIES LEVEL DATA

Depending on the species observed, any number of observations involving "Wildlife" or "Livestock – Domestic Species" can be added.

Following the diagram on page 6, the "Wildlife" and/or "Livestock – Domestic Species" Categories are used within a Wildlife Health Event:

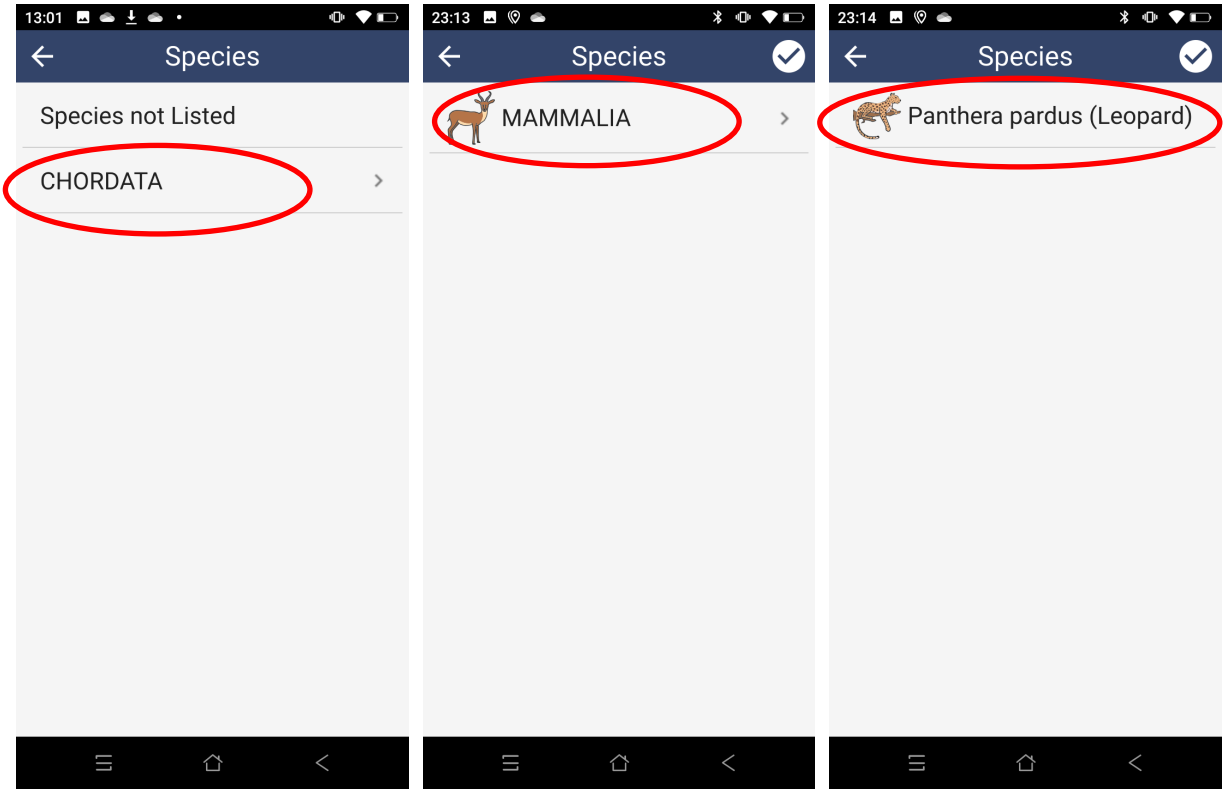


See the table below for guidance on how to use these Categories.

