



# User Guidance for the Rights-of-Way as Habitat Geospatial Database

Version 2.3

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This document serves as a “how to” manual for interacting with the Rights-of-Way as Habitat Geospatial Database. As additional workflows are developed, this guide will continue to expand with new and updated information. Please check the version you are using to be sure it is up to date. The most recent version is available via the Rights-of-Way as Habitat Working Group website:

<http://rightofway.erc.uic.edu/geospatial-database/>

If you have any questions and/or need support after consulting this document, please email [rowhwg@uic.edu](mailto:rowhwg@uic.edu) or use the “Contact” web form at the Rights-of-Way as Habitat Working Group website: <http://rightofway.erc.uic.edu/about/contact/>

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## OVERVIEW

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The Rights-of-Way as Habitat Working Group (ROWHWG) is a unique collaboration of professionals from across multiple sectors, including gas, electric, rail, and road industries. The group includes biologists, foresters, engineers, environmentalists, lawyers, educators, and other stakeholders interested in supporting habitat on rights-of-way (ROW) and other working landscapes and represents more than 400 organizations from across private industry, government agencies, non-profit organizations, and academia in the United States and Canada. For more information, visit our website at:

<http://rightofway.erc.uic.edu>.

One of the early priorities identified by the ROWHWG was the need for a system that energy and transportation organizations can use to collect data on pollinator habitat managed on ROW and other landscapes across the United States. This system was developed by the Keller Science Action Center at the Field Museum in partnership with the Energy Resources Center at the University of Illinois Chicago (UIC) and with support from a number of beta testing organizations and general feedback from the ROWHWG community.

### Core Purpose of the System

The Rights-of-Way as Habitat Geospatial Database (the Database) serves as a central repository for tracking existing and potential habitat areas and information about managed habitat and habitat restoration projects to further our understanding of the ecological benefits of energy and transportation lands. The Database also integrates the *Pollinator Scorecard* and other field data in order to track habitat quality and supports engagement with resource agencies to help inform future listing decisions under the Endangered Species Act (ESA) or other conservation strategies, including assisting organizations enrolled in the monarch butterfly Candidate Conservation Agreement with Assurances (CCAA) in fulfilling their monitoring and reporting requirements. It aims to facilitate conservation partnerships within and across sectors and works to promote voluntary conservation actions for at-risk species.

The Database was designed around a set of key system requirements, including:

- Capacity to support many organizations
- Ensure data sensitivity and privacy requirements
- Allow for and promote data sharing
- Contain primarily self-maintained datasets
- Support field data collection
- Provide tools for bulk data upload
- Enable public and private reporting
- Have an automated system administration

This system was developed using geospatial software created by Esri. Participating organizations are not required to have their own Esri software licensing to contribute data and participate in this system, since no-cost user accounts and no-cost desktop licensing options are available through UIC. To get started, energy or transportation organizations should first visit the ROWHWG Geospatial Database [webpage](#), where they can complete the *Intake Questionnaire*. Once approved, organizations will be provided with user accounts and access to the Database, including a set of customized objects (maps, tools, and other

services) to securely record pollinator habitat conservation activities. Options exist for sharing datasets with other participating organizations and the public. Users from each organization have visibility to their own groups, their own data, and data shared by other organizations.

## KEY DATABASE TERMS

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The following key terms will help you navigate the Database and the remainder of this document.

**Account Administrator** is the primary contact for administrative decisions relating to the Database.

**Basic User** level includes a free organizational account and ArcGIS Pro licensing to collect, view, and share habitat information in the Database.

**Basic Sharing** allows your organization to share basic identifying and descriptive (view-only) information with all or select Database organizations to support identifying potential future collaborations.

**Conservation Measures** are the specific conservation actions that are taken (e.g., conservation mowing, selective herbicide treatments, native seeding, etc.) on a land area.

**Data Manager(s)** are the Database users that handle your organization's data management, including importing and exporting data.

**Detailed Sharing** allows your organization to share some location, management, and other data with select Database organizations to support collaboration.

**Fieldworker(s)** are the Database users who collect habitat monitoring data using Survey123.

**Fieldworker Group** is an ArcGIS Online user group that provides access to the *Pollinator Scorecard* and a fieldwork-level data accessible via app or ArcGIS Online.

**Intake Questionnaire** is a web survey that establishes the initial Database user accounts and data sharing permissions for your organization.

**Management Area(s)** are land areas managed programmatically (as a group) with similar *Conservation Measure(s)* across several locations.

**Management Group** is an ArcGIS Online user group that provides access to all data fields and records in the Database, as well as options for importing and exporting data, via ArcGIS Online and ArcGIS Pro.

**Pollinator Scorecard** points are locations where monitoring has been performed using one of three assessment tools developed by the ROWHWG (Tier 1, 2, or 3) to assess pollinator habitat quality.

**Premium User** level includes all Basic User level functionality, plus customizable viewing, editing, and reporting options through payment of an annual fee.

**Private Dashboard** is an individualized ArcGIS Online interface that provides each organization key information about the data that has been uploaded to the Database, available to *Premium Users*.

**Programs** are used to apply one or more *Conservation Measure(s)* across *Management Areas* or to define a grouping of similarly managed *Sites*.

**Public Dashboard** is a publicly available ArcGIS Online interface that shares select, anonymized habitat data aggregated at the county level.

**Site(s)** are land areas (e.g., parcels or groups of parcels) where *Conservation Measure(s)* are tracked on an individual basis with location-specific measures.

## GETTING STARTED

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### INTAKE QUESTIONNAIRE

The ROW Database *Intake Questionnaire* is a web survey that establishes initial Database user accounts and data sharing permissions for your organization. The *Intake Questionnaire* is intended to be completed by authorized representatives of energy or transportation organizations that wish to participate in the Database. After submission approval, defined users will gain access to the ArcGIS Online Database interface and ArcGIS Pro licensing. The table below highlights key components and can be used for reference when filling out the *Intake Questionnaire*.

The *Intake Questionnaire* can be accessed here: <https://www.surveymoz.com/s3/5152173/ROW-Database-Intake-Questionnaire>

Define <i>Account Administrator</i> and <i>Data Manager</i> users	See <a href="#">User Accounts</a>
Determine appropriate field collection method for your organization	See <a href="#">Field Data Collection</a> or <a href="#">Appendix 1: Guide to Using Survey123</a>
Assign <i>Basic</i> or <i>Detailed</i> sharing permissions with all Database organizations and/or specific organizations	See <a href="#">Appendix 2: Data Sharing Levels</a>
Review Esri ArcGIS Pro licensing details	See <a href="#">Licensing</a>
Review Data Sharing Agreement	See <a href="#">Data Sharing Agreement</a>

## USER ACCOUNTS

The Database defines three types of user accounts: *Account Administrator*, *Data Manager*, and *Fieldworker*. User types vary in their access to ArcGIS Online groups (i.e., *Management Group* and *Fieldworker Group*) and intended roles. By default, each new user will be assigned a new ArcGIS Online account in the Database with an ArcGIS Pro Desktop license included (for use with the Database only). Users are specified in the *Intake Questionnaire* (see above).

**Account Administrator** - This account holder is the primary contact for account administration decisions. This person has the ability to authorize new users to both the *Fieldwork Group* and *Management Group* and can set up and modify collaborations with other organizations. Only one *Account Administrator* can be assigned.

**Data Manager** - These account holders typically handle your organization's data management, including importing and exporting habitat data. For example, they might be a staff member or an authorized consultant or contractor. Like the *Account Administrator*, *Data Managers* have full access to all data and geospatial tools and have the ability to invite existing ArcGIS Online users to the *Fieldwork Group* (not the *Management Group*). Multiple *Data Managers* can be identified for a single organization, and one person can serve as both the *Account Administrator* and a *Data Manager*.

**Fieldworker** - This account is intended for staff or contractors that plan to use the Database field application, ArcGIS Survey123, to collect *Pollinator Scorecard* monitoring data. *Fieldworkers* can only access the system via mobile field applications or online versions of ArcGIS Survey123. If your field staff already have ArcGIS Online organizational accounts, they can be specified in the *Intake Questionnaire* or invited to the *Fieldworker Group* through ArcGIS Online by an *Account Administrator* or *Data Manager*, after which they will receive a notification in their existing ArcGIS Online account. Alternatively, if field staff do not have existing ArcGIS Online accounts, a single, *Generic Fieldworker* account can be requested for shared use in the *Intake Questionnaire* or the [Esri User License request form](#) on the ROWHWG website.

## DATA SHARING

Habitat data generalized to the county-scale is shared through the [Public Dashboard](#). Additionally, the Database allows organizations to share habitat boundaries, monitoring data, and attributes with other ROW organizations in order to support cross-sector collaboration. To allow for some level of sharing customization with other organizations, the *Intake Questionnaire* allows you to choose from 3 organization-to-organization sharing options including “none,” “basic,” or “detailed” sharing for the following features: *Centerlines*, *Management Areas*, *Sites*, and *Pollinator Scorecard* points.

**Basic Sharing** - The *Basic Sharing* level allows organizations to view features (e.g., habitat boundaries or monitoring points) and basic descriptive information to support collaborations. Granting all or select organizations with privileges to view your *Basic* data will allow those organizations to answer the following types of questions:

- Which energy and transportation organizations manage habitat in a given state or county? Or, in which states or counties does your organization manage habitat?
- How does the organization categorize its managed habitat lands in a given state or county? For example, other user organizations granted *Basic* access can view an overview of the *Site* or *Management Area*, including its name and status (i.e., actively managed, not actively managed, proposed).
- What is the quality of habitat being managed in a given state or county by the organization? This includes general measures of nectar plant and milkweed abundance.

**Detailed Sharing** - The *Detailed Sharing* level expands on the information shared at the *Basic* level by providing access to most habitat and monitoring data fields to further support collaboration among organizations. In addition to answering *Basic* level questions, this level grants all or select user organizations with privileges to view your *Detailed* data. Organizations with *Detailed* permissions can answer the following questions about your data:

- Where does the organization manage habitat? At the *Detailed Sharing* level, other user organizations can view a *Site* or *Management Area* location description (e.g., mile marker) and details about land ownership type (i.e., owned or leased).
- How does the *Site* or *Management Area* look (i.e., any photos taken at monitoring points)?
- What additional habitat data was collected at monitoring points (e.g., invasive species cover, additional habitat resources)?

See [Appendix 2: Data Sharing Levels](#) for additional detail on data attributes by sharing level. User organizations with privileges to view your *Basic* or *Detailed* data will be able to do so in ArcGIS Pro, or via the *Management Group* WebMap in ArcGIS Online. *Premium Users* can also view shared data via the *Private Dashboard* or Data Management Web Application in ArcGIS Online.

*Basic* or *Detailed* sharing permissions can be applied using a blanket approach, where the same access is given to all user organizations in the Database. Additionally, your organization can select specific user organizations by name to share either *Basic* or *Detailed* level data. Data sharing is initially set when establishing new organizations via the *Intake Questionnaire*. *Account Administrators* and *Data Managers* can modify these settings at any time by editing the “Collaborations” table via the *REST\_Admin* REST endpoint using ArcGIS Pro. For information on how to add REST endpoints to ArcGIS Pro, see [Working with Management Areas](#), or [Working with Sites](#) and the step for “Add Online Data to Map.” Users can then open and edit the “Collaborations” table as any other GIS data layers. Auto-fill domain (drop-down) exist for fields with a categorical input to facilitate adding and modifying records.



In addition to *Basic* and *Detailed* sharing, an optional Public Data REST service is available to share a subset of *Site*, *Management Area*, and *Pollinator Scorecard* feature data outside the Database via URL. See [Opt-In REST Public Data](#) for more information.

## ORGANIZATIONAL USER LEVELS

Energy or transportation organizations can register as either *Basic Users* or *Premium Users*. Enrollment at the *Premium* level supports UIC's ongoing management of the Database and the development of future functionality, as well as offering additional user features and added convenience.

