AntWeb - Urban Ant Collector Application - Technical Design Document

Version 1

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Overview

This document describes the development of a new Urban Ant Collector application, to replace the previous version which relied on ODK Collect, and was limited to Android users.

By developing it from scratch as a web based application, utilizing HTML5 and CSS3 media queries, jQuery for geolocation, as well as PHP and MySQL, it will be available to a much wider audience, and not be subject to incompatibilities with third party versioning (which is the current trouble with ODK).

Availability

- iiOS6+ (iPhone and iPad)
- Android (mobile and tablet)
- In theory should work on Windows8 phones/tablets as well
- Firefox, Chrome, IE9 (desktop)

Basic Design

Effectively one (1) page, so that user only submits the form once - but designed to feel like a multi-step application, with form validation at each step of the way.

By using HTML5 and CSS media queries, the content will responsively scale to fit the correct design for the given viewport, be it a mobile device, a tablet, or a monitor/screen.

jQuery geolocation will be used to attempt to capture the user's location so as to get their latitude, longitude, and elevation.

Bing Maps REST Services will be used to try to reverse geocode to attempt to address when latitude and longitude are not available.

Login

Login via OpenID using Janrain (user management platform API) - yes? no? Would provide a way to guarantee unique users (which we could save out in a separate table), but is an extra step that might prevent people from doing it. The application is sufficiently complex with required fields to be filled out that I don't think we need to worry about spam, so that isn't an argument for required login.

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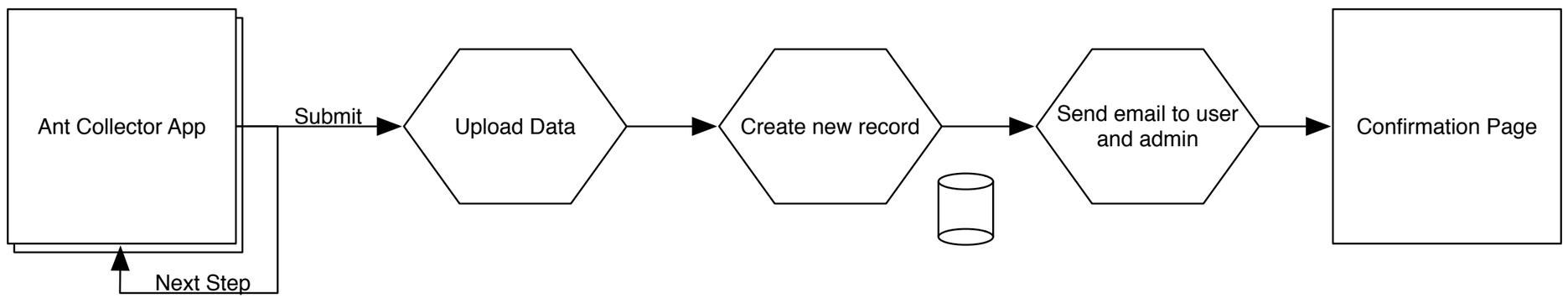
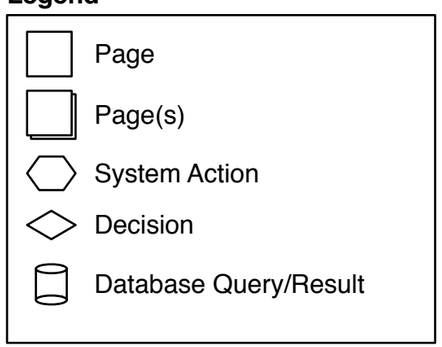
System Overview



Legend



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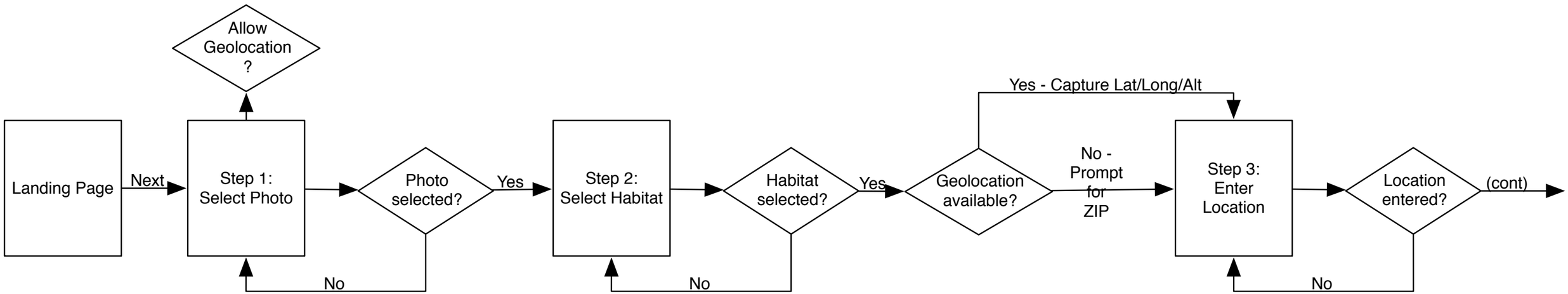
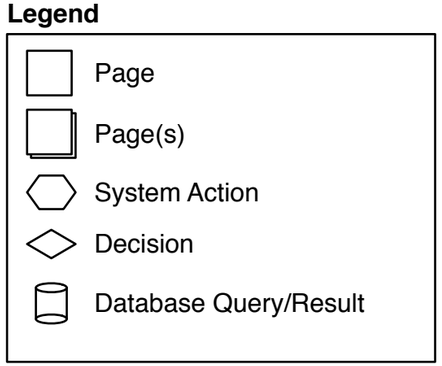
Workflow