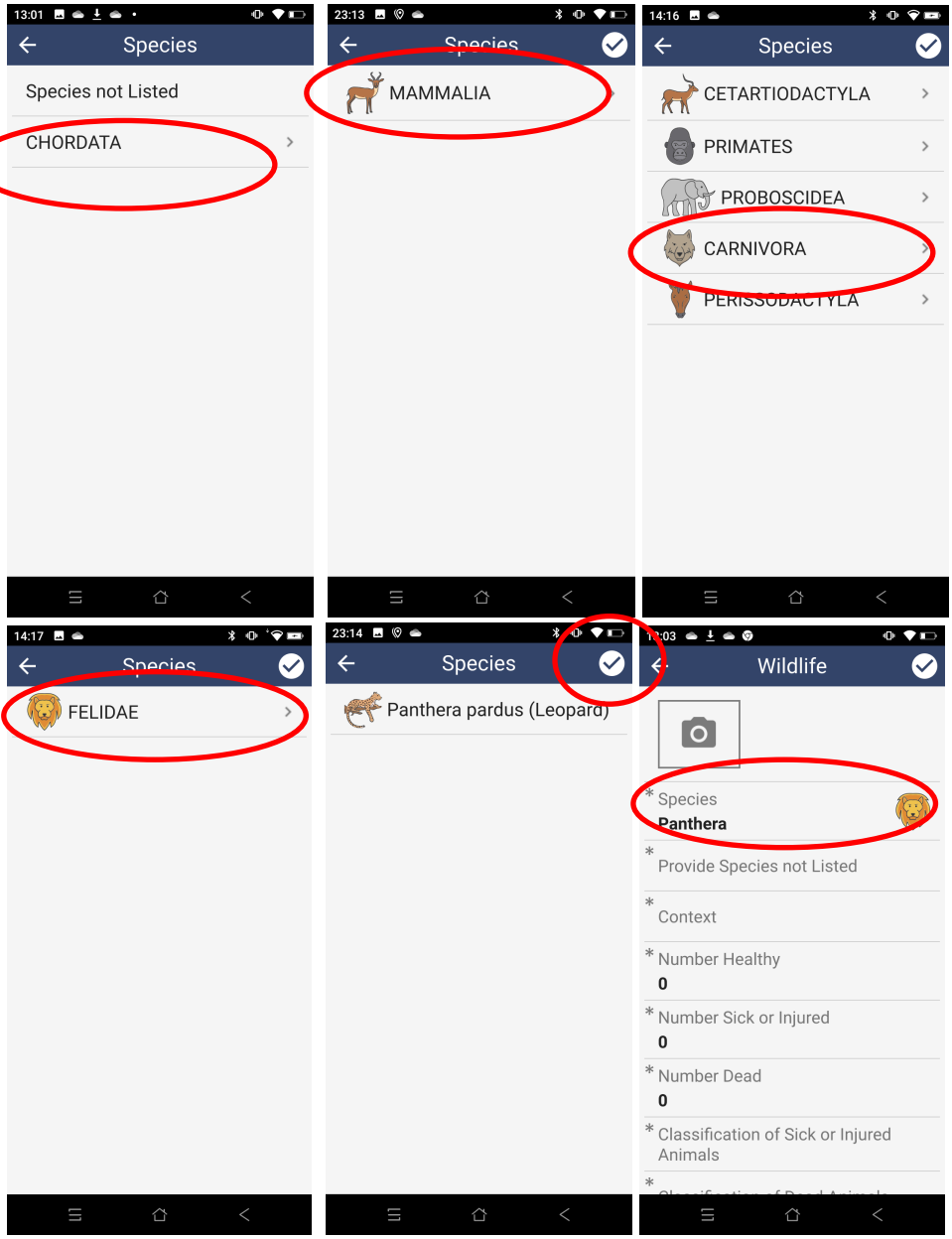
Category	When to use it?
Wildlife	When a species of observed animals in the Wildlife Health Event is not domestic
Livestock – Domestic Species	When a species of observed animals in the Wildlife Health Event is domestic

- Provide the species observed. For "Livestock – Domestic Species" select from a pre-defined list of common names. For wildlife species, the Attribute "Species" is a hierarchy that starts with "**Species not Listed**" and "**Chordata**". If the species is known, click on "Chordata" and then click on the corresponding taxa groups until arriving at the species and its scientific name. **Click on the species** and it will be recorded (see below).

