

Configuration Guide for ArcGIS Field Maps and ArcGIS OnLine

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Intended Audience and Purpose: This guide is intended for organizations that:

- 1) Are using a Pinyon Jay Survey Protocol produced by the Pinyon Jay Working Group (PJWG),¹ and
- 2) Are using the ArcGIS Field Maps app to record field survey data under the Protocol.

This guide describes how to perform necessary configuration steps for this data collection system in the ArcGIS Online (AGOL) environment.² This configuration must be performed before field workers can use Field Maps for data collection. Once configuration is completed, field workers should consult a separate document ([User Guide for ArcGIS Field Maps](#)) for detailed instructions about how to use the Field Maps app to record survey data.

Configuration is a somewhat technical task best undertaken by the GIS specialists that support their organizations. This guide therefore assumes familiarity with GIS terminology and processes, but it does not assume prior experience with configuration for Field Maps. It also assumes that the individual responsible for performing configuration has administrative privileges within their organization's ESRI organizational account (see below).

Getting Help: For questions or help with configuration, contact John Boone (boone@gbb.org).

Prerequisites: The following prerequisites must be satisfied before proceeding with the configuration process described in this document:

- 1) Your organization must have an organizational (not personal) ESRI account. There is an annual subscription cost associated with maintaining this account, which varies according to organization type, size, and licensing specifics.
- 2) Each field worker must have an AGOL user account with the "Creator" user type or higher.³

¹ Either [Pinyon Jay Survey Protocol for Landscape Applications](#), which is currently available, or [Pinyon Jay Survey Protocol for Project Applications](#), which will be available in the near future.

² AGOL is a web-based GIS that stores and manages the data collected with Field Maps. ArcGIS Enterprise is an alternative to AGOL that may be more appropriate for some organizations, but it is not explicitly covered in this guide. The workflows described in the guide are conceptually applicable to configuring Field Maps under ArcGIS Enterprise although the specifics may vary.

³ Organizations may opt to have multiple field workers share a smaller number of user accounts to reduce costs, but this is not recommended.

- 3) If your organization wants to record and view the tracks traveled by field workers as they conduct surveys using the area search approach, a location sharing solution for Field Maps must be implemented as described in detail [here](#). The PJWG group recommends that you use location sharing to facilitate, evaluate, and document appropriate survey coverage within selected plots or project polygons.

Brief Overview of the Configuration Process: The Field Maps app is an interface for adding and editing features to an editable feature layer within a web map hosted in AGOL. In addition to depicting the editable feature layer, the web map can also depict one or more non-editable feature layers (e.g., survey plot or survey polygon boundaries) and a base map that helps the field worker navigate and orient to their surroundings. The configuration process consists of gathering these layers, adjusting their settings, creating and sharing the web map, and preparing the Field Maps app itself.

Preconfigured File Geodatabase: Data collected using Field Maps are stored in the [file geodatabase](#) (FGDB) format. To simplify the configuration of Field Maps, the PJWG has prepared two FGDB templates that are freely available:

- 1) [PIJA_FGDB_Landscape](#), which is fully compatible with the [Pinyon Jay Survey Protocol for Landscape Applications](#), and
- 2) [PIJA_FGDB_Project](#), which is fully compatible with the [Pinyon Jay Survey Protocol for Project Applications](#).

You should select and download the template that is appropriate for your organization's application.⁴ Both templates have the following preconfigured characteristics:

- 1) All non-optional domains and domain values shown in Table 4 have been created.⁵
- 2) Two feature classes ("Visits" and "Sightings") with the attributes shown in Tables 1 and 2 have been created, with additional configuration as follows:
 - a. Default attribute values are set for some domains, as shown in Table 4.
 - b. Allowability of "null" (i.e. "blank") values are set as indicated in Tables 1 and 2 (i.e., attributes defined as "optional" in these tables are set to allow null values; other attributes are set to disallow null values).⁶
 - c. Automatic **Global ID** generation is enabled for both feature classes.
 - d. **Editor Tracking** is enabled for both feature classes.
 - e. **Attachments** are enabled for both feature classes.

⁴ The two FGDB's are identical in most respects but vary with regard to how certain default attribute values are set and other small details.

⁵ Table numbers cited in this numbered list refer to the [Pinyon Jay Survey Protocol for Landscape Applications](#) document. They will be updated to also reflect the [Pinyon Jay Survey Protocol for Project Applications](#) document once it is finalized.

⁶ An important point of clarification to prevent confusion is that the "Stop Time" and "Jays Present?" attributes from the Visits feature class are required (i.e., null values disallowed), but accurate data entry for these attributes cannot be determined when a visit-level record is first created at the beginning of a survey. Thus, the assumption is that a placeholder value will be entered at the beginning of the survey and then changed to the correct value at the end of the survey. This is fully described in the [User Guide for ArcGIS Field Maps](#).