**Basic User (Free)** level includes:

- Free organizational account with *Account Administrator*, *Data Manager(s)*, and *Fieldworker* roles
- Anonymous county-level data sharing on the *Public Dashboard*
- Ability to view and share more detailed data with other ROW organizations
- Access to Survey123 digital app to collect monitoring data in the field and automatically sync it with the Database
- Complimentary ArcGIS Pro license(s) (if needed) to perform bulk data uploads to Database
- Editing interface through ArcGIS Online to review and fix data errors

**Premium User (Annual Fee)** level requires an annual subscription. In addition to all the functionality of a *Basic User*, *Premium Users* gain access to:

- A customized *Private Dashboard* to review key information about your organization's data, including a suite of dashboard analytics, popup survey photos, program statistics, and an easy interface for reviewing detailed validation errors
- The Data Management Web Application to quickly view and edit data errors
- An easy-to-use query and reporting tool that pulls and filters monitoring data, runs calculations, and creates a summary report consistent with the annual compliance reporting requirements for the monarch butterfly Candidate Conservation Agreement with Assurances (CCAA)

View [Appendix 3: Database User Levels](#) for more information, including the current user fee structure to enroll at the *Premium User* level.

All new Database organizations receive a 60-day *Premium* trial period, after which *Premium* content and tools can be previewed through the "DEMO" *Fieldworker* and *Management Groups* in ArcGIS Online. Contact UIC at [rowhwg@uic.edu](mailto:rowhwg@uic.edu) to request more information about registering your organization as a *Premium User*.

## INTRODUCTION TO DATABASE INTERFACES

Below is a description of the Database's key functionalities across several interfaces. This section briefly introduces each of these interfaces to help you navigate the remaining document.

**Web Interface** - The Database's web interface was designed to facilitate user organizations' interactions with the Database and communicate the value of pollinator habitat on ROWs and other energy and transportation lands to the public. The web interface contains the latest documents and resources to guide current and prospective users through the process of enrolling into the Database, collecting and uploading habitat data, and processing that information in a meaningful way. See [Appendix 4: Web Interface](#) for a more detailed description of key functionality and content. Access the web interface directly here:

<http://rightofway.erc.uic.edu/geospatial-database/>

**ArcGIS Pro** - ArcGIS Pro is a geographic information systems (GIS) desktop software developed by Esri. The Database relies on this software for performing most GIS data management actions through a shared ArcGIS Pro project file (see [Accessing and Editing Data in ArcGIS Pro](#)). Your organization is not required to have its own ArcGIS Pro license to contribute data or use the system, since no-cost user accounts and desktop licensing options are available.<sup>1</sup> By default, any new user account created for the Database has an associated ArcGIS Pro license.

**ArcGIS Online** - The Database uses ArcGIS Online as the user interface for managing user credentials and permission groups, viewing and editing data, and distributing map and tools services, while the backend data management system is housed on virtual machines hosted by the UIC. The *Account Administrator* account is authorized to "invite" individual users to the *Management* and *Fieldworker Groups* (see [Administrative Functions](#)). Similarly, *Data Manager* account(s) are authorized to invite additional users to the *Fieldworker Group*. In order to access your organization's data via ArcGIS Pro, your ArcGIS Online account needs to 1) have access to the *Management Group* for your organization and 2) be authorized with an appropriate ArcGIS Pro license. Users with an existing ArcGIS Online organizational account and ArcGIS Pro license (e.g., from an existing corporate or institutional Esri account) can also access data via ArcGIS Pro provided that they have been invited into the *Management Group* or *Fieldworker Group* and they have accepted the invitation.

**Mobile Applications** - Your organization may wish to collect habitat data using a free mobile application in the field (i.e., ArcGIS Survey123), which standardizes the collection process and streamlines data collection. This app can be downloaded to your phone, tablet, or other device to be used in the field and have offline functionality if working outside of a reliable internet connection. ArcGIS Survey123 allows users to easily collect *Pollinator Scorecard* points that are automatically linked to the Database (see [Appendix 1: Guide to Using Survey 123](#)).

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<sup>1</sup> Link to request an ArcGIS Pro license: <https://tinyurl.com/y9ppxbh6>

## LICENSING

UIC is able to provide complimentary ArcGIS Pro licenses and permissions to user organizations for the sole purpose of data capture and contribution to the Database. Using these credentials for other purposes is not authorized. By default, all accounts associated with new user organizations include licensing for ArcGIS Pro.

Please visit the following website to request additional user accounts or ArcGIS Pro licensing for additional users: <https://tinyurl.com/y9ppxbh6>

After agreeing to the terms and conditions, an ArcGIS Pro license will be added to the new user account associated with the Database. The ArcGIS Pro software itself can then be downloaded via the following Esri website as a “21-day” trial:

<https://www.Esri.com/en-us/arcgis/products/arcgis-pro/trial>

Note that in the process of downloading and installing the software, **you will be required to create a (temporary) ArcGIS Online account** using a valid email address. Once you have downloaded the ArcGIS Pro software, you will then be able to log in using your ROWHWG account (provided). Since your ROWHWG named user account will include ArcGIS Pro licensing, the trial period will not lapse after 21-days so long as you are logged in with your ROWHWG credentials. Once ArcGIS Pro is installed, you can run software updates from the software application, so you always have access to the latest version. The Database currently supports ArcGIS Pro version 2.4.1 or newer.

## GETTING SET-UP IN ARCGIS PRO

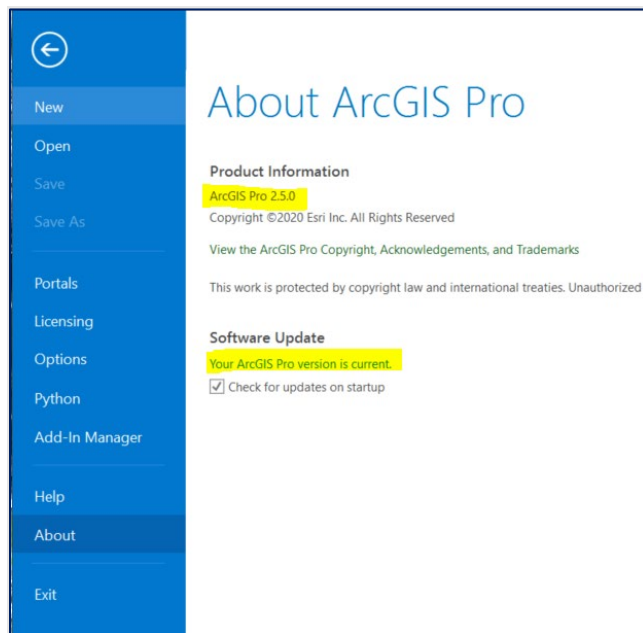
This section describes how to access the Database using ArcGIS Pro. If you are an *Account Administrator* or *Data Manager*, begin by opening ArcGIS Pro (see [Licensing](#) for software download instructions) and logging in with your ArcGIS Online account associated with the Database. If you are using an existing ArcGIS Online organizational account with an ArcGIS Pro license (e.g., from an existing corporate or institutional Esri account), make sure you have been invited to your organization’s *Management Group* and have accepted the invitation before moving onto the next step. For more information about adding users and accepting ArcGIS Online invitations, see [Inviting Additional Users](#).

### Loading the ROW Tools Project

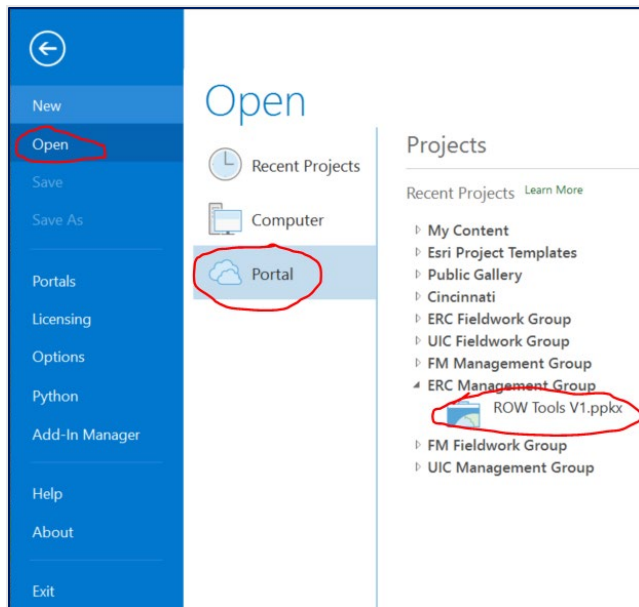
A set of tools is provided to assist you (i.e., the *Account Administrator* or *Data Manager*) in a variety of data management tasks. In order to access these tools, you will first need to open the “ROW Tools” project in ArcGIS Pro. Begin by selecting “Settings” (bottom-left of screen).



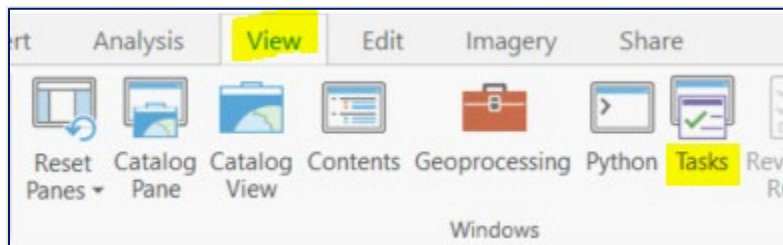
In the “About ArcGIS Pro” window, make sure that you are using version 2.4.1 or newer, since there are known bugs in earlier versions that affect some of the tools. On this page, click the “Download Now” button to download a software update (if needed).



Next, on the left-hand side, go to “Open,” click on “Portal,” and select the arrow next to your organization’s *Management Group* name. Select “ROW Tools V1.ppkx” to open the ROW Tools project document.



When the project opens for the first time, you will see an empty map. To display the Tasks and Workflows pane (if not already open), click on “View” and select “Tasks” (as shown below).



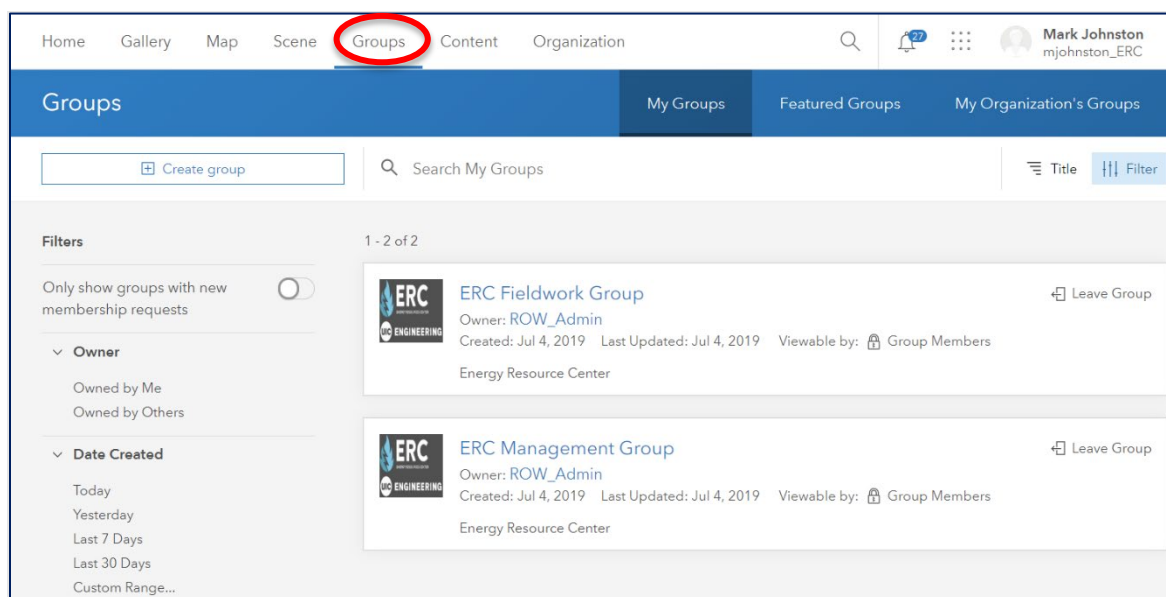
From here, you will be able to run tools for importing and managing your data in the Database (see [Importing Data](#), [Working with Management Areas](#), [Working with Sites](#)).

## ADMINISTRATIVE FUNCTIONS

Individual Database users are assigned access to the *Fieldworker Group* or *Management Group* based on their user type (see descriptions below) in order to streamline field collection and safeguard organizational data. User assignments are initially defined in the *Intake Questionnaire*, after which *Account Administrators* and, to a lesser degree, *Data Managers* can “invite” additional users through ArcGIS Online (see [Inviting Additional Users](#)).