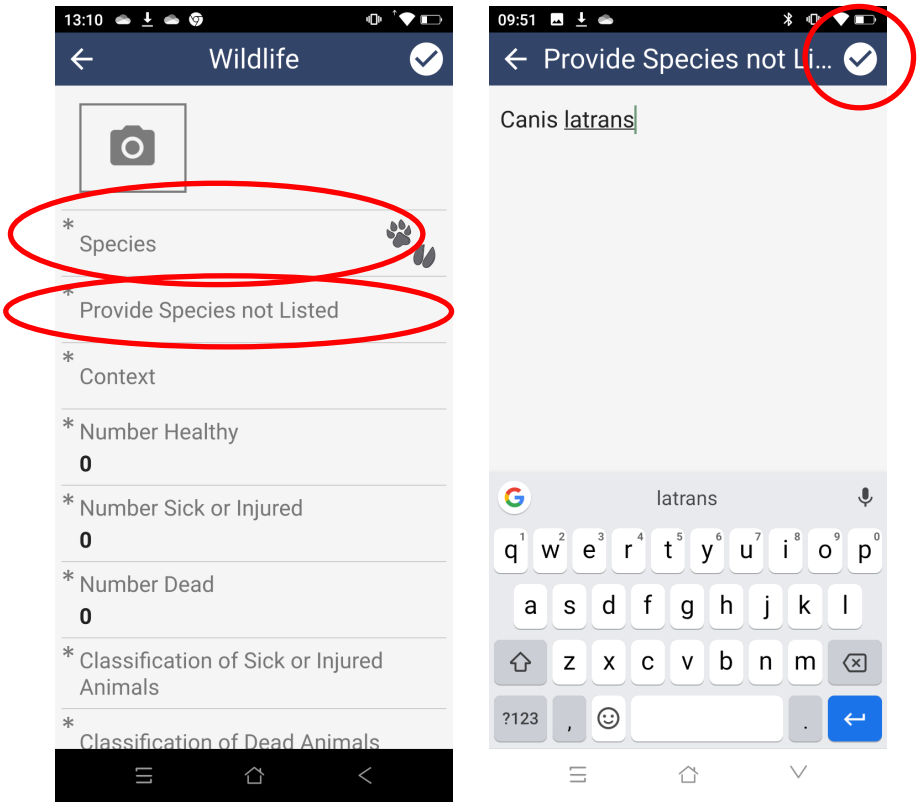
At least one animal of a species must be observed in order to record species level information ("Wildlife" or "Livestock – Domestic Species"). For example, if a single sick Batagur is observed in a Wildlife Health Event, then this species must be documented using the "Wildlife" Category **once**. If twenty Batagurs are observed in a Wildlife Health Event, then this species must be documented using the "Wildlife" Category **once.** If two wildlife species are observed in a Wildlife Health Event, then the "Wildlife" Category should be used twice to document each one of these species.



- It is also possible to record a higher-level taxon if, for example, the genus of the species is known but the full scientific name is unknown. To do this, the user moves one level lower than desired and selects the checkmark at that level. For example, if a species is identified to genus-level only, the genus is selected and in the next screen the list of species of the genus will be provided. If no scientific name is selected but **the checkmark is clicked** on (instead of a species), then only the genus will be recorded. To add the taxonomic family the user selects the checkmark when the list of genera is shown (see below).