Legend



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Database Design

Database table for submissions:

- entry_id - Unique identifier for the entry
- openid_id - If we decide to use OpenID, the unique id provided, to reference user table
- photo - Filename of uploaded photo (photo will be stored in a directory, not DB)
- habitat - Habitat entered
- microhabitat - Microhabitat entered
- field_id - Field identification entered
- latitude - Latitude captured from geolocation, or derived from reverse geocoding
- longitude - Longitude captured from geolocation, or derived from reverse geocoding
- altitude - Altitude (in feet) captured from geolocation. Can be blank if geolocation not available.
- ZIP - ZIP entered in the case where geolocation is not available.
- location - Location entered
- name - Name entered
- email_address - Email address entered by user (distinct from OpenID email, if we decide to use OpenID)
- collection_id - ID created from first three characters of email address plus four numbers
- created_at - Timestamp of creation date
- updated_at - Timestamp of updated date

If using OpenID, table for unique users:

- id - Unique identifier for user
- openid_id - OpenID identifier
- fname - First name
- lname - Last name
- email_address -Email address

Possible table description (not tested):

```
CREATE TABLE ant_collector (
    entry_id INT NOT NULL AUTO_INCREMENT,
    openid_id INT NOT NULL,
    photo VARCHAR(50),
    habitat VARCHAR(50),
    microhabitat VARCHAR(50),
    field_id TEXT,
    latitude VARCHAR(20),
    longitude VARCHAR(20),
    altitude VARCHAR(20),
    zip VARCHAR(10),
    location VARCHAR(50),
    name VARCHAR(50),
    email_address VARCHAR(50),
    collection_id VARCHAR(10),
    created_at TIMESTAMP DEFAULT "0000-00-00 00:00:00",
    updated_at TIMESTAMP DEFAULT NOW() ON UPDATE NOW(),
    PRIMARY KEY (entry_id),
    FOREIGN KEY (openid_id) REFERENCES user(openid_id)
) ENGINE=InnoDB


CREATE TABLE users (
    id INT NOT NULL AUTO_INCREMENT,
    fname VARCHAR(50),
    lname VARCHAR(50),
    email_address VARCHAR(50),
    openid_id INT,
    PRIMARY KEY (id),
    FOREIGN KEY (openid_id) REFERENCES ant_collector(entry_id)
) ENGINE=InnoDB
```

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Basic Layout

The basic layout for the application.

NOTE: This is being designed for optimal display on a mobile device, with the design adjusting for tablet display and monitor display.

