

# User Requirements Definition

## Functional Requirements

### *Basic Search*

- FR1:** The user shall be able to search by scientific or common name.
- FR2:** A user search shall produce a selectable list of species names, with the common name preceding the scientific name.
- FR3:** The selectable list should display a preview image of the species next to its name.
- FR4:** The application will have a “What’s Around Me?” button on the home screen which will populate a list of the species within a mile radius specified by the user (defaulting to 10 miles).
- FR5:** The application shall keep a record of past searches made by the user.
- FR6:** The user shall be able to specify the type of search he or she is making (common name, scientific name, state, or state with county/parish/organized borough).

### *Filter*

- FR7:** The application shall filter search results using the user’s GPS, showing the species within a range specified by the user (defaulting to 50 miles).
- FR8:** The application shall populate a list of the species within a state which is selected or searched for by the user.
- FR9:** The application shall allow the user to obtain a list of the species within a selected or searched for county, parish, or organized borough.
- FR10:** A user shall be able to filter search results by selecting a taxonomic rank. This includes kingdom, phylum, class, order, family, genus, and species.
- FR11:** The user shall be able to filter his or her search for species by inputting a specific event date.
- FR12:** The user shall be able to select multiple filters to widen or narrow his or her search.

### *Species Page*

- FR13:** When selecting the preview image or the species name, the user shall be directed to a page containing additional information about the species.
- FR14:** The species page should have a link to a page (EOL or MediaWiki) which will provide more information about the species.

**FR15:** The species page shall include a citation which gives credit to the data provider.

### ***Personal Recordings***

**FR16:** The user shall have the ability to access his or her camera within the app to take and upload photos of observed organisms.

**FR17:** The user shall be able to take and upload audio recordings of observed organisms.

**FR18:** The user shall be able to group saved images and audio recordings under a specific name.

**FR19:** The application shall allow the user to add a location to their photo and/or audio recording. The user can select a specific location or use their current GPS location.

**FR20:** The personal recordings page shall have a list of the user's recordings along with icons for using the mobile device's camera or microphone.

### ***Downloading***

**FR21:** The application should offer a way to download data from a set location for offline use.

### ***Settings***

**FR22:** The user shall be able to access the settings menu through a button in the top right hand corner of the screen.

**FR23:** The settings menu shall contain a toggle to enable/disable preview images, showing only the species names.

**FR24:** The settings shall allow the user to clear his or her search history.

**FR25:** The settings shall allow the user to clear the cache of downloaded data.

**FR26:** The user shall be able to change the distance that the "What's Around Me?" button searches within the settings.

### ***Map***

**FR27:** The user should be able to do a map search for a species which shows the locations where the species was observed.

**FR28:** The user should be able to click the observation on the map and be directed to a page with additional information about the species/observation.

### ***Basic Features***

**FR29:** The application shall have a banner that directs the user back to the home screen.

- FR30:** The application shall have a help page providing a short tutorial detailing the functions of the application which will be accessible through a button in the top left hand corner of the screen.
- FR31:** The application shall utilize multiple APIs to acquire information about species, such as name, location, data provider, etc.
- FR32:** The application shall have a back button on each page, allowing the user to return to the previous page.

### *Image Recognition*

- FR33:** The application should be able to perform image recognition when the user inputs an image of a species.

### **Nonfunctional Requirements**

- NFR1:** An untrained user should be able to intuitively navigate the simple search method to find information about a species.
- NFR2:** This application shall translate on all screen sizes so that a user with any type of Android phone can view the application properly.
- NFR3:** The application shall be able to function without significant loading times using only a limited cell connection (3G, minimum).

## System Requirements Corresponding to Functional Requirements

### *Basic Search*

- SFR1:** The user shall be able to search for organisms by typing the common name or the scientific name into a search bar. The search bar will have a 255 character limit.
- SFR2:** A user's search will generate a maximum of 10 results at a time. The user can click a view more results option to view 10 more results.
- SFR3:** Each image in the selectable list will be 400px by 400px. The image will appear to the left of each species result.
- SFR4.1:** The application shall ask the user for access to his or her location upon initial use of the "What's Around Me?" button.
- SFR4.2:** The user's GPS location will be used as the center point of the area searched.
- SFR4.3:** This feature will not work unless the user allows the application to use their GPS location.
- SFR5:** The application shall keep a record of a total of 20 past searches before automatically clearing the least recent search.
- SFR6:** The search bar shall produce radio buttons when the user begins typing that he or she can select to specify their search. The default search is by common name.

### *Filter*

- SFR7.1:** The filter menu shall have a check box for the user to select to use their GPS to narrow his or her results.
- SFR7.2:** The GPS filter shall have a text box which will allow the user to enter a specific radius. This text box will prohibit the user from entering invalid numbers (such as 0, letters, or negative numbers).
- SFR8:** When the user selects to filter by state, the filter menu shall have a drop down of all the states from the APIs.
- SFR9:** The user shall only be able to select or search by county/parish/organized borough if a state has already been specified.

**SFR10.1:**

<b>Taxonomic Ranks</b>	<b>Examples</b>
Kingdom	Animalia, Plantae, Fungi, et al.
Phylum	Acanthocephala, Bryophyta, Ascomycota, Cercozoa, Deferribacteres, Korarchaeota, et al.
Class	Mammalia, Maxillopoda, Sauropsida, et al.
Order	Primates, Procolophonomorpha, Carnivora, et al.
Family	Felidae, Canidae, Ursidae, Mustelidae, et al.
Genus	Acomys, Viverra, Zalophus, et al.
Species	Linyphiidae, Hypericum, Rosa, et al.