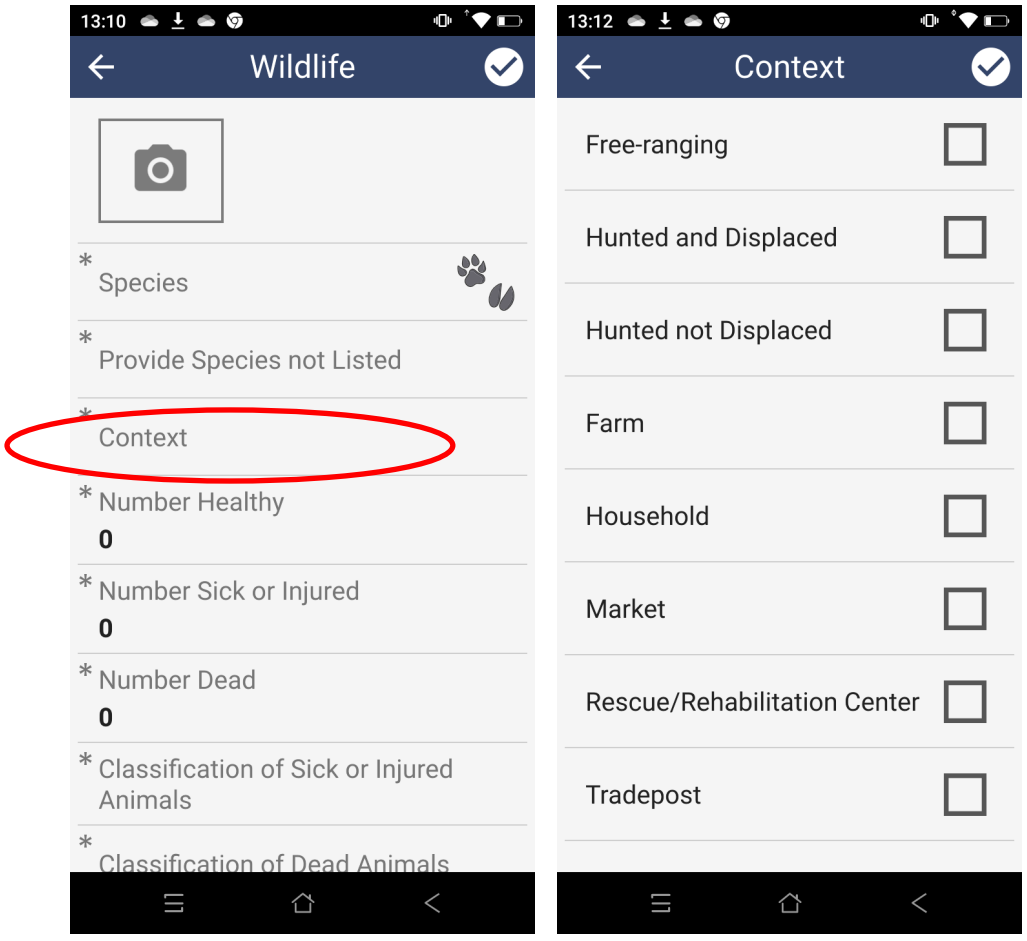
- If the species or a higher-level taxonomy is known but it is not listed, select the "**Species not Listed**" option and then use the Attribute "**Provide Species Not Listed**" to type the species common or scientific name, or any taxonomy level known (e.g. the taxonomic genus, family, order, or class). This Attribute will become available once the Option "Species not Listed" is selected in the "Species" Attribute.



- Take photographs of the animals.

- Complete the "**Context**" Attribute. This is a multi list Attribute and it is used to understand the capture, captivity, or hunting conditions of the animals within the corresponding "Wildlife", or "Livestock – Domestic Species" Categories.