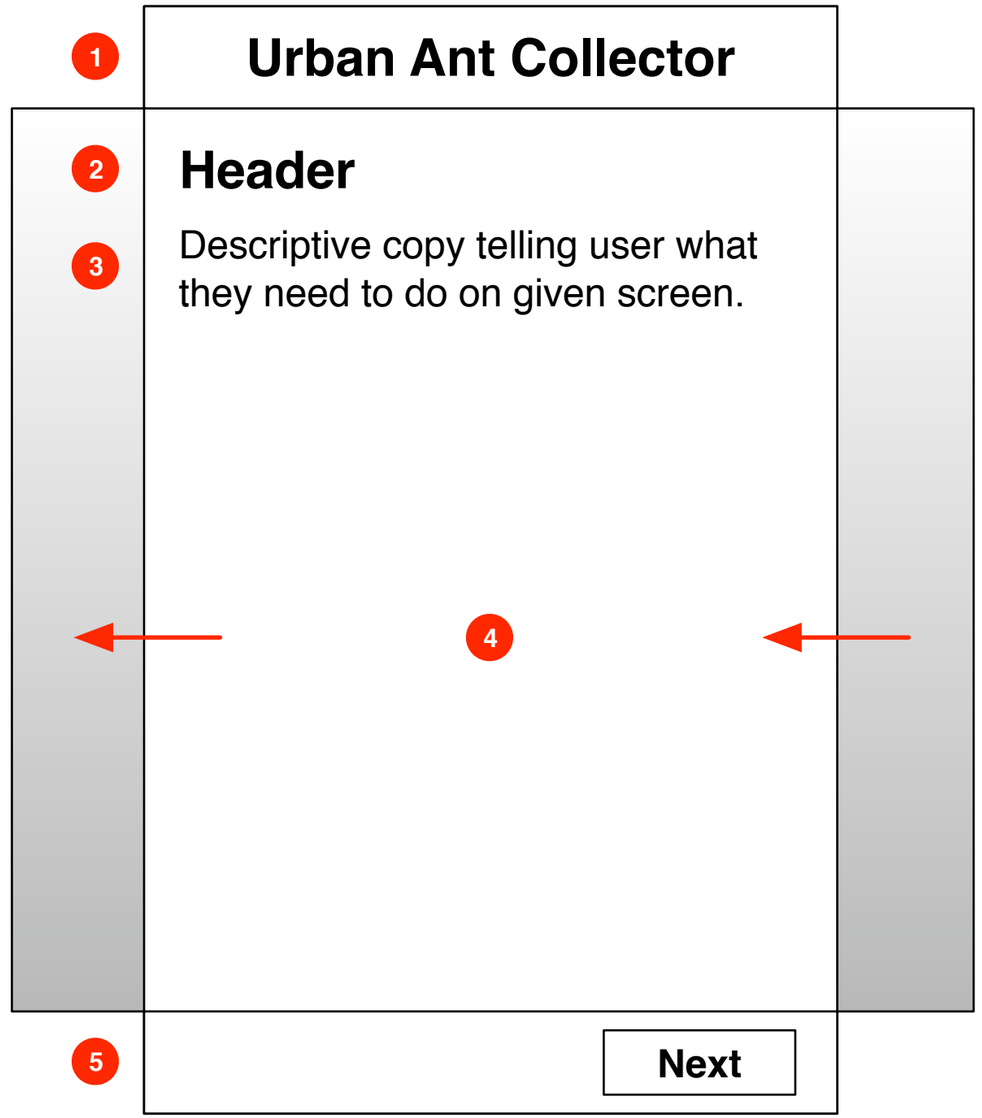
1 - Title Bar
Provides branding for application

2 - Header
Displays of which step a user is in.

3 - Instructions
Instructions and form elements.

4 - Page Interaction
When user clicks **5** and form validation is successful, current screen contents slide out to the left, as the next screen's contents slide in from the right. The slide out to the left has a delay of .3 seconds, and slides out in .8 seconds, the slide in from the right has a delay of .1 seconds, and slides in in .8 seconds. By doing this there is a sense of fluidity to the interaction.

5 - Navigation
Provides mechanism for moving to the next step in the application. When user clicks "Next", form validation occurs, and current content wipes to the left, as next content slides in from the right.



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Landing Page

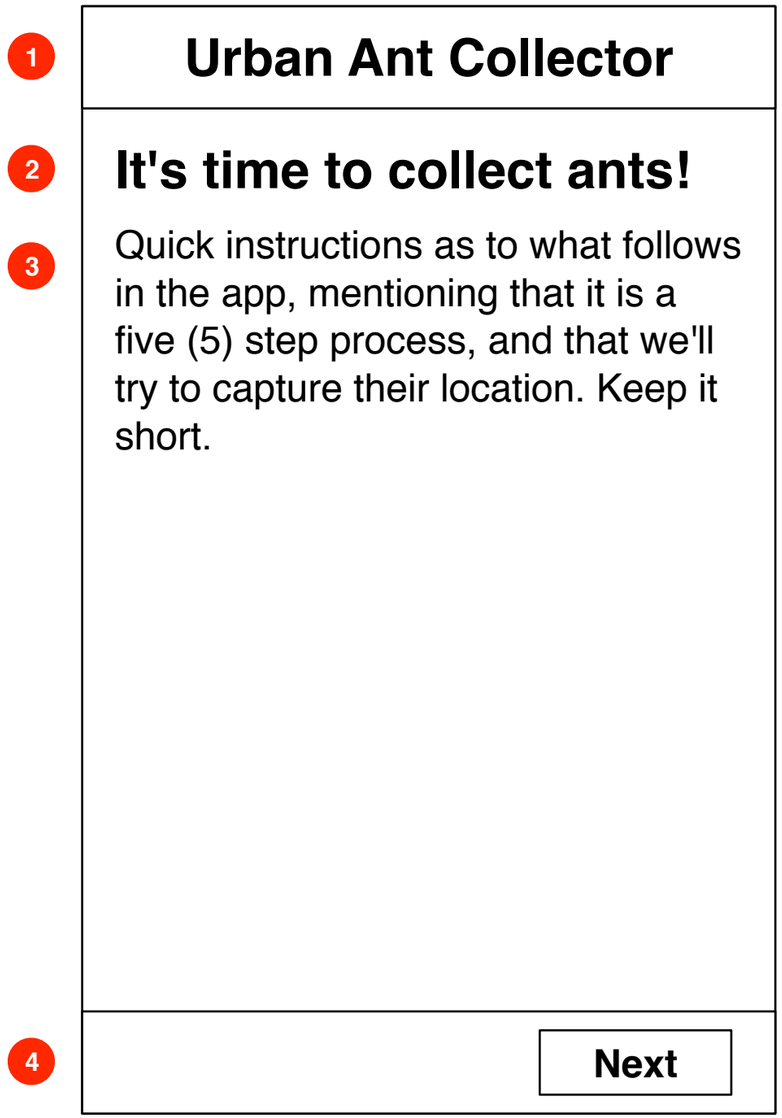
Landing page of the application.