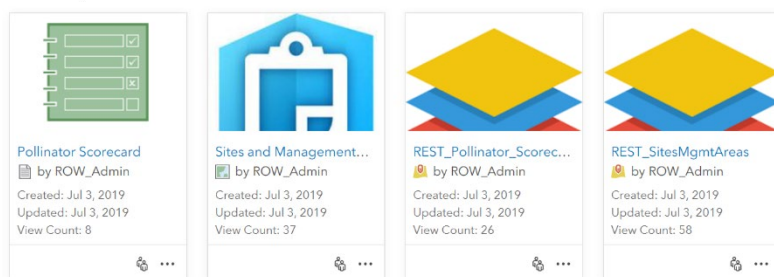
## MANAGING GROUPS AND MEMBERS

Any approved user can access their group(s) by logging into the ROWHWG ArcGIS Online website and clicking on the “Groups” menu. *Account Administrators* and *Data Managers* have access to a *Management Group* for their organization and, along with *Fieldworkers*, also have access to a *Fieldworker Group*. Below is an example of a *Management Group* and *Fieldworker Group* for the ERC organization.

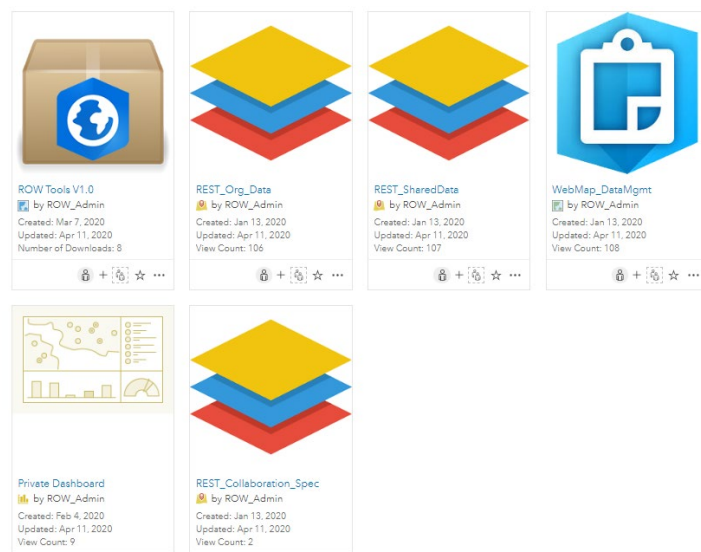


**The Fieldworker Group** provides access to the *Pollinator Scorecard* form and a fieldwork-level WebMap, with only the essential fields needed by *Fieldworkers*. The *Pollinator Scorecard* is accessed via the Survey123 application, downloaded for free on various mobile platforms, and allows users to enter detailed habitat information using a GPS-enabled form. The “Sites and Management Areas” WebMap can either be opened in ArcGIS Online or accessed on mobile devices via the ArcGIS Field Maps application for online or offline use. This application is supported by the REST-endpoints, which should not be interacted with directly. View [Field Data Collection](#) for directions on using the Survey123 application and viewing boundary data in Field Maps.

## Recently added content

[View All Group Content](#)


**The Management Group** provides access to all data fields and records in the Database via an administrative-level WebMap. This group also contains an ArcGIS Pro project called “ROW Tools,” which is used primarily for importing data into the online Database and for managing *Conservation Measures* and *Programs*. The REST-endpoints (e.g., REST\_Org\_Data, REST\_SharedData) are direct links to the data on the server and can be used to access your organization’s data in ArcGIS Pro (see [Accessing and Editing Data in ArcGIS Pro](#)). There are additional REST-endpoints for configuration and dashboard analytics. For *Premium Users*, the *Management Group* also contains access to a *Private Dashboard* for performing data analytics and a Data Management Web Application for data review. *Account Administrators* have the ability to edit and create new content in the *Management Group*. See example content below.

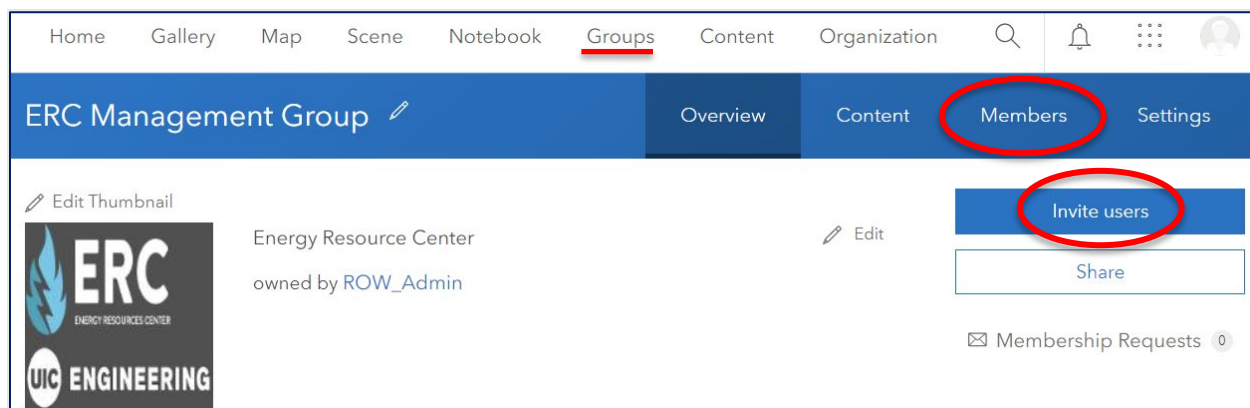


## INVITING ADDITIONAL USERS

If you are logged in as the *Account Administrator*, you can “invite” users with existing ArcGIS Online organizational accounts into the *Management Group* and/or the *Fieldwork Group*. Similarly, as a *Data Manager*, you can invite users with existing ArcGIS Online organizational accounts into the *Fieldwork*

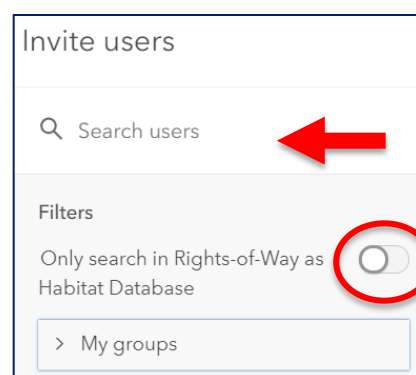


*Group.* Click on the “Groups” menu and select the group where you want to invite new users. Once inside the group, you can view existing members using the “Members” tab and add new members using the “Invite users” button as shown in the example below.



After clicking on the “Invite users” button, you need to turn off the slider under “Filters” that only searches for members inside the Database (see right), and then enter the ArcGIS Online username that you want to add. **Important note:** the account you are adding must be an ArcGIS Online organizational account (personal accounts are not recognized).

To accept an invitation, new users must first log into their own organization's ArcGIS Online system, where they will see a bell icon on the Home screen as shown below (circled in red). After clicking on the bell icon, they can follow the link to join the *Fieldwork Group*.



If you would like to invite a new user who does not have an existing ArcGIS Online organizational account, you can complete the [Esri User License request form](#) on the ROWHWG website.

## DATA ORGANIZATION

The Database captures information about where and how potential and existing pollinator habitat is managed. Habitat quality is approximated on managed lands using *Pollinator Scorecard* monitoring data. The following sections summarize how the Database defines different managed land area types in order to effectively track conservation activities and habitat data for your organization. Additionally, step-by-



step guidance is provided for establishing boundaries and land management information in the Database to prepare your organization for habitat data collection.

## SITES AND MANAGEMENT AREAS

An important determination your organization will need to make is whether land areas managed for habitat should be entered as *Sites*, *Management Areas*, or a combination of both. Both *Sites* and *Management Areas* allow organizations to track the following attributes associated with management activities that promote or protect habitat:

- Type of *Conservation Measure* (e.g., seeding and planting, conservation mowing, etc.)
- Implementation organization (i.e., the organization responsible for implementing the *Conservation Measure(s)*)
- Implementation status of *Conservation Measure(s)* (i.e., implemented, not yet implemented)
- Implementation frequency of *Conservation Measure(s)* (i.e., one-time occurrence, more than once a year, annually, once every 2 years, once every 3-5 years, once every 6-10 years)
- Activity start date
- Activity end date
- Notes

**Sites** are land areas (e.g., parcel or groups of parcels) for which *Conservation Measures* are tracked individually. They allow for the most detailed, location-specific tracking of *Conservation Measures* (e.g., date when a particular parcel or group of parcels was seeded). In this case, the specifics of each management activity are recorded for each location individually. **Note:** *Sites* uniquely allow organizations to record the proportion of the land area on which a *Conservation Measure* was implemented (e.g., conservation mowing occurred on 30% of the *Site*).

**Management Areas** are land areas for which *Conservation Measures* are tracked at a programmatic scale. They allow for tracking conservation actions across multiple land areas (e.g., conservation mowing occurred across managed lands at the end of the 2020 growing season), and thus do not allow for detailed, site-specific information. When working with *Management Areas*, you must first define a *Program*, which is associated with one or more *Conservation Measures*. This *Program* is then applied to a selected set of *Management Areas*, so that all land areas in a given *Program* share the same *Conservation Measures* (see [Conservation Measures and Programs](#)).

[Appendix 5: Sites and Management Areas](#) provides additional guidance on how to determine whether your organization is best suited to track information using *Sites*, *Management Areas*, or a combination of both.

## CONSERVATION MEASURES AND PROGRAMS

*Conservation Measures*, or vegetation management activities that help to promote or protect habitat areas, can be tracked in the Database for *Sites* or *Management Areas*. These include: seeding and planting to restore or create habitat, conservation mowing to enhance floral resource habitat, targeted herbicide treatment of undesirable vegetation, suitable habitat idle lands or set-asides, brush removal to

promote suitable habitat, controlled grazing to promote suitable habitat, and prescribed fire to promote suitable habitat.

There are two ways that these management activities can be recorded in the Database. First, one or more *Conservation Measures* can be directly associated with a single land area (i.e., a *Site*). Alternatively, one or more *Conservation Measures* can be assigned to a *Program*, which is then applied programmatically across several land areas (i.e., *Management Areas*).

One primary benefit of recording *Conservation Measures* by *Sites* is that individual measures are assigned to a single land area so that site-specific information can be recorded (e.g., date when a *Site* was seeded). On the other hand, the benefit of recording *Conservation Measures* through *Programs* and *Management Areas* is that these records can be associated with many land areas simultaneously over a general period of time (e.g., conservation mowing occurred in 2020). See [Working with Sites](#).

Using *Programs* is the only way to specify *Conservation Measures* for *Management Areas*. Multiple *Management Areas* can be designated under one *Program* if they share the same management properties (e.g., type, frequency, etc. of conservation actions). These *Programs* also serve as “sampling groups,” so that *Pollinator Scorecard* points across similar *Management Areas* in a *Program* can be evaluated together. See [Working with Management Areas](#).

Similarly, *Programs* can be used to define “sampling groups” for *Sites* as well. In this case, *Programs* do not allow for information on *Conservation Measures* since this is defined individually for each *Site*. A *Program* can be assigned to a single *Site* (unique) or assigned to a cluster of *Sites* (grouped) if you wish to evaluate *Pollinator Scorecard* points across a set of similarly managed *Sites*.

For example, scenarios of how *Programs* can be used with *Sites* or *Management Areas*, see the [Appendix 5: Sites and Management Areas](#).

## POLLINATOR SCORECARD

*Pollinator Scorecard* points are locations where an assessment has been performed at one of three monitoring levels (Tier 1, 2, or 3) to assess pollinator habitat quality on managed lands. The attribute fields in the *Pollinator Scorecard* point feature class are based on the ROWHWG Pollinator Scorecard. The ROWHWG defines pollinator habitat as areas containing native flowering plants, host plants, and nesting sites, throughout the growing season. See the *Pollinator Scorecard* User’s Guide (available at <http://rightofway.erc.uic.edu/pollinator-habitat-scorecard>) for more details.

The *Pollinator Scorecard* is designed with user flexibility in mind, understanding that ROW managers may have varying objectives for monitoring pollinator habitat and differing levels of access to resources and expertise for conducting assessments. Therefore, the *Pollinator Scorecard* was designed with a multi-tiered approach to support all ROW managers in habitat evaluation.