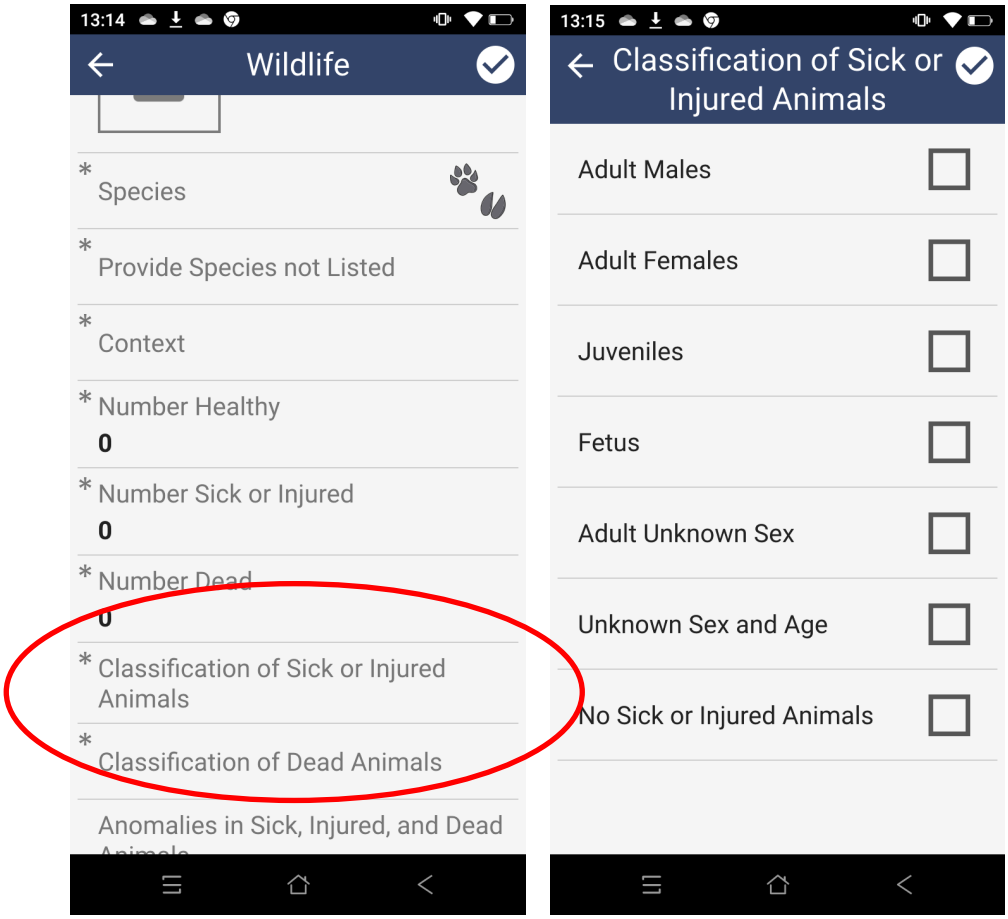
  Select "Free-ranging" if the animals of the corresponding species are not captured at all. Choose "Hunted and not Displaced" when the individuals of the species observed are hunted or captured in a trap, cage, snare, etc., or shot. Choose "Hunted and Displaced" when the individuals of the species observed are hunted or captured and moved from the original point of capture. Choose from the remaining Options ("Farm", "Household", "Zoo", etc.) when the individuals of the species observed are in a captivity facility.



For definitions of the Attributes see here.

- Provide the number of Healthy, Sick or Injured, and Dead animals belonging to the same species no matter their age or sex. **The count of individuals per health status per species must include the animals that provide samples** and that are documented using the "Animal and Samples" Category.

- The Attributes "**Classification Sick or Injured Animals" and** "**Classification Dead Animals**" to report the presence of "sick or injured" or dead animals of the observed species per age and sex (see below). If no animal is 'sick or injured' or dead, answer "No Sick or injured Animals" and "No Dead Animals", respectively.



- Complete the "**Anomalies in Sick, Injured, or Dead Animals**" Attribute by providing a description of the obvious problems observed in the animals of the corresponding species

- Complete the "**Condition Dead Animals**" Attribute which refers to the condition of the carcasses of the observed dead animals of the species recorded

- Complete the "**Potential Cause of Death, Disease, or Injury**" by providing an assessment of the suspected cause of death, disease, or injury of the animals of the recorded species

- Complete the "**Carnivore Attack**" and provide any extra information using the "**Other Relevant Information**"

The user can select multiple options for "**Condition Dead Animals**" and "**Potential Cause of Death, Disease, or Injury**" when more than one option applies. Similarly, if **no animals are dead** then **choose "No Dead Animals" for the "Condition Dead Animals"** Attribute **and** "**No Dead, Sick, or Injured Animals" for the "Potential Cause of Death, Disease, or Injury"** Attribute.