**Table 1:** This table shows the taxonomic classification levels that the user would be able to search from, with example usage under ‘Examples.’

**SFR10.2** The taxonomic filter should be a text box that allows the user to enter the taxonomic name that they want to filter results by.

**SFR11:** After the user selects the event date filter, three drop-down bars shall appear for the user to select month, day, and year.

**SFR12:** The user shall not be able to filter by GPS location and state or state with county at the same time.

### *Species Page*

**SFR13:** The species page will have a larger picture for the user to view along with a description of the species beneath it.

**SFR14:** The MediaWiki API will provide a response which can be formatted in a WebView showing the Wikipedia page for the species.

**SFR15:**

Citation Information	Example or Required Inputs
Data Provider or Owner Name	Field Museum of Natural History or Gordon, J.
Resource or Dataset Name	U.S. Bird Occurrences
Publisher [Data Provider name, address or affiliation(s)]	Field Museum of Natural History, Museum of Vertebrate Zoology, University of Washington Burke Museum, and University of Turku
Service Used to Access	<i>Biodiversity Information Serving Our Nation (BISON)</i>
URL	<i><a href="https://bison.usgs.gov">https://bison.usgs.gov</a></i>
Date	YYYY-MM-DD

**Table 2:** This table shows the information to cite for the used data from the BISON API.

***Personal Recordings***

- SFR16:** The application shall request access to the mobile device's camera before the user is able to use the personal recordings functionality for the first time.
- SFR17:** The application shall request access to the mobile device's microphone before the user is able to use the personal recordings functionality for the first time.
- SFR18:** The user shall specify a title name for the recording or combination of recordings.
- SFR19:** When uploading the image or audio recording, the application shall prompt the user with a dialog where they can select the location where the image or audio recording was taken.
- SFR20:** Each of the user's recordings shall be in a selectable list by title. Upon selection, the user will be moved to a page with those specific recordings.

***Downloading***

- SFR21:** The application shall only be able to download 100MB of data for offline use.

***Settings***

- SFR22:** The settings button shall always be accessible to the user no matter which page they are currently viewing.

- SFR23:** The toggle shall be set as on by default (showing the preview images).
- SFR24:** The application shall prompt the user with a dialog to make sure he or she is sure about their decision to clear the search history.
- SFR25:** The application shall prompt the user with a dialog to make sure he or she is sure about their decision to clear the cache of downloaded data.
- SFR26.1:** The settings shall have a text box which will allow the user to enter a specific radius for the “What’s Around Me?” button. This text box will prohibit the user from entering invalid numbers (such as 0, letters, or negative numbers).

**SFR26.2:**

<b>Toggle for Images</b>	Enabled	When the toggle switch is enabled, a user’s search will generate images of the organisms returned from the search.
	Disabled	When the toggle switch is disabled, a user’s search will not generate images of the organisms returned from the search. This will decrease load times if the user has poor cellular connection.
<b>Clear Searches</b>	This will be a clear history button that will clear the user’s search history when pressed.	
<b>Clear Downloaded Data</b>	This will be a clear cache button that will clear all downloaded data from the user’s cache when pressed.	
<b>Mile Radius Selection</b>	This will be a drop-down bar that allows the user to select a 5, 10, 25, 50, or 100 mile radius.	

**Table 3:** Above is a table that describes how each of the settings in **FR21 - FR24** will be handled in the settings menu of the application.

**Map**

- SFR27:** The BISON Web Map Service will be used to render data retrieved from BISON in Google Maps.
- SFR28:** Clicking the observation on the map should prompt the user with a dialog containing the observation name and a button to move to the species page (where there will be more information).

**Basic Features**

- SFR29:** This banner shall be visible on all pages of the application.

**SFR30:** The help page shall have a tab for each feature of the application. Clicking on the tab will provide a tutorial on the selected feature.

**SFR31:**

APIs	Usage
Biodiversity Information Serving Our Nation (BISON)	The BISON API can retrieve a list of occurrences for a given species by searching using the selected state and county or entering latitude and longitude.
Encyclopedia of Life (EOL)	The EOL API can search for a specific species and obtain information such as physical descriptions, habitat, images, and a map of known areas in which the species lives.
Global Biodiversity Information Facility (GBIF)	The GBIF API can search for a species using its scientific and common name, habitat, family, etc. The GBIF API allows for the ability to create and edit information in their data system. Additionally, this API can search occurrence records in the GBIF archive, and it offers a mapping service.

**Table 4:** The above table shows the APIs that will be used and how they will be implemented.

**SFR32:** The back button that leads to a previous search will restart the user at the top of the selectable list.

### ***Image Recognition***

**SFR33.1:** Google's Vision API shall be used to recognize the species within the image.

**SR33.2:** The user can select the organism within the image to remove the noise from the image.

### **System Requirements Corresponding to Nonfunctional Requirements**

**SNFR1:** The untrained user should only need 30 minutes to become completely familiar with navigating through the app and utilizing its features.

**SNFR2:** The developer will use direct proportion (dp) which will allow the layouts to change size based on the proportions of the screen.



**SNFR3:** The application should not take longer than 10 seconds to load data from searches.