- f. A **Visit ID** attribute created for the Sightings feature class in GUID format.⁷
- 3) A one-to-many relationship class has been created between the Visits feature class (the “origin”) and the Sightings feature class (the “destination”). This is based on using the Global ID attribute from the Visits feature layer as a primary key and the Visit ID attribute from the Sightings feature layer as a foreign key.

By using these templates, you can avoid having to configure all of these items from scratch.

Configuration

Step 1: Download FGDB and Open in Desktop GIS

First, download the appropriate FGDB template to your computer. Unzip it into a folder. You should select a descriptive name for the folder, but the folder name must end with the “.gdb” suffix (minus the quotation marks). Open your preferred desktop GIS software (ArcGIS Pro or ArcMap), select **Add Data**, and add the Visits and the Sightings feature classes from the FGDB to a new blank map.

Step 2: Additional FGDB Configuration (if applicable)

While it is open in desktop GIS software, you may wish to perform additional configuration on the FGDB template.⁸ Examples of additional configuration could include creating new project-specific attributes or creating new project-specific domains.⁹ If additional configuration is contemplated, it is important to note that some changes to FGDB’s can be made only within desktop GIS software before publishing the FGDB to AGOL as a hosted feature layer (see Step 3). Examples of changes that must be made in desktop software include:

- 1) Changing the fundamental database ordering of attributes in the feature classes.
- 2) Changing / creating different default values for attributes.
- 3) Changing whether a given attribute allows null values or not.

If necessary, other changes can be made to the FGDB later, after it is published to AGOL as a hosted feature layer, including:

- 1) Adding new attributes.
- 2) Creating or editing domains.¹⁰
- 3) Changing aliases of attributes.

⁷ This is necessary to create a “key” for the relationship class between the Visits and Sightings feature classes.

⁸ No changes should be made, however, that compromise the compatibility of the data set with the Data Dictionary presented in the PJWG Survey Protocols.

⁹ The most likely project-specific domains will include pick lists for surveyor identities and ID numbers for the plots or polygons that will be surveyed.

¹⁰ Note however that if domain values are changed after data collection has begun, is done, manual editing of older data may be needed to change previous domain values to new domain values.

However, we recommended that to the extent possible, all changes to the FGDB template be made in in desktop software before publishing to AGOL, and that changes to the hosted feature layers in AGOL be avoided or minimized.

Step 3: Publish the FGDB to AGOL as a Hosted Feature Layer

To function with Field Maps, the FGDB must be published to AGOL as a hosted feature layer. Although this process can be initiated from within AGOL, we recommend that it be initiated from within ArcGIS Pro or ArcMap.

To publish from ArcGIS Pro:

- 1) Open the two feature classes from the FGDB into a blank map as described above.
- 2) Choose **Share – Web Layer – Publish Web Layer**.
- 3) In the resulting dialogue box, accept defaults except as follows:
 - a. Under **General**, complete the **Item Details** as needed.
 - b. **Sharing** can either be deferred until later.
 - c. Under **Configuration**, click the **Configure Layers** button and then:
 - i. Select **Enable editing and allow editors to:** and then select the **Add, update, and delete features** button.
 - ii. Select **Enable Sync** and **Export Data**.
 - iii. Select **Preserve editor tracking info**.
 - d. Under **Configuration**, click the **Configure Parameters** button, and then:
 - i. If the data collection will all occur in one time zone, the time zone in the **Date Fields** section. Otherwise, it can be left blank and managed by the field data collection devices.
 - ii. De-select the **Ensure map is set to allow assignment of unique IDs** setting.
- 4) Click **Analyze**; This may return some “medium” or “low” severity messages, which can be ignored. “High” severity messages however must be resolved before proceeding.
- 5) Click **Publish**; some processing will occur but eventually a success message should display.
- 6) NOTE: The resulting Hosted Feature Layer will be stored in your default folder in AGOL. It will consist of two items: the hosted feature layer and service definition with the same name. These items can be moved to a different folder in AGOL if desired.

To publish from ArcMap:

- 1) Open the two feature classes from the FGDB into a blank map as described above.
- 2) Make sure you are signed in (see **File** menu) to your AGOL account.
- 3) Choose **File - Share As - Service**, click **Publish a Service**, and then **Next**.
- 4) Select the **My Hosted Services** connection, pick a name for your service, and then **Continue**.
- 5) Work through the full dialogue box, accepting defaults except for:
 - a. Under **Capabilities-Feature Access**, click all five check boxes (**create, delete, query, sync, and update**).