- **Tier 1** surveys are intended for anyone with minimal training and provide a “Yes/No” habitat determination.
- **Tier 2** surveys are intended for users with some training and provide a qualitative rating of pollinator habitat and management score.

- **Tier 3** surveys are intended for more advanced users and provide a qualitative rating of pollinator habitat including a list of species present and metrics per species as well as a management score.

*Pollinator Scorecard* assessments can be performed at either a single location or across multiple land areas that share the same or similar *Conservation Measures*. To assist you with tracking and evaluation, all *Pollinator Scorecard* points are automatically assigned to the *Program* associated with the *Site* or *Management Area* they overlap with (if any) during the nightly Database validation checks. While many points can be assigned to the same *Program*, each *Program* is only associated with one of the following: a single (unique) *Site*, multiple (grouped) *Sites*, or one or more *Management Areas*.

As previously mentioned, *Programs* are also used to identify a shared set of *Conservation Measures* for *Management Areas* only, since *Conservation Measures* are individually defined at the *Site* level. Thus, for *Sites*, *Programs* are used solely for assigning *Pollinator Scorecard* points to either a single location (unique *Site*) or multiple areas (grouped *Sites*) based on how you want to track and evaluate the monitoring data. Grouping multiple *Sites* under a single *Program*, allows you to track their *Pollinator Scorecard* points together, even if the specific details of the *Conservation Measures* (e.g., the name of the organization that implemented the activity) are different or are managed independently.

*Pollinator Scorecard* points can be entered into the Database through [Field Data Collection](#) or bulk upload (see [Importing Data](#)).

## DATA MANAGEMENT

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### DASHBOARDS

Data contributed to the Database are summarized and displayed in a *Public Dashboard* (available on the ROWHWG website) and a *Private Dashboard* (available only to *Premium Users* for their internal use).

#### Public Dashboard

The *Public Dashboard* aggregates data at the county and state level to provide summary reporting statistics without providing specific geographic locations or attribute information, such as organization name. The shared dashboard is available through the Database [web interface](#). Summarized data layers show the collective impact of habitat managed by ROW organizations based on data currently captured in the Database. The dashboard also helps to drive goal setting across the ROWHWG. The *Public Dashboard* can be accessed directly via the following link: <https://arcg.is/110qO9>. For more detailed information about the shared content, see [Appendix 6: Public Dashboard](#).

#### Private Dashboard

Individualized *Private Dashboards* can be made available to each user organization via ArcGIS Online and provide key information about the data you have uploaded to the Database, including feature counts, acreage totals by *Program*, habitat ratings, and validation issues by

feature. The *Private Dashboard* can assist you with tracking, querying, and displaying detailed data for internal metrics. **Note:** *Private Dashboards* are only accessible to members of your *Management Group* if your organization is a paid *Premium User* (see [Organizational User Levels](#)). However, an example *Private Dashboard* can be previewed through the “DEMO” *Management Group* in ArcGIS Online. For more detailed information, see [Appendix 7: Private Dashboard](#).

## FIELD DATA COLLECTION

Importing *Pollinator Scorecard* data into the Database can be significantly streamlined through the use of ArcGIS Survey123, a free mobile application available from Esri. You can access the ROWHWG *Pollinator Scorecard* in Survey123 via phone, tablet, or desktop. This is a slightly simplified version of the paper/PDF format of the ROWHWG *Pollinator Scorecard*, with the added benefit that *Pollinator Scorecard* data are automatically uploaded into the Database.

In addition, *Site*, *Management Area*, and *Pollinator Scorecard* boundary data can be viewed by phone and/or tablet in the field through ArcGIS Field Maps.

### Using the Pollinator Scorecard (in Survey123)

On your phone and/or tablet, install and open the Survey123 application using your preferred mobile application store. Sign in and download the *Pollinator Scorecard* survey in your organization’s *Fieldwork Group* folder.

When you are ready to perform a field assessment, click “Collect” to start a new survey and capture relevant pollinator habitat data. The screenshots below show examples of the field collection form. Fields with a red asterisk (\*) are required. After entering some basic site information, you will be prompted to select your survey tier. Depending on the tier selected, the relevant form fields will appear to correspond to Tier 1, 2, or 3. Sections include: Plot Information (for details about the plot including photos), Habitat Attributes (for details about the habitat), Pollinator Score (for Tiers 2 and 3), Management (for Tiers 2 and 3, to note threats and opportunities), and Notes. Click the check mark at the bottom to submit.

**DEMO Pollinator Scorecard**

**Monitoring Type \***  
Please select the monitoring type.

☐ Baseline assessment  
☐ Post-activity assessment

**Geographic Region \***  
Please select the geographic region of your survey.  
**Western/southern states include:** AL, AK, AZ, AR, CA, CO, FL, GA, HI, ID, LA, MS, MT, NV, NM, NC, OK, OR, SC, TN, TX, UT, WA, WY. **Midwest/Eastern states include:** CT, DE, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, NE, ND, NH, NJ, NY, OH, PA, RI, SD, VA, VT, WI, WV.

☐ Western / Southern U.S.  
☐ Midwest / Eastern U.S.

**Survey Tier \***  
Please select the assessment tier you are using. The selected tier will determine what data fields are visible/required.

☐ Tier 1: Basic  
☒ Tier 2: Qualitative  
☐ Tier 3: Detailed

**Plot Information**

**Plot Number \***  
A unique identifier for the plot.

**Collect the GPS Coordinates of Your Plot \***

**Plot Location \***  
The coordinates of the plot and/or sufficient information to re-identify the plot in subsequent visits.

**Plot Description \***  
A general description of the plot (e.g., ROW type, off-ROW or facility, leased vs. owned, etc.).

**Plot Photos**

**Pollinators Observed**  
Check for any pollinators observed while surveying the plot. Pollinators need not be located within the plot to be counted.

☐ Honey bees  
☐ Other bees  
☐ Monarch butterflies  
☐ Other butterflies  
☐ Beetles on flowers  
☐ Wasps on flowers  
☐ Moths  
☐ Flies on flowers  
☐ Other (describe)

**Pollinator Score**

**Total Score:**  
35

**Habitat Quality Rating:**  
Basic Habitat Quality

When submitting, you will have the option to “Send Now,” “Continue this survey,” or “Save in Outbox” (e.g., if there is no internet access) in which case a copy is saved in the app. If you choose the “Save in Outbox” option, click “Outbox” to edit and/or send the surveys once you are ready or have internet access. Once surveys are sent, click “Inbox” to see submitted surveys, edit them, or copy the information into a new blank survey. Submitted surveys will automatically populate as *Pollinator Scorecard* points for your organization in the Database. If they occur within a *Site* or *Management Area* that has an associated *Program*, they will also be linked to that *Program* for future tracking and evaluation.

**Pollinator Scorecard Survey V2.1**

**Demonstration Organization**  
Owner: ROW\_Admin  
Created: 9/13/19 12:30 PM  
Modified: 8/31/20 12:25 PM  
Demonstration Organization pollinator scorecard Survey123 Form

**Collect**  
**Inbox**  
**Outbox** 1

**Pollinators Observed**  
Check for any pollinators observed while surveying the plot. Pollinators need not be located within the plot to be counted.

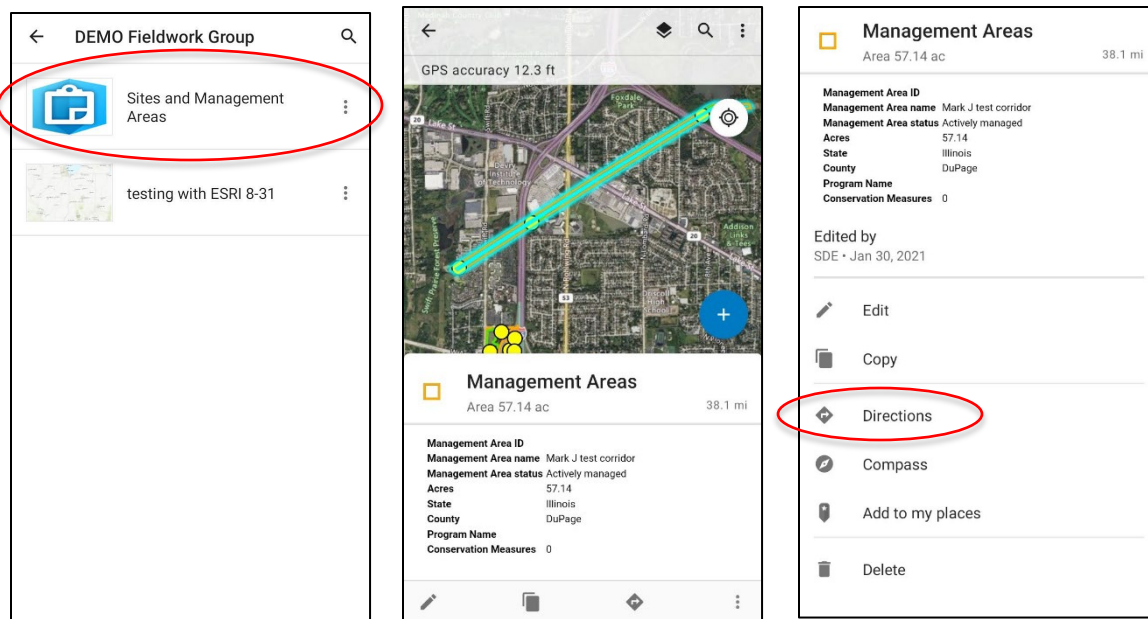
**Survey Completed**  
Your device is online.

**Send now**  
**Continue this survey**  
**Save in Outbox**

See [Appendix 1: Guide to Using Survey123](#) for step-by-step instructions on how to download and collect data using Survey123. See also the ROWHWG *Pollinator Scorecard* User’s Guide (available at <http://rightofway.erc.uic.edu/pollinator-habitat-scorecard>) for details on completing the field assessment form itself.

## Viewing Boundaries in Field Maps

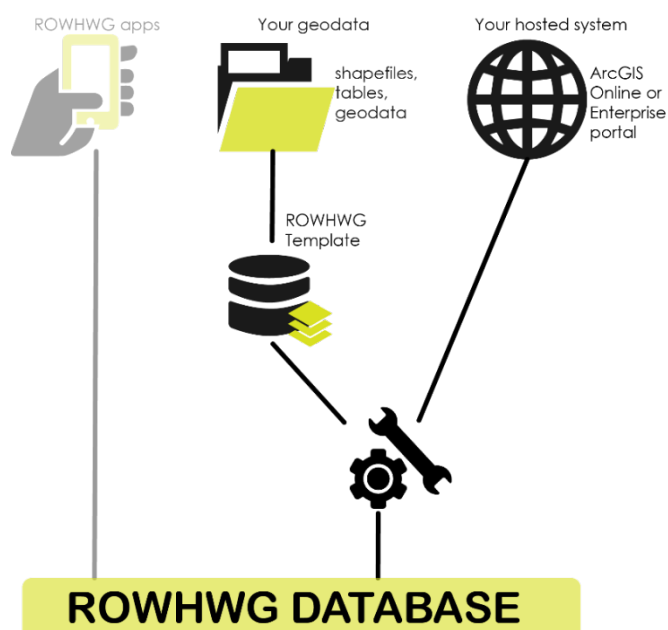
To view *Site*, *Management Area*, and *Pollinator Scorecard* boundary data, install ArcGIS Field Maps onto your phone and/or tablet using your preferred mobile application store. Sign in using your ArcGIS Online login credentials and open your organization's *Fieldwork Group*. Open the map called "Sites and Management Areas." Click on the *Site*, *Management Area*, or *Pollinator Scorecard* point to view additional information (e.g., name, status, acres, Program, Conservation Measures) and open navigation to that location (in Google Maps).



## IMPORTING DATA

If your organization uses the Survey123 (for *Pollinator Scorecard* points), then your data is automatically submitted to the Database (although you may need to manually “sync” data on your mobile device(s) if used offline).

If you have geospatial data from other sources (such as shapefiles, a file geodatabase, or other digital applications), you can bulk import these data into the Database using the Template Geodatabase and ArcGIS Pro, as described in this section.



### Data Preparation

A set of tools is provided to assist you (i.e., the *Account Administrator* or *Data Manager*) in preparing and importing your organization’s data into the Database. In order to access these tools, open the ROW Tools project in ArcGIS Pro (see [Loading the ROW Tools Project](#)).