1 - Title Bar
Provides branding for application

2 - Header
It's time to collect ants!

3 - Instructions
Short descriptive copy telling the user what they're about to do. Perhaps try to detect if they don't have iOS6+ to tell them it won't work?

4 - Navigation
Tapping this sends them to the first step (page 8) in the application. **NOTE:** If we decide to use OpenID to have the user log in to use the app, this would be the place to do it, so they log in after having read the instructions, but before they start the process.



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Step One

First step of the application. jQuery will attempt to capture user's geolocation, so upon landing on this screen, user will be prompted to allow us to get their location. If they decline, or if we cannot capture it (reasons include, but aren't limited to, GPS failure, device doesn't support it), user will be prompted to provide their ZIP code in the third step (see details on page 10).

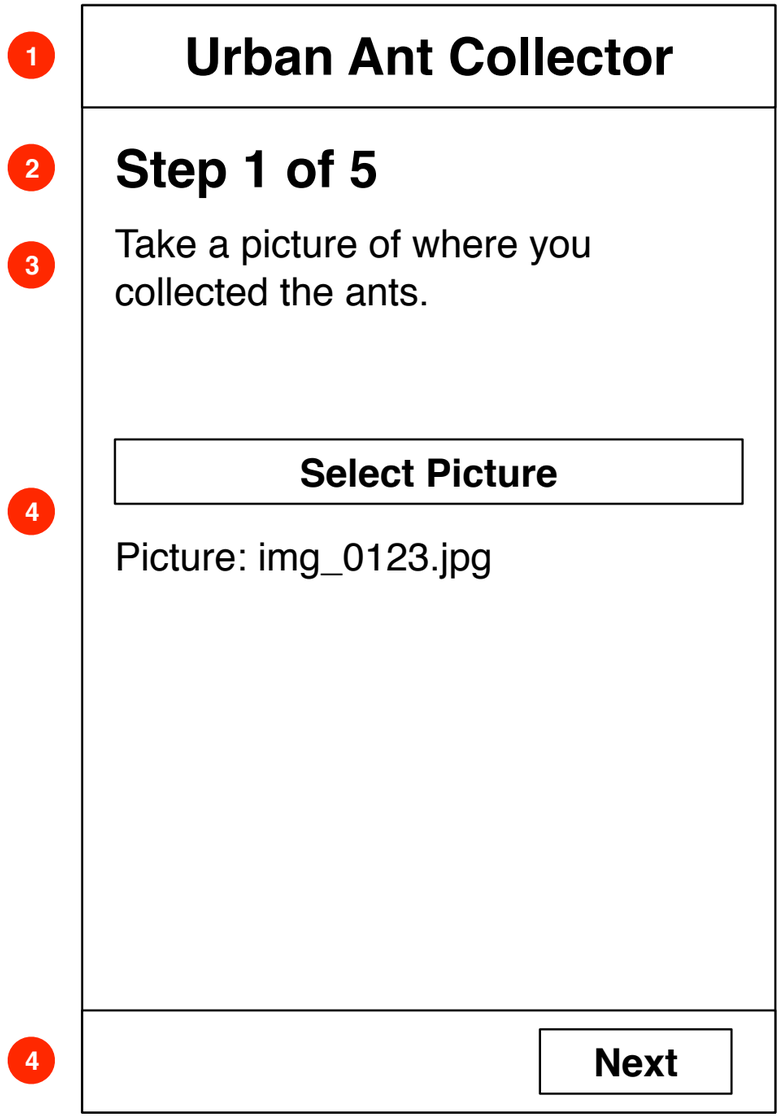
1 - Title Bar
Provides branding for application

2 - Header
Step 1 of 5

3 - Instructions
Instructs user to take a photo.