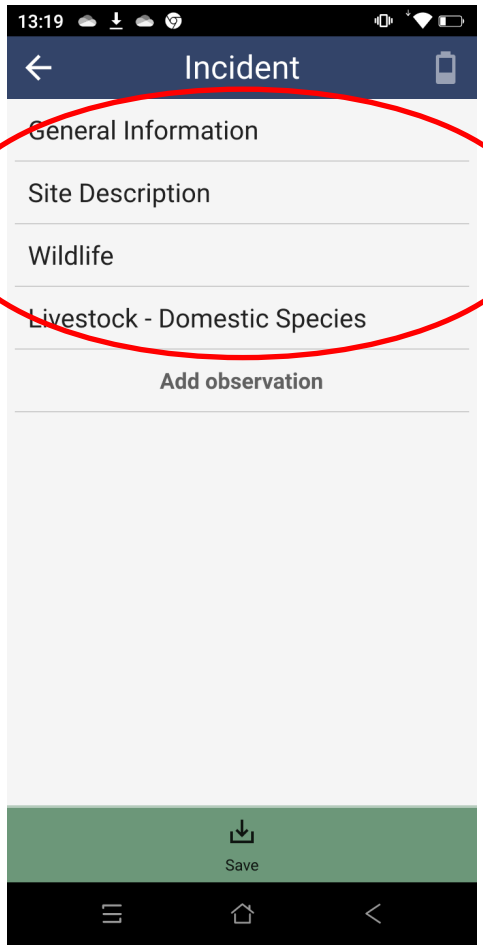
- For a definition of the Attributes and Options see here.

- If you want to cancel the completed Category, select the top-left arrow. If you are satisfied with your entry, click on the checkmark. Clicking on the checkmark will take the user back to the "Incident" screen again and the new Observation ("Wildlife" or "Livestock – Domestic Species") will be listed for the current Event.

If it is epidemiologically relevant, an Event may include livestock or domestic species! For example, rangers find a group of dead wild ungulates and they suspect the cause was an infectious disease. In the same area where they found the dead ungulates, the rangers also observed livestock roaming. In this case, the livestock could be a potential source of the suspected infectious disease for the wild ungulates.

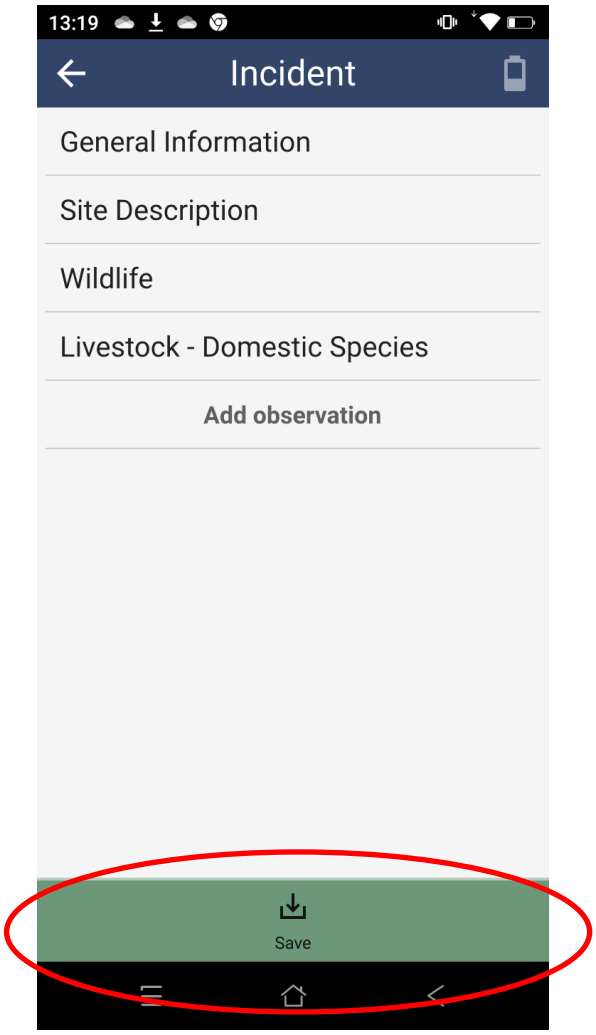
A Wildlife Disease Event with:

- **A wildlife species (captive or not) and a livestock or domestic species (captive or not)** looks like this:


13:19
Incident
General Information
Site Description
Wildlife
Livestock - Domestic Species
Add observation
Save