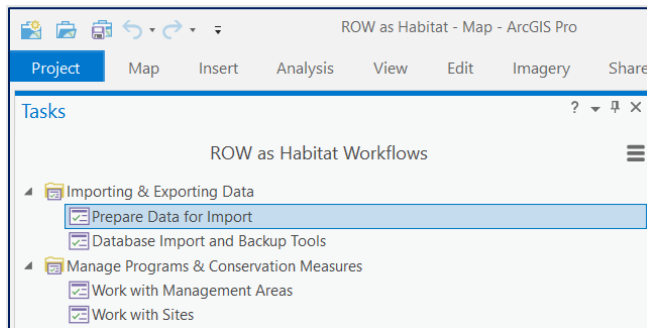
Prior to bulk importing data, you must ensure that your data conform to the ROW Database Schema. This workflow loads your data into a downloaded “staging” Template Geodatabase that has the latest ROW Database Schema. This process may include matching attribute fields, so that attribute information from the original data source can be aligned with attribute fields in the ROW Database Schema. **Important notes:**

- If your data is already loaded into the Template Geodatabase and includes all of the provided feature classes (even if empty), you can skip this section and go to the [Download a database backup](#) section.
- In determining how best to match up your data fields to the ROW Database Schema, please refer to the [Schema Guidance](#) and ROW Database Schema<sup>2</sup> (in Microsoft Excel), which includes detailed information about all fields in the Database.
- Do not include spaces or periods in the names of the files you plan to upload to the database, and do not have a number at the beginning of your files’ names, or else you will not be able to upload your file to the database. Replace any spaces with underscores.

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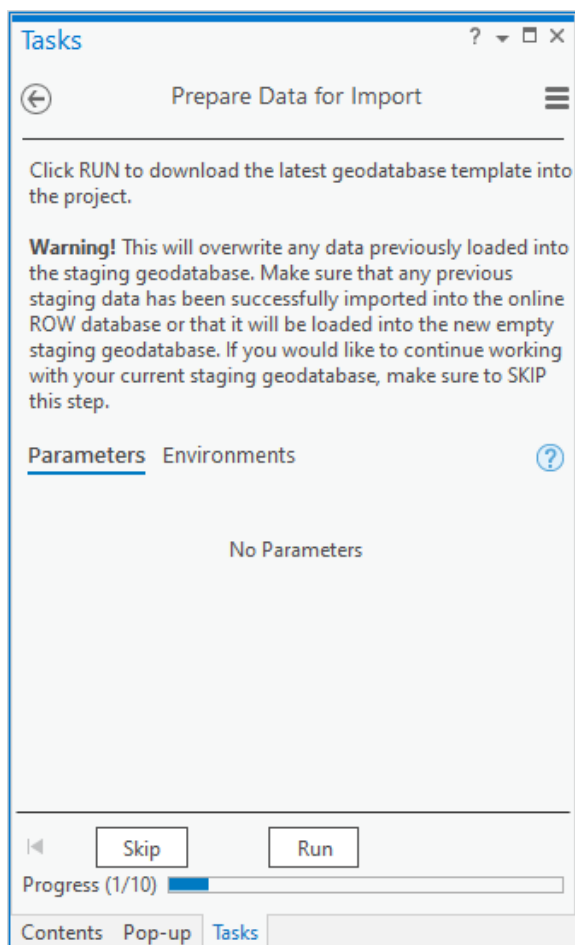
<sup>2</sup> Available for download from the Database [web interface](#) under “Downloads.”

With “ROW as Habitat Workflows” visible in the Tasks pane, expand the workflow folder titled “Importing & Exporting Data” and then double click on “Prepare Data for Import” to show all of the steps, which are described below.



**Step 1: Download the Latest Template.** This step downloads a copy of the latest ROW Database Schema that you will use for preparing your data for import. If you have already started the process of pre-loading your data into the Template Geodatabase, you should skip this step because it will overwrite the staging geodatabase with a fresh copy of the Template Geodatabase.





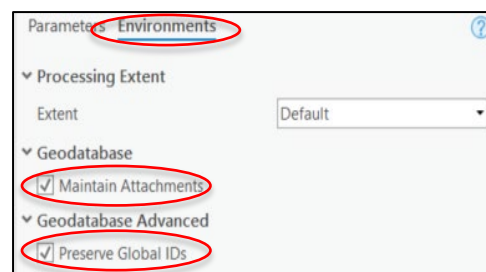
**Step 2-9: Adding Features and Tables to the Staging Database.** This figure shows the tool fields for adding feature classes and tables to the Template Geodatabase. Select an “Input Dataset” with the fields you want to match to the Template Geodatabase<sup>3</sup>. The target dataset in each step defaults to the step’s respective staging database layer or table.

- In the panel, select the **Input Dataset** that contains your data (e.g., a shapefile, a feature class, or table). This example uses a feature class called “Management Area” from a file geodatabase.
- Next, the **Target Dataset** should be set to the staging template layer you are importing, in this case “Management Area\_Staging.”
- Ideally, the data fields in your data source are the same fields provided in the Template Geodatabase schema and thus should automatically match. However, if the data fields in your data source do not exactly match the Template Geodatabase, then you will need to set the **Schema Type** to “Use the Field Map to reconcile schema differences.”
- Select an unmatched field on the left (e.g., “OwnerType” highlighted in red). On the right-hand side, click the “Source” tab and “Add New Source” and scroll down the list to select the appropriate matching field from your data source (e.g., Owner). Alternatively, if you do not have a matching field, you can remove the field in red by clicking on the red “X” that appears when hovering over the field. For your convenience, internal database fields like “ValidationLevel” have already been removed in default settings.

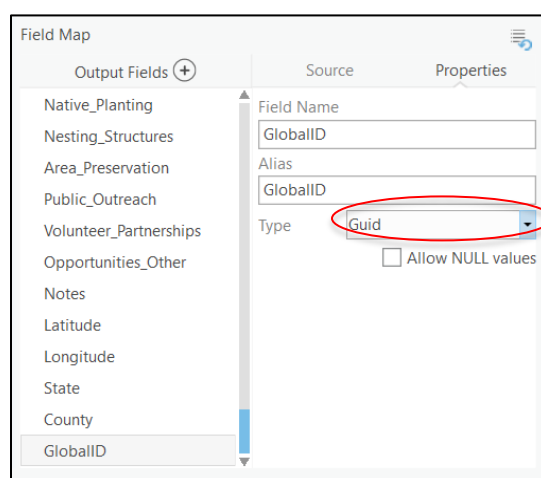
<sup>3</sup> For detailed information on all fields in the template, refer to the Schema Guidance document on the Database [web interface](#) under “Downloads.”

### Important notes:

- For data that uses a Global ID field for related tables and attachments (e.g., *Sites Conservation Measures*, Plot Photos table), you may need to make sure that the options to “Maintain Attachments” and “Preserve Global IDs” are selected. At the top of the Tool window, Select the “Environments” tab and make sure that the “Maintain Attachments” and the “Preserve Global IDs” fields are checked.



- For all data with a Global ID field, you may need to make sure that the property type has been changed from “GlobalID” to “Guid” to ensure that the tool runs successfully. Under the “Output Fields” column, select the “GlobalID” field. On the right-hand side, select the “Properties” tab. Change the Type field from GlobalID to Guid.



- When importing *Management Areas* and *Sites*, consider matching additional data to the “Notes” field such as land management, or best management practices that might be useful for grouping features into *Programs* later (see [Working with Management Areas](#)).
- If you encounter a failure, review the resulting error message. Usually, errors are due to incompatible field types. Remove or modify the data source and try “Run” again.
- Shapefile field names are limited to 10 characters, so you may want to avoid using this data format for capturing data in the future as it may truncate your fieldnames if originally converted from a geodatabase.

**Step 10: Save to new location for import.** This step provides you an opportunity to save a local copy of the staging geodatabase to a known location. Be sure to save the file into a location where you can easily find it for the import process in the next section. **Important note:** Make sure to include the (.GDB) file extension in the file name.

## Download a Database Backup

If your organization has any existing data in the Database, it is strongly recommended that you make a backup of your data as outlined below.

With the ArcGIS Pro project loaded, and “ROW as Habitat Workflows” visible in the Tasks pane, expand the workflow folder titled “Importing & Exporting Data” and then double click on “Database Import and Backup Tools” to show all of the steps.

**Step 1 (optional): Add Online Data to Map.** This optional step provides instructions on adding your online data to the map to see what data you will be exporting out to a local backup copy.

**Step 2: Backup Your Online Data.** The figure below shows the tool fields for saving a local backup copy of your online data.

- Select your **Organization ID** from the dropdown list. There should only be one option unless you are part of more than one subsidiary, or you are a contractor working for more than one organization.
- Provide a name for your **Output Dataset** that will serve as your backup. **Important note:** Be sure to include the (.GDB) file extension in the file name.

Confirm your Organization ID and select an Output Dataset location and name to back up all features from your organization's data in the online system. The database filename must include the ".gdb" file extension.

Parameters Environments

Organization ID  
ERC

Output Dataset  
ROW\_Habitat\_Backup.gdb

## Review and Import Your Data

This section continues from the one above, beginning with Step 3 from “Database Import and Backup Tools” in “ROW as Habitat Workflows.”

**Step 3 (optional): Preview Your Planned Import.** This step creates a local copy of all of the data that will be included in the Database after the import is complete. The purpose of this optional step is to provide you an opportunity to review how your data will import and merge with existing data before running the actual import. If this is your first data import to the Database, you can skip this step. **Important note:** the “preview” step and “import” step (Step 4) are identical, except that “preview” saves the output locally, while the “import” step adds the data to the online Database.

The figure below shows the tool fields for creating and saving a local copy of the import results.

- Select your **Organization ID** from the dropdown list. There should only be one option unless you are part of more than one subsidiary, or you are a contractor working for more than one organization.
- For the **Input Dataset**, locate the database you plan to import (e.g., the “staging database” you saved if you followed [Data Preparation](#) above).
- Provide a name and location for your local **Output Dataset** that will serve as a preview geodatabase for review.
- The Input Dataset and Output Dataset names should not contain spaces or periods in any part of the name (except when denoting the file extension) and the file name should not begin with a number.
- There are two **Import Options**: (1) append or (2) purge and replace. If you have existing data in the Database, you can use the **Append** option to add new records to the existing data, or you can use the **Purge and Replace** option to first delete all of your existing records from the Database and then replace it with all of the records in your Input Dataset.
- Using the **Matching Record Option**, you can either: (1) **Update** any existing records in the Database with new matching records (including geometry changes) or (2) **Skip** matching records, and the existing records will be kept unchanged. For this setting to have any effect, the Feature Class/Table you are importing must have populated ID Field records (see table to the right). In addition, you must have the “Append” option selected as the “Import Option” setting above.
- **Important note:** If you are importing data for first time and you would like to edit data in the Database in the future, you should include unique IDs for your features and tabular records, so future imports can utilize the Append feature with the Matching Record Option.