4 - Select Picture / Selected Picture
Provides mechanism for selecting a photo. If no photo has been chosen, user sees the "Select Picture" button. If photo has been selected, file name is displayed.

5 - Navigation
Tapping this checks to make sure they selected a photo. If not, user is prompted to select a photo. If photo is not a JPG, user is prompted to select a JPG image. Once a photo is selected, sends them to the second step (page 9) in the application.



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Step Two

Second step of the application.

1 - Title Bar
Provides branding for application

2 - Header
Step 2 of 5

3 - Instructions
Instructs user to select the type of habitat.

4 - Select Habitat
Provides mechanism for selecting a habitat.

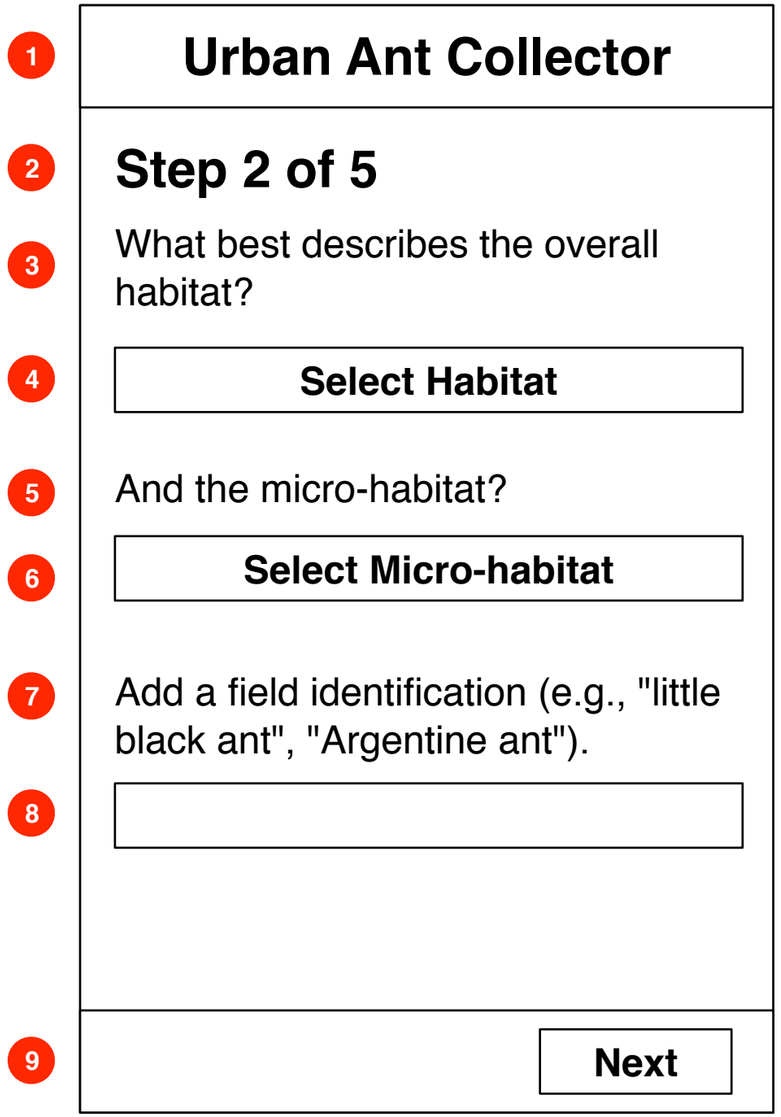
5 - Instructions
Instructs user to select the type of micro-habitat.

6 - Select Micro-habitat
Provides mechanism for selecting a micro-habitat.

7 - Instructions
Instructs user to enter a field identification.

8 - Text Input
Provides mechanism for entering a field identification.

9 - Navigation
Tapping this checks to make sure they selected a habitat, microhabitat, and entered a field identification. If not, user is prompted to fill those out. Once a entered, sends them to the third step (page 10) in the application.



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Step Three

Third step of the application.

NOTE: This screen has hidden inputs for latitude, longitude, and altitude, if geolocation was able to capture them in step one (page 8).