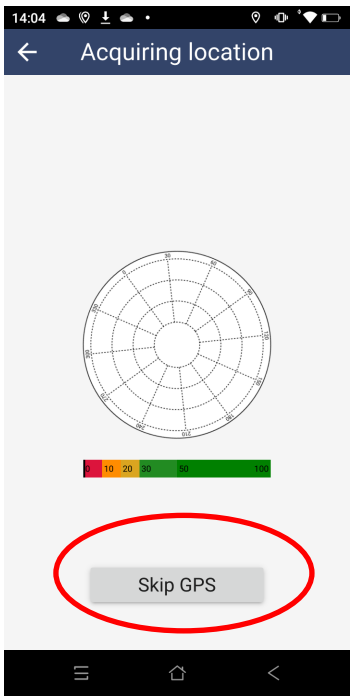
SAVE A WILDLIFE HEALTH EVENT

Once all the data of the Wildlife Health Event has been collected, click on the “Save” button of the “Incident” screen.

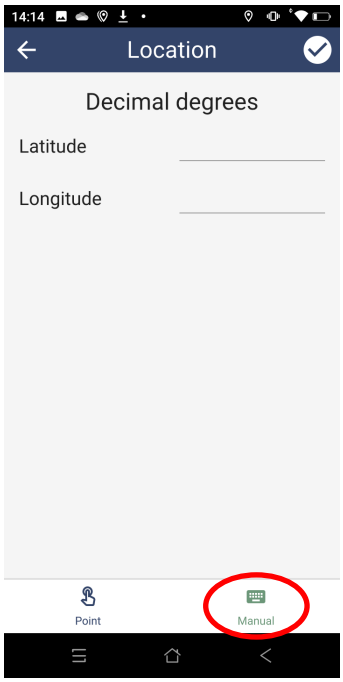


Once the “Save” button is clicked, SMART Mobile will record the position of the Wildlife Health Event and store all the data entered for the Event. Then, the screen will clear and reset to an empty “Patrol” screen with no Observations, allowing the user to continue the Patrol and collect new Wildlife Health Events as Independent Incidents.

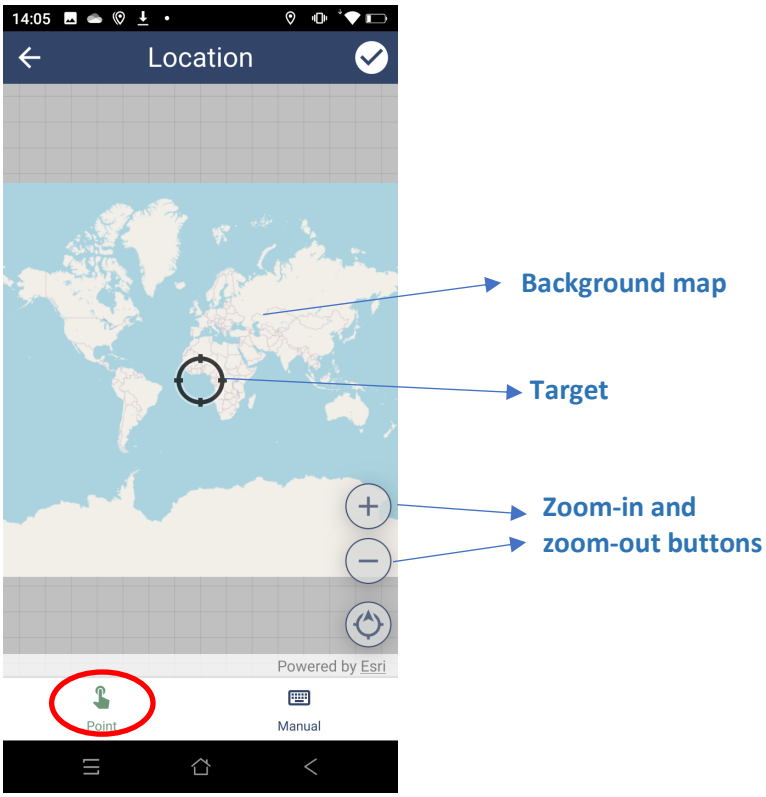
If SMART Mobile fails to record the position automatically, select the “Skip GPS” button.