The screenshot shows a 'Parameters' window with the following settings:

- Organization ID:** ERC
- Input Dataset:** ROWHWG\_ERC\_import.gdb
- Output Dataset:** ROWHWG\_ERC\_Preview.gdb
- Import Option:** Append
- Matching Record Option:** Update

Feature Class/Table	ID Field
Site	Site_ID
Managment_Areas	Area_ID
Centerlines	LineName
Pollinator Scorecard	Scorecard_ID
Management Area Conservation Measure	MgmtCM_ID
Site Conservation Measures	SiteCM_ID
Plot Photos	PlotPhoto_ID

**Step 4: Import Data into the Database.** This step will import your data into the Database and may change or delete records depending on the settings you select. **Important note:** as mentioned in the previous section, if your organization has any existing data in the Database, we strongly recommend that you make a backup of your data before importing new data. In addition, it is also recommended that you “preview” (Step 3) your data import before adding your data to the Database. **Other notes:**

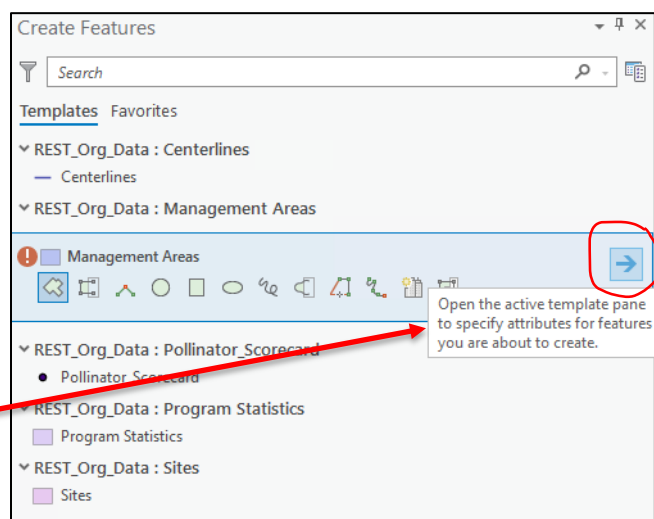
- This step uses the same interface as the preview tool above, except since data goes directly into the online Database, there is no Output Dataset setting. See the previous step for information about each setting.
- Use the “Purge and Replace” option with extreme CAUTION, especially if you have not first exported a copy of your database (see Step 1). This option not only removes all features, but also all *Programs* and *Conservation Measure* tables. If you do not have any existing data in the Database, this setting is arbitrary.
- HTML Programming tags and the arroba “@” symbol entered into any text field will result in an import failure when writing to a REST endpoint (this is due to Esri security settings).
- After inputting your data, it is recommended that you review your data in the system to make sure all of your data imported correctly.

### Individually Add Sites and Management Areas

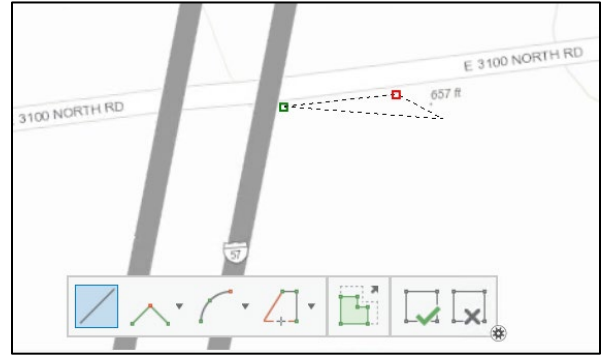
Your organization may want to add new *Sites* or *Management Areas* individually, which can be done by an Account Administrator or Data Manager in ArcGIS Pro. This allows your organization to add *Site* and *Management Area* boundary data, while circumventing the bulk import data process (see [Importing Data](#)).

### Steps to Add New Management Area in ArcGIS Pro

1. Open ArcGIS Pro and make sure that you are logged in with your Database ArcGIS Online account that has access to an ArcGIS Pro license and your organization’s *Management Group*.
2. Right-click on the REST\_Org\_Data endpoint and select “Add to New Map” (see [Steps to Access and Edit Database Records using the Catalog Pane](#)).
3. **Open *Management Area* attribute table.** Expand REST\_Org\_Data in Contents pane. Right-click on “Management Areas” and open “Attribute Table.”
4. Select the “Edit” tab and then click “Create.” With the Create Features pane open, expand REST\_Org\_Data “Management Areas” and click on arrow (on the right).
5. **Fill in the *Management Area* fields.** Required fields: Management Area Status, Land Ownership Type, and Overlap with Partner Land.

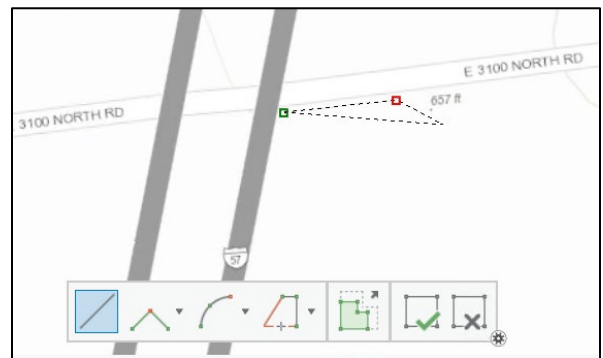
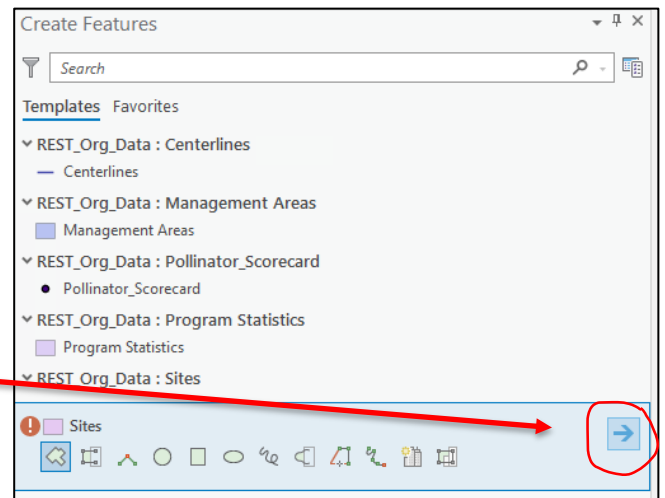


6. Create a new polygon.
  - With the polygon icon selected, use the Create toolbar to outline the new *Management Area* boundary.
  - When completed, click the “Finish” icon or double-click the first anchor point to close the polygon.
  - The new *Management Area* will populate as a new row in the *Management Area* attribute table.
7. Click “Save” to save the edits.



### Steps to Add New Site in ArcGIS Pro

1. Open ArcGIS Pro and make sure that you are logged in with your Database ArcGIS Online account that has access to an ArcGIS Pro license and your organization’s *Management Group*.
2. Right-click on the REST\_Org\_Data endpoint and select “Add to New Map” (see [Steps to Access and Edit Database Records using the Catalog Pane](#)).
3. **Open Sites attribute table.** Expand REST\_Org\_Data in Contents pane. Right-click on “Sites” and open “Attribute Table.”
4. Select the “Edit” tab and then click “Create.” With the Create Features pane open, expand REST\_Org\_Data “Sites” and click on arrow (on the right).
5. **Fill in the Sites fields.** Required fields: Site Status, Land Ownership Type, and Overlap with Partner Land.
6. Create a new polygon.
  - With the polygon icon selected, use the Create toolbar to outline the new Site boundary.
  - When completed, click the “Finish” icon or double-click the first anchor point to close the polygon.
  - The new *Site* will populate as a new row in the *Sites* attribute table.
7. Click “Save” to save the edits.





## WORKING WITH MANAGEMENT AREAS

This section walks you through creating a *Program*, adding your online data to a map (if not previously done), adding *Conservation Measures* to a *Program*, and applying a *Program* to selected *Management Areas*.

With the ArcGIS Pro ROW Tools project loaded and “ROW as Habitat Workflows” visible in the Tasks pane, expand the workflow folder titled “Manage Programs & Conservation Measures,” and then double click on “Work with Management Areas” to show all of the steps. For help on loading these tasks and workflows, see [Getting Set-up in ARCGIS Pro](#) (above).

**Step 1: Create a Program.** If you have created or imported *Management Areas* into the Database but have not yet created one or more *Programs*, run these steps (repeatedly if needed) to lump your *Management Areas* into one or more *Programs*, which are needed to associate monitoring and management activities. If you have not added any *Management Areas*, you can still create one or more *Programs*, but they will not be associated with any areas until you add *Management Area* features and run Step 4 below. In establishing these *Programs*, think carefully about how *Management Areas* will be assigned to a *Program* (Step 3). Since *Programs* are what tie *Conservation Measures* to *Management Areas*, these *Programs* should not change from year to year. Instead, *Conservation Measures* should be attributed with Activity Start and Activity End dates to designate past or current activities. **Important note:** *Management Area* features can only belong to a single *Program*. If you want to be more granular about associating *Conservation Measures* and/or monitoring points, then consider using individual or grouped *Sites* instead of *Management Areas*, see [Sites and Management Areas](#) (above).

This first step can be skipped if you have already established *Programs* and just want to add *Conservation Measures* and/or want to assign *Management Areas* to an established *Program* in subsequent steps. The figure below shows the tool fields for creating a new *Program* for a *Management Area*.

- **Org ID:** Select your organization ID from the list of options (based on your login credentials).
- **Program Name:** Add a unique and concise name that describes the project or program. This name will be used in the next step for assigning *Conservation Measures*, and then for adding *Management Areas* to the *Program*.
- **Purpose:** Select “Management Areas.” Other options exist because this tool is also used in other tasks for assigning *Programs* to unique and grouped *Sites*.

The screenshot shows the 'Parameters' tab of a tool interface. It contains the following fields:

- Org ID:** A dropdown menu with 'ERC' selected.
- Program Name:** A text input field containing 'Michigan MA plan-1'.
- Purpose:** A dropdown menu with 'Management Areas' selected.
- CreatedBy:** A text input field containing 'Mark J (data manager)'.
- Notes:** An empty text area.



- **Created By:** Add your name to indicate that you created the *Program* record.
- **Notes:** Add any additional notes that may be helpful or leave blank.

**Step 2: Add Online Data to Map.** This step adds your organization's data that is currently hosted on the Database to the map (if you have not yet uploaded data, see [Importing Data](#)). It serves two purposes. First, after adding your online data to the map, you can open the "Management Areas - Conservation Measures" table to see any existing measures and new measures added in the next step. Second, this step loads the *Management Areas* feature class, which you will need in the fourth step for selecting the *Management Area* polygons that will be added to each *Program*.

- In the Catalog Pane (under View), select "Portal" and the "Groups" icon to locate your organization's *Management Group*. Next, double click the Group name, right click on the "REST\_Org\_Data," and select "Add To Current Map." Be patient, the server may need to establish a connection if it has not been in use for some time.
- By switching to the Contents tab (or click on "View" and "Contents"), you should now see feature layers for your organization under "REST\_Org\_Data." Expand this group to show all of your layers.
- Open the "Management Areas - Conservation Measures" table under "Standalone Tables" by right-clicking on the table and selecting "Open."
- Open the *Management Areas* attribute table by right-clicking on the layer and selecting "Attribute Table."
- Return to the Tasks pane tab (or "View" and "Tasks") in preparation for the next step.

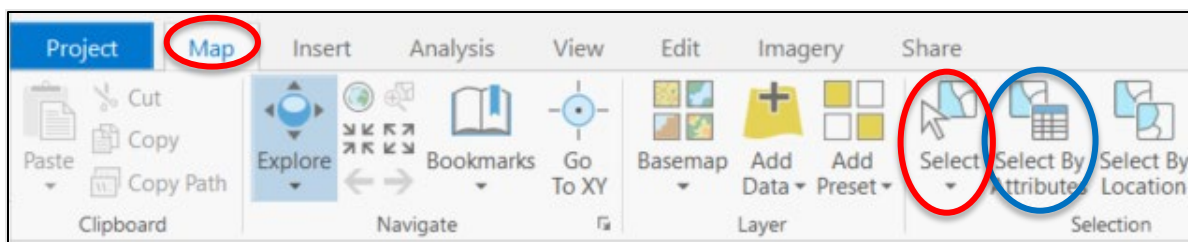
**Step 3: Add a Conservation Measure.** This step, which can be repeated as often as needed, adds *Conservation Measures* to previously created *Management Area Programs*. It is recommended that you have the *Conservation Measures* table open so that you can review existing records and edit records if needed. It may also help to avoid duplication. To sort the table, select the field header and right-click to see sorting options by one or more fields. The figure below shows the tool fields for adding a *Conservation Measure* to a selected *Program*.

- **Org ID:** Select your organization ID from the list of options (based on your login credentials).
- **Program Name:** Be sure to select the correct *Program* you want to work with in assigning *Conservation Measures*.
- **Conservation Measure:** Select from the available options. Keep in mind that the same measure can be applied twice with different start/end times if needed.
- **Implementation organization:** Add the name of the organization that performs the work (if known).
- **Implementation frequency:** Select the most appropriate frequency for this conservation action. Are you recording a one-time occurrence, an annual event, or some other frequency?
- **Date activity began:** The approximate start date or season when this *Conservation Measure* began (required).
- **Date completed or last activity:** The approximate end date or end of season when this *Conservation Measure* ended. For ongoing measures, this field can be kept empty, implying that this activity is still active (optional).
- **Notes:** Add any additional notes that may be helpful or leave blank.
- **Measure ID:** This optional field allows your organization to uniquely identify each measure so that during future data uploads, measures with the same identifier will either be skipped or replace the existing measure as specified by the user. This field avoids replication if uploading future datasets that contain a mix of new and old records, which may occur if your organization maintains a parallel database with newer records. For instance, you could use “Org\_CM\_2020” and “Org\_CM\_2021” to distinguish between conservation mowing activities in 2020 and 2021.