1 - Title Bar
Provides branding for application

2 - Header
Step 3 of 5

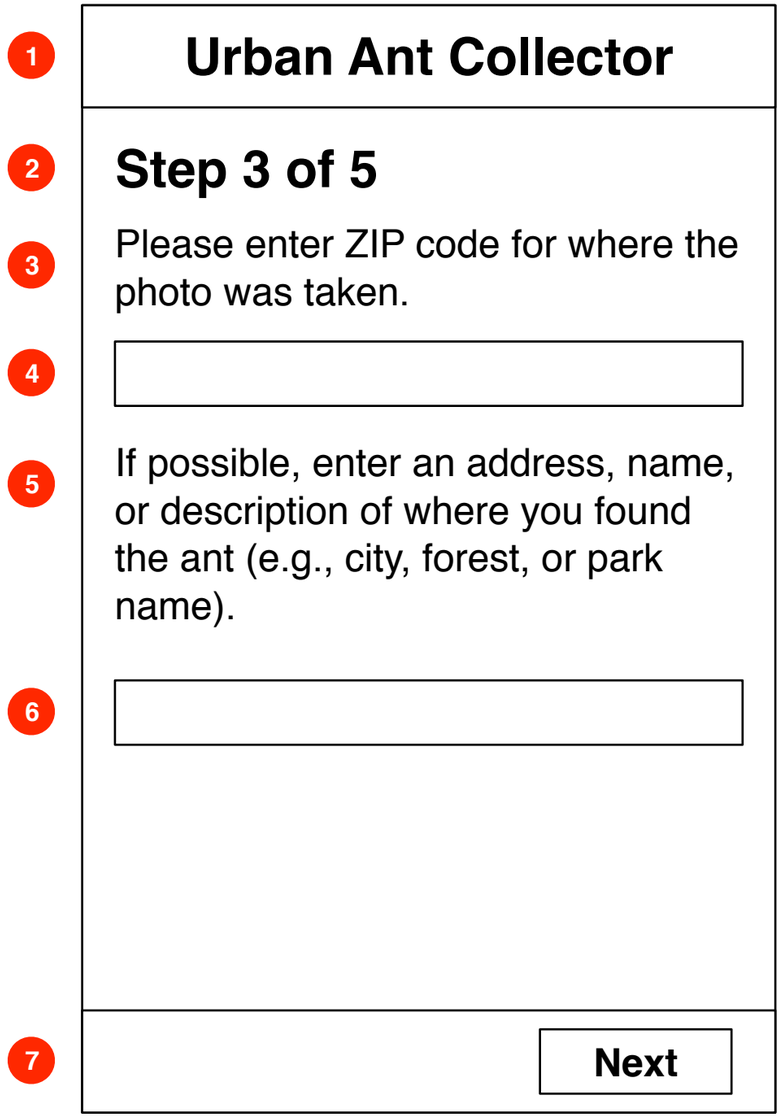
3 - Instructions
Only displayed if geolocation was unable to capture latitude and longitude in step one (page 8). Instructs user to specify a ZIP code. **NOTE:** This might not be efficient, as the user might not know the ZIP code where they are. Consider having this be a city/state/country selection (and consider having it as a separate screen, so as to not have an overwhelming display).

4 - Text Input
Only displayed if geolocation was unable to capture latitude and longitude in step one (page 8). Instructs user to specify a ZIP code. **NOTE:** This might not be efficient, as the user might not know the ZIP code where they are. Consider having this be a city/state/country selection (and consider having it as a separate screen, so as to not have an overwhelming display).

5 - Instructions
Instructs user to specify a location.

6 - Text Input
Provides an input for entering the location.

7 - Navigation
Tapping this checks to make sure they entered a location (and a ZIP, if geolocation wasn't available). If not, user is prompted to fill those out. Once a entered, sends them to the fourth step (page 11) in the application.



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Step Four

Fourth step of the application.