- b. Fill out the **Item Description**.
- c. For now, choosing **Sharing** options can be deferred.
- 6) Click **Preview**; This will likely return a few “medium” or “low” severity messages, which can be ignored. “High” severity messages however must be resolved before proceeding.
- 7) Click **Publish**; some processing will occur but eventually a success message should display.
- 8) NOTE: The resulting Hosted Feature Layer will be stored in your default folder in AGOL. It will consist of two items: the hosted feature layer and service definition with the same name. These items can be moved to a different folder in AGOL if desired.

Step 4: Log in to AGOL

Subsequent steps are completed in AGOL. Navigate to your organizational AGOL page and log in with your administrator credentials.

Step 5: Complete Metadata

Click **Content**, navigate to the location of your newly published hosted feature layer, and click the feature layer name, which opens the item’s **Overview** page. This is where you should enter the metadata required by the PJWG Survey Protocols by editing **Add an in-depth description of the item**. Be sure to include all required information as described in Table 3 of the Protocol.

Step 6: Create Group(s)

Groups are defined sets of AGOL users with which specific content can be shared. It is recommended that you create a group in AGOL specifically for field workers who will be using Field Maps. Optionally, you may wish to create additional group(s) tasked with project management or administration.

To create a field work group:

- 1) Click **Group – Create Group**.
- 2) Fill in the **Group overview** section, including a descriptive name for the group.
- 3) Under **Group membership**, select the following options:
 - a. **Only group members**.
 - b. **My organization’s members only** (unless you wish to include surveyors from other AGOL organizations in your data collection effort).
 - c. **All group members**.
 - d. Either option is acceptable for the last item.
- 4) In most circumstances, you should enable the **Shared update** option under **Group designations**.
- 5) Click **Save**
- 6) Click **Invite Users** and follow the prompts to add your field workers to the group based on their AGOL usernames.

Follow similar steps to create additional group(s) if desired.

Step 7: Configure Editable Feature Layers

The only editable feature layer required for the PJWG Survey Protocol is the hosted feature layer created by publishing the FGDB template. This must be configured in AGOL with the proper settings to function correctly, as follows:

- 1) Click **Content**, navigate to the location of your hosted feature layer, and click on that item to open its Overview page.
- 2) Click on the **Visualization** button. Use the resulting map-viewer interface to define symbology (i.e., “Styles”) and the pop ups for features within the Sightings and Visits feature classes. Note that by default, popup configuration (which fields are visible, and the order in which they are shown) defines the data collection forms in Field Maps, so consider it carefully. More specifically, by default the attributes in a feature class are listed in alphabetical order within a popup, rather than in their underlying database order. We recommend that you reorder the visible attributes in a sequence that will make logical sense in the field, ideally in the same order used for Tables 1 and 2 in the Survey Protocol.
- 3) Click the **Settings** button. Settings that are recommended or critical in terms of Field Maps functionality are:
 - a. Enabling **Delete Protection**.
 - b. Under **Editing**, **Enable editing**, the **Keep track of who edited the data**, and **Enable Sync** options must be checked.
 - c. Under **What kind of editing is allowed**, the **Add**, **Delete**, and **Update** options must be checked, and the **Attributes and Geometry** button selected.
 - d. Under **What features can editors see?**, you must determine if you want field workers to be able to see only the features they create, or all features when using Field Maps (or AGOL).
 - e. Under **What features can editors edit?**, you must determine if you want field workers to be able to edit only the features they create, or all features when using Field Maps (or AGOL).
 - f. Under **What Access to anonymous editors have?**, we recommend limiting this to the **Only add new features** option.
 - g. If you want your field workers to be able to export accumulated data to other formats (Excel, CSV, etc.), check the box under **Export Data**.
 - h. Be sure to save all changes, noting that different parts of the Settings page have their own **Save** buttons.

NOTE: Under some circumstances, it is a good practice to create a [hosted view layer](#) from the editable hosted feature layer and using the hosted view layer to build the web map viewed in Field Maps. We suggest that you consider the potential benefits of this approach, but do not provide the relevant details in this document.

Step 8: Prepare, Publish, and Configure Non-Editable Layers

Most users will wish to prepare a layer showing the plots or polygons within which surveys must be conducted. Visualizing this layer in Field Maps will assist field workers as they navigate through assigned plots or polygons conducting area searches.

If you are using plots as required by the [Pinyon Jay Survey Protocol for Landscape Applications](#), you can start by downloading the appropriate grid layer for your area [here](#). The next steps are to:

- 1) Perform your plot selection exercise.
- 2) Create an attribute for the layer that can be used to indicate the plots selected for surveys.
- 3) Create an attribute showing a unique ID for each selected plot.

Then, the layer can be published to AGOL as a hosted feature layer, as described previously.

A similar process is followed if you are using project-specific survey polygons as required by the [Pinyon Jay Survey Protocol for Project Applications](#).