The screenshot shows a web form titled 'Parameters' with a 'Parameters' tab selected. The form includes the following fields:

- Org ID:** A dropdown menu with 'ERC' selected.
- Program Name:** A dropdown menu with '[9212] Management Areas: Michigan MA plan-1' selected.
- Conservation measure:** A dropdown menu with 'Brush removal to promote suitable habitat' selected.
- Implementation organization:** A text input field containing 'Environmental services'.
- Implementation status:** A dropdown menu with 'Implemented' selected.
- Implementation frequency:** A dropdown menu with 'Annually' selected.
- Date activity began:** A datetime picker showing '5/1/2020 4:34:41 PM'.
- Date completed or last activity:** An empty datetime picker.
- Notes:** A text input field.
- Measure ID:** A text input field containing 'ERC\_MA\_plan\_9212'.

**Step 4: Apply Program to Selected Features.** This step allows you to assign selected *Management Areas* to a designated *Program*. Make sure that the *Management Areas* you are displaying are from the “REST\_Org\_Data” layer in the online Database (Step 2). The figure below demonstrates how to select features in the map for use in the tool.



- Within the map interface, use the “Map” tab and the “Select” tool (circled in red) to select features you want to add to a *Program*. Click-hold and drag the mouse to select all features in a box and/or hold down the Shift key to select additional features.
- Instead of manually selecting features using the above method, you can use the “Select by Attributes” tool (circled in blue) to select a subset of *Management Areas* based on attributes such as the Notes or Ownership fields. Select the *Management Areas* layer for the Input Rows and then click on “New expression” to add one or more *where* clauses for selecting the features of interest. For example, when importing your data you may want to include BMPs, or management data in the Notes field to help select features that you will associate with a *Program*. Click on “Run” to select the matching features.

The figure below shows the tool fields for assigning the selected *Management Areas* to a designated *Program*.

- **Feature Layer:** Select the feature layer with the selected features (REST\_Org\_Data\Management Areas).
- **OK to Select All Features:** If you do not first select features (in the previous step), then by default, all features are selected. Select this option if you intentionally want to run this tool on all *Management Area* features (rather than selecting a subset as shown above) to apply to a single *Program*. Do not check this box unless you want to apply a single *Program* to all *Management Areas*.
- **Program to Apply:** Choose the *Program* that will be assigned to the selected *Management Area* features. *Program* options will change depending on the Feature Layer selected above. **Note:** Features can only belong to a single *Program*.
- **If feature has existing Program:** For features that have already been assigned to a *Program*, this setting will determine if the *Program* will be overwritten with the one you have selected, or if the existing *Program* will be kept. This is evaluated for each feature.

 A screenshot of the 'Parameters' tab in a tool interface. It contains the following fields:
 

- Feature Layer:** A dropdown menu showing 'Management Areas' with a folder icon to its right.
- OK to Select All Features:** An unchecked checkbox.
- Program to Apply:** A dropdown menu showing '[9212] Management Areas: 'Michigan MA plan-1''.
- If feature has existing program:** A dropdown menu showing 'Keep the existing program'.

## WORKING WITH SITES

This section walks you through adding your online data to a map (if not previously done), creating and assigning *Conservation Measures* to multiple *Sites* (in bulk), creating and assigning *Programs* for individual *Sites* or grouped *Sites*, and assigning multiple *Sites* to a grouped *Sites Program*. **Important notes:**

- *Conservation Measures* can either be created and assigned to multiple *Sites* at once using the bulk tool or can be added to individual *Sites* manually.
- Unlike for *Management Areas*, *Programs* created for *Sites* are used solely for the purpose of assigning *Pollinator Scorecard* points to their associated *Sites*. Each *Pollinator Scorecard* point is automatically assigned to the *Program* associated with the *Site* it overlaps via nightly validation checks. Thus, a *Pollinator Scorecard* point can be associated with either a single *Site* (i.e., the overlapping *Site* has a unique *Program* associated with it) or with multiple *Sites* (i.e., the overlapping *Site* shares a grouped *Program* with other *Sites* that may share similar management practices).

With the ArcGIS Pro ROW Tools project loaded and “ROW as Habitat Workflows” visible in the Tasks pane, expand the workflow folder titled “Manage Programs & Conservation Measures,” and then double click on “Work with Sites” to show all of the steps. For help on loading these tasks and workflows, see [Getting Set-up in ARCGIS Pro](#) (above).

**Step 1: Add Online Data to Map.** This step adds your organization’s data that is currently hosted in the Database to the map (if you have not yet uploaded data, see [Importing Data](#)). It serves two purposes. First, after adding your online data to the map, you can open the “Sites - Conservation Measures” table to see any existing measures and new measures added in the next step. Second, this step loads the *Sites* feature class, which you will need in the following steps.

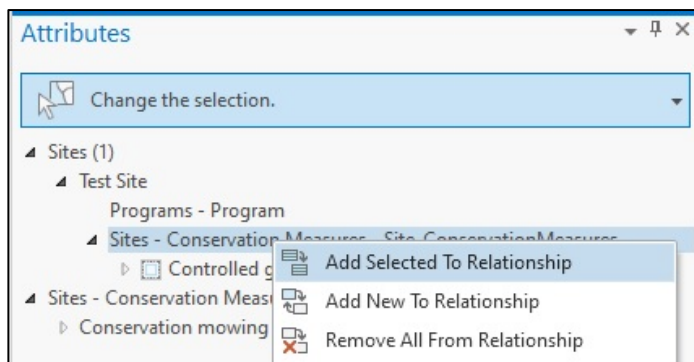
- In the Catalog pane (under View), select “Portal” and the “Groups” icon to locate your organization’s *Management Group*. Next, double click the Group name, right click on the “REST\_Org\_Data,” and select “Add To Current Map.” Be patient, the server may need to establish a connection if it has not been in use for some time.
- By switching to the Contents tab (or click on “View” and “Contents”), you should now see feature layers for your organization under “REST\_Org\_Data.” Expand this group to show all of your layers.
- Open the “Sites - Conservation Measures” table under “Standalone Tables” by right-clicking on the table and selecting “Open.”
- Open the *Sites* attribute table by right-clicking on the layer and selecting “Attribute Table.”
- Return to the Tasks pane tab (or “View” and “Tasks”) in preparation for the next step.

**Step 2: Assign Conservation Measures to One or More Sites.** Since *Conservation Measures* are associated with individual *Sites*, adding them to each individual *Site* can be tedious for organizations that have lots of *Sites*. To make this an easier process, *Conservation Measures* can be added to several *Sites*

simultaneously using this tool. For example, an organization may want to apply conservation mowing to a rotating set of *Sites* each year. This step can be repeated to add different *Conservation Measures*, and different *Sites* can be selected for each run.

If you would like to manually create *Conservation Measures* and apply them to a single *Site* at a time, use the following steps:

- Open the “Sites - Conservation Measures” table.
- At the table bottom, “Click to add new row” and enter the details of the new *Conservation Measure(s)*
- Select the desired *Conservation Measure(s)* and the corresponding *Site* they will be applied to.
- Open the Attributes pane by selecting the “Edit” menu and “Attributes” button.
- In the Attributes pane, click to expand the arrow next to “Sites” and the arrow next to the *Site* name.
- Right click on “Sites – Conservation Measures – Site\_Conversation Measures” and select “Add Selected To Relationship” (as shown in the figure to the right).



The procedure and figure below show the tool for assigning *Conservation Measures* to selected *Sites* in bulk.

Within the map interface, use the “Map” tab and the “Select” tool or the “Select by Attributes” tool to select the features you want to use with the tool. See Step 4 of [Working with Management Areas](#) for more detailed information about selecting features.

- **Sites Layer:** Select the *Sites* layer with the selected features (REST\_Org\_Data\Sites).
- **OK to Select All Features:** If you do not first select features (in the previous step), then by default, all features are selected. Select this option if you intentionally want to run this tool on all *Management Area* features (rather than selecting a subset as shown above) to apply to a single *Program*. Do not check this box unless you want to apply a single *Program* to all *Management Areas*.

- **Conservation Measure:** Select from the available options. Keep in mind that the same measure can be applied twice with different start/end times if needed.
- **Implementation organization:** Add the name of the organization that performs the work (if known).
- **Implementation frequency:** Select the most appropriate frequency for this conservation action. Are you recording a one-time occurrence, an annual event, or some other frequency?
- **Date activity began:** The approximate start date or season when this *Conservation Measure* began (required).
- **Date completed or last activity:** The approximate end date or end of season when this *Conservation Measure* ended. For ongoing measures, this field can be kept empty, implying that this activity is still active (optional).
- **Notes:** Add any additional notes that may be helpful or leave blank.
- **Measure ID:** This optional field allows the organization to uniquely identify each measure so that during future data uploads, measures with the same identifier will either be skipped or replace the existing measure.

**Step 3: Create a Program.** In order to associate *Pollinator Scorecard* assessments with particular *Sites*, the *Sites* must be assigned to a *Program*. *Programs* can be matched (one to one) with unique *Sites* (Option A) or you can match many *Sites* with a *Program* (many to one) as grouped *Sites* (Option B), as described further below. **Important note:** *Site* features can only belong to a single *Program*, and *Programs* can hold only one unique *Site* under option A, or many *Sites* under option B.

**Option A: Create a Program for Unique Sites.** If a *Program* is associated with a single *Site* polygon, it is considered unique. This tool automates the process of creating unique *Site Programs*. Users select one or more *Sites* that need to be associated with a unique *Program*, and the tool generates a new *Program* for each of the selected *Sites*. **Note:** Review the attribute table for all selected features to make sure that each feature has a unique entry for the *Site ID* field, which will be used for the unique *Program* Name. If the *Site ID* field is empty, no *Program* will be created for the *Site*.

The figure below shows the tool fields for creating a unique *Program* for each selected *Site*. Within the map interface, use the “Map” tab and the “Select” tool or the “Select by Attributes” tool to select the features you want to use with the tool. See Step 4 of [Working with Management Areas](#) for more information about selecting features.



- **Sites Feature Layer:** Select the *Sites* layer with the selected features (REST\_Org\_Data\Sites).
- **OK to Select All Features:** If you do not first select features (in the previous step), then by default, all features are selected. Select this option if you intentionally want to run this tool on the *Sites* feature (rather than selecting a subset as shown above) to apply to a single *Program*.

Do not check this box unless you want to create individual *Programs* for every *Site* in the system.

- **Created By:** Add your name to indicate that you created the *Program* record.
- **Notes:** Add any additional notes that may be helpful or leave blank.
- **If Program already exists:** For features that have already been assigned to a *Program*, this setting will determine if the *Program* will be overwritten with the one you've selected, or if the existing *Program* will be kept. This is evaluated for each feature.

**Option B: Create a Program for Grouped Sites.** The purpose of grouping *Sites* under a shared *Program* is so *Pollinator Scorecard* (habitat assessment) monitoring results can be tracked across *Sites* with similar conditions or under similar land management practices. This step first creates a new *Program* that can then be assigned to a group of *Sites* and *Pollinator Scorecard* points. You can skip this initial series of steps if you have an existing *Program* you want to work with.

- **Org ID:** Select your organization ID from the list of options (based on your login credentials).
- **Program Name:** Add a concise but clear name that describes the project or program. This name will be used in the next step for assigning *Conservation Measures*, and then for adding *Sites* to these *Programs*.
- **Purpose:** Select "Grouped Sites." Other options exist because this tool is also used in other tasks for assigning *Management Areas* to *Programs*.
- **Created By:** Add your name to indicate that you created the *Program* record.
- **Notes:** Add any additional notes that may be helpful or leave blank.

Once you have a defined *Program*, you can group similar *Sites* together under a single *Program*. The figure below shows the tool fields for assigning multiple *Sites* to a *Program*. Within the map interface, use the "Map" tab and the "Select" tool or the "Select by Attributes" tool to select the features you

want to use with the tool. See Step 4 of [Working with Management Areas](#) for more information about selecting features.