1 - Title Bar
Provides branding for application

2 - Header
Step 4 of 5

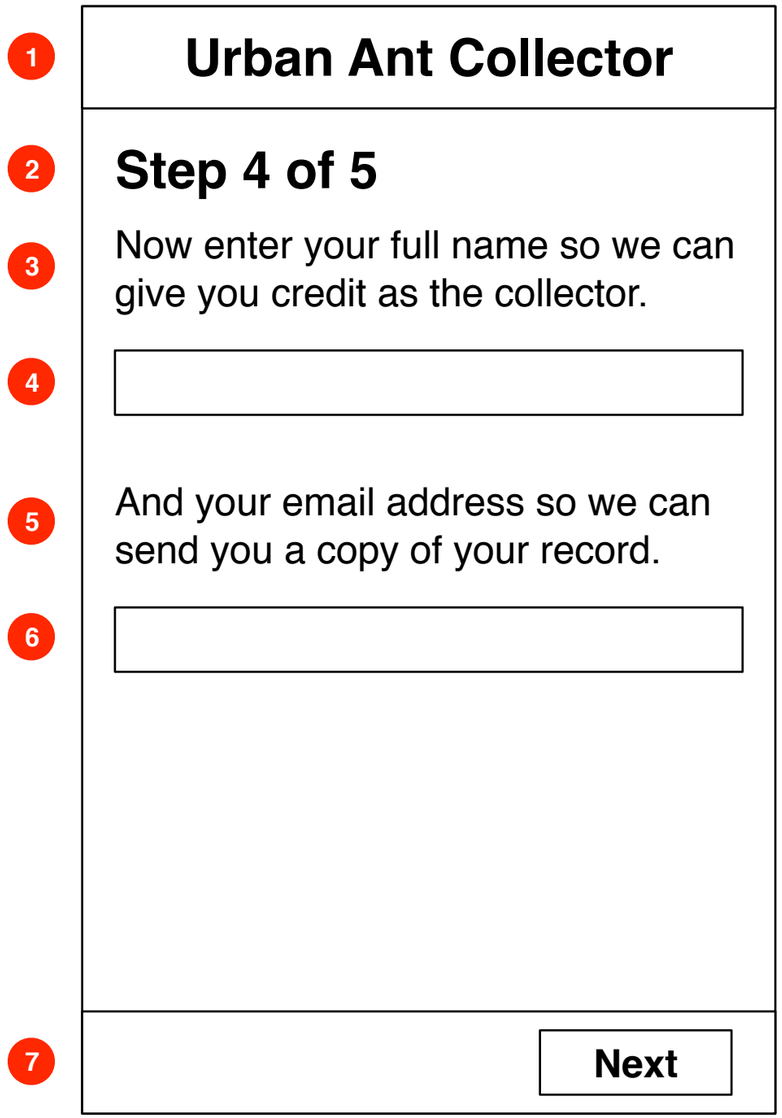
3 - Instructions
Instructs user to enter their name.

4 - Text Input
Provides an input for entering their name.

5 - Instructions
Instructs user to enter their email address.

6 - Text Input
Provides an input for entering their email address.

7 - Navigation
Tapping this checks to make sure they entered their name and email address. If not, user is prompted to fill those out. If email address "doesn't look like an email address", user is prompted to enter a valid looking email address. Once a entered, sends them to the fifth step (page 12) in the application.



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Step Five

Fifth step of the application.

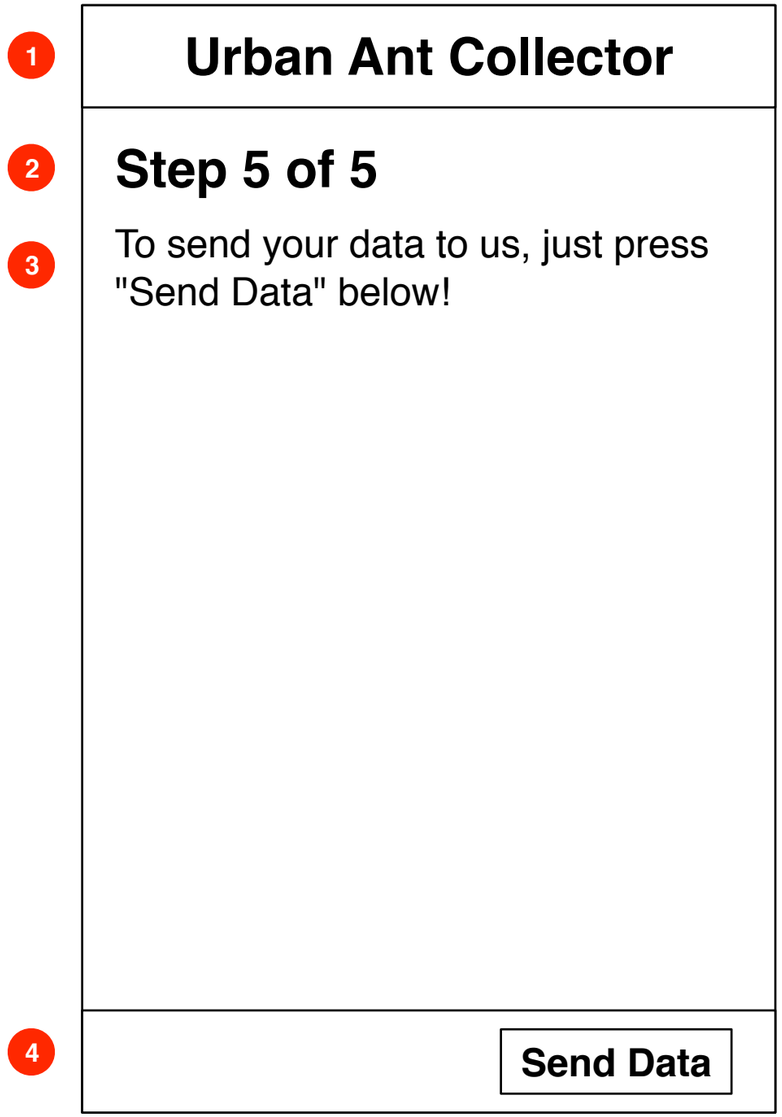
1 - Title Bar
Provides branding for application

2 - Header
Step 5 of 5

3 - Instructions
Instructs user to submit their data.