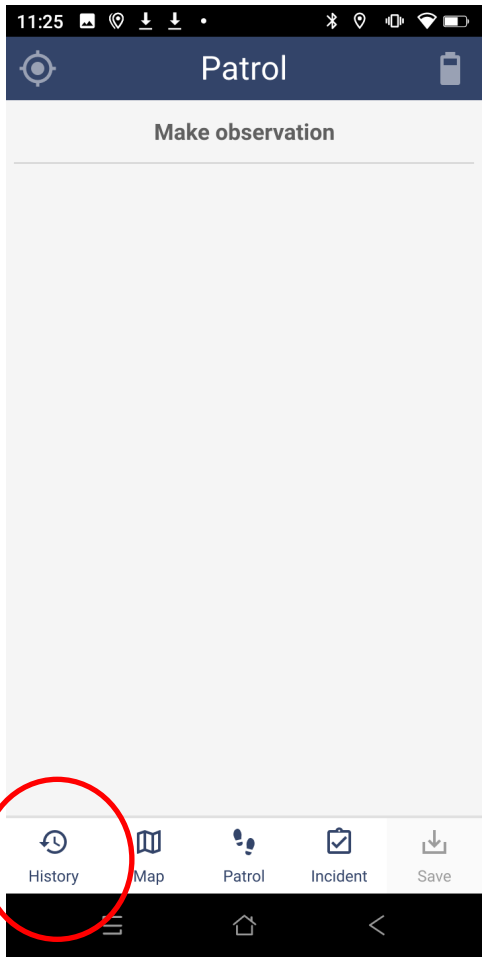
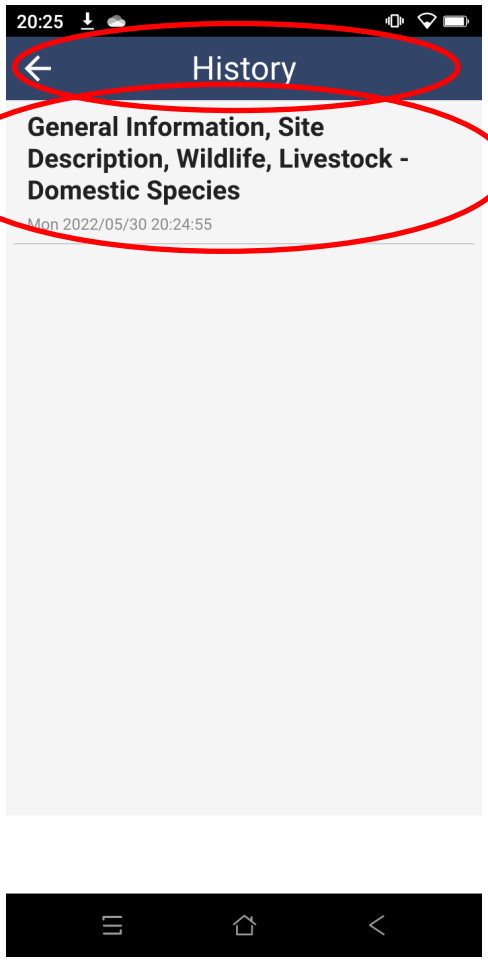
Then provide the geographical coordinates by directly entering the latitude and longitude, or by providing your approximate location in a map. For the first option, click on the “Manual” button of the “Location” screen and manually enter the coordinates provided by a GPS device:



For the second option, click on the “Point” button of the “Location” screen. Move the background map using your fingers and zoom-in and zoom-out until the target is in the desired position. Once the position is correct, click on the checkmark on the top-right corner of the screen:



It is very important to verify that the Event data are saved and stored. See below.

CONFIRM WILDLIFE HEALTH EVENT DATA WAS SAVED

To confirm data was properly saved, before starting a new Wildlife Health Event click on the “History” button of the Patrol screen. In the “History” screen, select the “Incidents” button. The “History” screen will show the Events that have been saved as Independent Incidents. The most recent Events are added to the bottom of the list. If the last Event recorded was properly saved, then the Categories used will be shown in the last item of the list (see below).