Once the relevant layer has been published to AGOL, you should uncheck the setting for **Enable editing** on the item's **Settings**, but the **Enable Sync** option must remain checked.

Step 9: Create, Configure, and Share Web Map

Map building in AGOL is done in Map Viewer, which is activated by clicking the **Map** button. If you are unfamiliar with the organization and functionality of the AGOL Map Viewer, we recommend that you review the self-learning material [here](#) before proceeding.

The steps necessary to create a map appropriate for data collection with Field Maps are as follows:

- 1) Add the editable hosted feature layer to the map. For each of its two feature classes (Visits and Sightings), do the following:
 - a. Confirm the **Enable editing** is activated.
 - b. Review and adjust its **Style** as needed.
 - c. Double-check that the attributes and ordering in the **Pop-ups** are configured as previously described.
 - d. Set a display **Filter** if desired. For example, you may wish to ensure that field workers conducting a survey visit to a plot cannot see data previously collected on the plot.
 - e. Explore other map options if / as needed.
- 2) Add your plot or polygon layer to map. Configure as follows:
 - a. Ensure that **Enable editing** is deactivated.
 - b. Deactivating **Pop-Ups** is recommended.
 - c. Enable **Labels** and set a **Label class** expression to display the Plot ID or Polygon ID.
- 3) Add a Basemap. Imagery is recommended for most applications.
- 4) If desired, add the **Location Sharing** layer to the map, with settings appropriate for field workers as described in the Location Sharing documentation.
- 5) **Save** the map with an appropriate name.

- 6) Find the web map you just created in your **Content** window. Click the item name and then the **Sharing** button. Select the **Edit Group Sharing** option and share the map with the field worker group that you created earlier. You will be prompted to “Update Sharing” for the map layers and should accept this option.
- 7) Click on **Settings** button for the map item. Configure **Settings** as follows:
 - a. Ensure that the **Enable offline mode** option is enabled.
 - b. Ensure that the **Use in ArcGIS Field Maps Mobile** option is checked.
 - c. Optionally, create Offline Map Areas to facilitate use of Field Maps in situations where internet connectivity is or may be absent. Alternatively, each field worker can download offline map areas prior to field outings, as described in the [User Guide to Arc GIS Field Maps](#).
 - d. Other Settings options may be configured according to your preference.

Step 10: Final Configuration in Field Maps Web App

In the upper right corner of the AGOL window, click the nine-dot app launcher icon. Find the Field Maps app and open it. You will first see a window showing the web maps you have created that are enabled for Field Maps. Click on the web map you just created. Then do as follows:

- 1) Click on **Forms**. You need to click the expand arrow by the main editable layer to show both the Visits and Sightings feature classes. For each of the feature classes in the editable feature layer in turn, choose to **Convert the Pop-Up** option. This will use the previously configured pop-up as a template for the data collection form that displays in Field Maps. Ensure that all the options associated with the form for each feature class are correct. For the Visits feature layer, click on the Start Time field, and in the **Properties** panel to the right, click the dropdown for **Input Type** and change this to **Date and time**. Do the same for the Stop Time field. After performing all of these steps, Make sure to click the small Save icon (which looks like an old floppy disk) at the upper right after making any changes; it is easy to overlook. If you don't click this icon, none of the settings you changed in this step will be saved.
- 2) The **Geofences** button enables you to define a project area, and alert field workers when they enter or leave the area. It can also be useful as a way to automatically turn Location Sharing on and off without manual toggling by field workers. Depending on the extent and geometry of your project area, geofences can be helpful.
- 3) The **Offline** button provides you with additional options for creating offline **Map Areas**. The **Offline** toggle switch must remain enabled.
- 4) The **App Settings** button provides many settings to fine tune how Field Maps work. Most can be left in their default settings. However, it is critical to ensure that under the **Collection** settings, the toggle for **Show related types** is enabled. If it is not enabled, the preconfigured relationship class between the Visits and Sightings feature classes will not be recognized in Field Maps. Additionally, if you have opted to utilize **Location Sharing**, the **Required** toggle switch must be enabled. Make sure to click the small Save icon at the upper right after making any changes; it is easy to overlook.
- 5) The **Sharing** button provides an alternative location to ensure that your map is shared with the appropriate group(s).

Step 11: Set Up Mobile Devices

A few basic set-up procedures are needed to prepare mobile devices for collecting data in the field using Field Maps. These can be performed centrally by the organization, or individually by each field worker. The steps required to configure devices are described in the [User Guide to ArcGIS Field Maps](#).

Data Management in AGOL: Data collected in Field Maps by multiple users are synched to the AGOL-based hosted feature layer. This Guide does not provide any instructions for using AGOL for data management, visualization, and analysis, but many online resources exist.