4 - Submit Button
Submits data to AntWeb. Upon submit:

Upload photo
Rename photo to prevent overwriting
Create thumbnail of photo
If no latitude or longitude, use Bing Maps REST Services to reverse geocode to attempt to get those.
Create a Collection ID based on email address plus four numbers
Save data to database
Send email to user saying we received their entry, etc
Send email to Brian
Redirect user to Confirmation Page (page 13)



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Confirmation Page

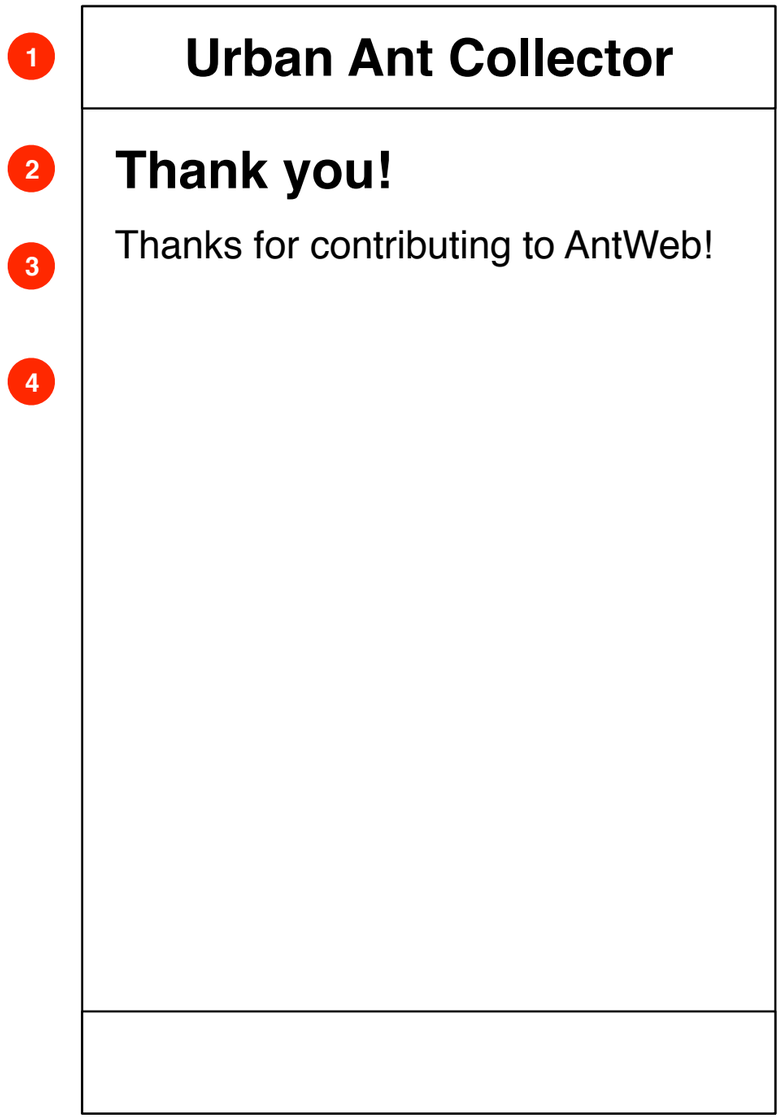
Confirmation page for the application. Should any errors have occurred, describe them in **3** below, and ask them to try again.

1 - Title Bar
Provides branding for application

2 - Header
Thank you!

3 - Instructions
Thank you / confirmation message.

4 - ??
Buttons/links to do another one?



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Admin Screen

Admin screen for managing submissions. Will be linked to from current Admin section of AntWeb, but be separate from it so it can access the specifics for the ant collector app.

1 - Header
Admin

2 - Description
Defaults to "Latest Uploads"

3 - Data
Break it out like the specimen list stuff? Display thumbnail of photo?

Tasks:
Link to display photo
Mailto to email user
Delete
Edit

- Collection ID
- Latitude
- Longitude
- Altitude
- Location
- Habitat
- Microhabitat
- Field Identification
- Name
- Email address
- Delete photo

View by user
Sort by date, user, location...