- **Feature Layer:** Select the feature layer with the selected features (REST\_Org\_Data\ *Sites*).
- **OK to Select All Features:** If you do not first select features (in the previous step), then by default, all features are selected. Select this option if you intentionally want to run this tool on all *Site* features (rather than selecting a subset as shown above) to apply to a single *Program*. Do not check this box unless you want to apply a single *Program* to all *Sites* in the system.
- **Program to Apply:** Choose the *Program* that will be assigned to the selected *Site* features. *Program* options will change depending on the Feature Layer selected above. Keep in mind that features can only belong to a single *Program*.
- **If feature has existing Program:** For features that have already been assigned to a *Program*, this setting will determine if the *Program* will be overwritten with the one you have selected, or if the existing *Program* will be kept. This is evaluated for each feature.

The screenshot shows a 'Parameters' dialog box with the following settings:

- Feature Layer:** Sites
- OK to Select All Features:** ☐
- Program to Apply:** [13612] Grouped Sites: 'Big Sauble Sites'
- If feature has existing program:** Keep the existing program

## REVIEWING DATA

The Database performs a number of automated nightly validation tasks, including calculating spatial attributes (e.g., city, county, adjusted acreage<sup>4</sup>) and reviewing data for errors. The Database checks features against a set of rules, and then records the error/validation information in each feature's attribute table. These features can then be queried and displayed by the error level for *Data Managers* to review and edit within the Data Management Web Application or ArcGIS Pro.

In addition, if you are a *Data Manager* or *Account Administrator*, you can view and edit data in the Database on your own, as described in this section.

### Automated Data Validation

Data validation is the process of inspecting the data submitted by user organizations to ensure it is consistent and in a form that can be applied in different analyses. Any features that have been added or modified in the Database have several fields that are calculated during nightly system checks. These fields are important for summarizing data for use by the *Public* and *Private Dashboards* and avoid the need for users to input fields that are easily automated. The following table shows which fields are

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<sup>4</sup> "Adjusted acreage" subtracts any overlap between *Sites* and *Management Areas* to avoid any double counting of managed lands in area calculations.



calculated for each feature class type during nightly data checks based on their spatial location and geometric properties.

Field	Feature Class				Notes
	Management Area	Site	Centerline	Pollinator Scorecard	
County	✓	✓	✓	✓	If the feature spans multiple counties, it is assigned to the county with the largest segment
State	✓	✓	✓	✓	If the feature spans multiple states, it is assigned to the state that contains the county with the largest segment
Acres	✓	✓			Derived by feature geometry as calculated by ArcGIS
Acres Adjusted	✓				<i>Management Area</i> acres are adjusted by removing the acreage of overlapping <i>Sites</i>
Miles			✓		Derived by feature geometry as calculated by ArcGIS
Program GUID				✓	See notes below

It is important to note that the Database automatically assigns a *Program* (see Program GUID field) for any newly added or modified *Pollinator Scorecard* records that overlap with a *Site* or *Management Area* associated with a *Program*. This means that if new or modified *Pollinator Scorecard* points overlap with a *Site* or *Management Area* that is associated with a *Program*, the Database automatically associates the *Pollinator Scorecard* points with that *Program*. In cases where the *Pollinator Scorecard* point overlaps with both a *Site* and a *Management Area*, the *Pollinator Scorecard* point will be assigned to the *Program* associated with the *Site*.

### Reviewing and Correcting Validation Errors

The validation process can automatically correct some inconsistencies; while for others, the Database simply raises a flag by attributing the feature with an error description and severity. Automated nightly data checks log database errors that violate a set of database rules, as shown in the table below. These errors are recorded for each feature layer in three fields, including the date the error was logged (ValidationDate), the error level from 1 (high) to 3 (low) (ValidationLevel), and the error descriptions (ValidationMsg) in a comma separated field.

Error Level	Error Severity	Error Description
0	None	Valid
1	High	Not yet validated (initial value)
1	High	Feature spans multiple counties
1	High	Feature not contained in any counties
1	High	<i>Management Area</i> or <i>Site</i> overlaps
1	High	Feature is not assigned to a <i>Program</i>
2	Medium	<i>Site</i> or <i>Management Area</i> is too big to be considered for <i>Pollinator Scorecard</i> analysis
2	Medium	<i>Pollinator Scorecard</i> point is not contained in any <i>Site</i> or <i>Management Area</i>
3	Low	Feature contains a duplicate record ID
3	Low	Feature is sharing a unique <i>Site Program</i> , i.e., more than one <i>Site</i> is associated with that <i>Program</i>

If your organization is registered as a *Premium User*, you can review and correct these errors using the dedicated Data Management Web Application in ArcGIS Online (see [Data Management Web Application](#)). Otherwise, validation errors and edits can be made using ArcGIS Pro via your organization's "REST\_Org\_Data" (REST endpoint).

### Data Management Web Application (WebApp)

This customized WebApp is only available if your organization is registered as a *Premium User*. It provides a streamlined method to review and correct any geometry validation errors through the ArcGIS Online platform.

### Steps to Access and Utilize the WebApp

1. Log into ArcGIS Online ([ArcGIS.com](https://arcgis.com)) using your account associated with the Database, go to "Groups," and select your organization's *Management Group*.
2. Open the WebApp titled "Data Management."

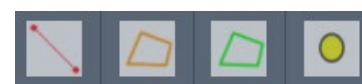
## Navigation

- Standard navigation tools along the top-left allow you to zoom in and out of the map using the “+” and “-” buttons.
- The home icon will take you back to the original map extent, and the circle with hash marks will attempt to locate your current location, if you have shared it with your browser.

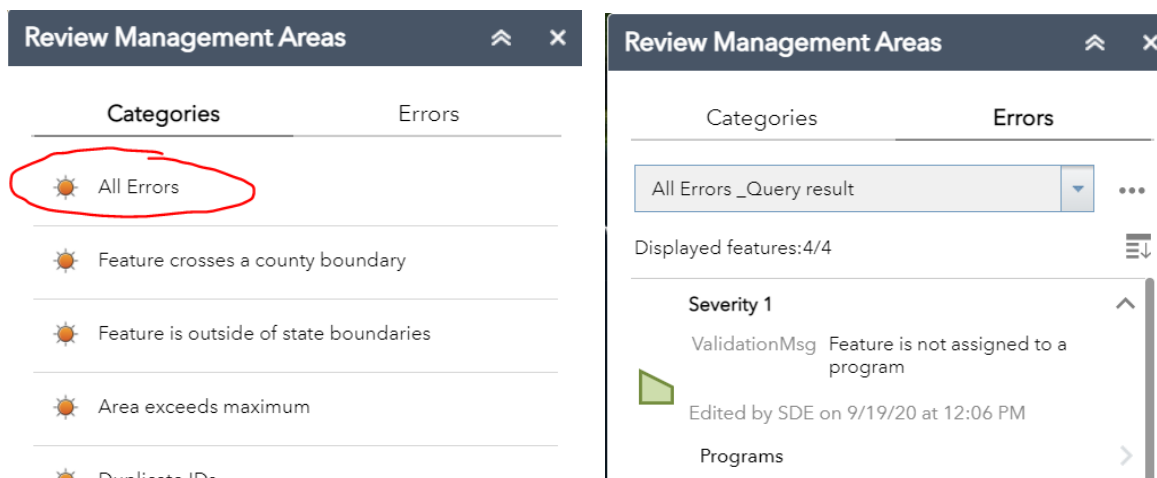


## Validation Error Toolbar

- In the top-right corner of the WebApp, is the Validation Error toolbar. The first four buttons on the toolbar are filters for each feature type in the Database: *Centerlines*, *Management Areas*, *Sites*, and *Pollinator Scorecard* points as shown.



- Clicking on any one of these buttons will bring up a window (as shown below) that allows you work with “Categories” of validation errors. Selecting “All Errors” will show every validation error category for the feature type you selected.

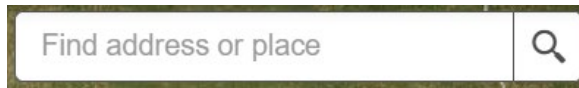


- The resulting validation errors will display by feature in a list (as shown above on the right). Selecting a feature will zoom the map to that location, allowing you to review the issue more closely. For editing instructions, see the additional “Editing and Sharing Toolbar” steps below.  
**Note:** after zooming to a feature, you will need to re-select it before you will be able to edit.
- The additional three tools on the toolbar are used to turn on the “Legend,” to select layers from the “Layer List” for turning on/off, and a “Basemap Gallery” for selecting a different map background.



## Editing and Sharing Toolbar

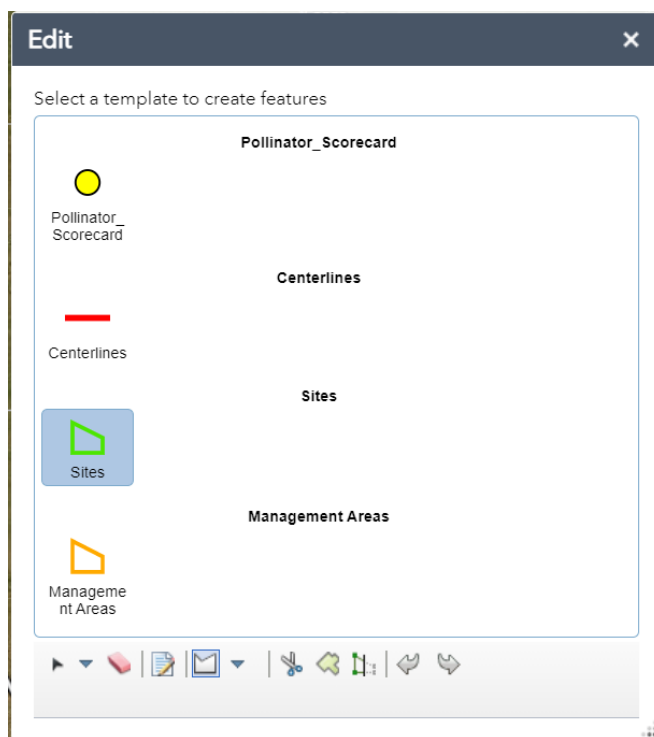
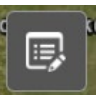
9. Near the navigation tools in the top-left, you can search for an address, if you want to zoom into a particular area of interest. Type in an address and hit enter.



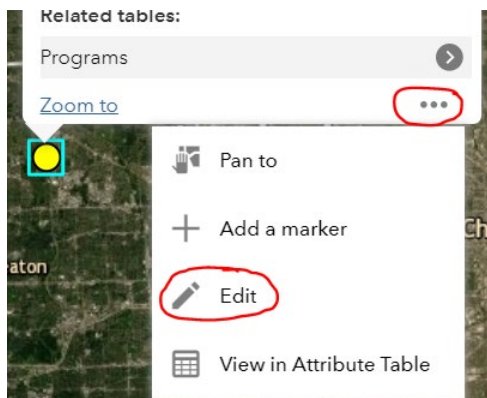
10. Under the search bar are several tools, the first one (with the back turning arrow) is used to run a customized script that will update the Database validation checks. Run this tool after you have made one or more feature edits to see if your edited features contain any remaining validation errors.



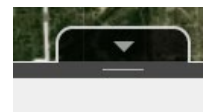
11. The second tool (with the checklist and pencil) is for editing features and attributes. It can also be used to create new features. Clicking on this tool will bring up a window (as shown below) that allows you to create new features. Select the feature type and begin digitizing on the map. At the bottom of this window are several useful tools for selecting/deselecting features, deleting features, and modifying geometries. Hovering over these tools gives a description of how it is used.



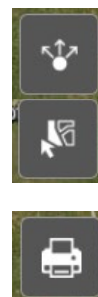
12. Features can also be edited without the above “Edit” tool by selecting a feature on the map, clicking the ellipses (...), and then “Edit” in the pop-up window (as shown below).



13. The “Select Feature” tool can be used to select several features at once. Use the “Select Feature” pop-up window to select from features in one or more layers only. Use “Clear” to deselect records. This tool can be used in combination with the attribute table where the selected records are highlighted. Access the table by clicking and dragging up on the down arrow tab (as shown) at the bottom of the map.



14. The “Share” tool can be used for sharing a link of the map view with a colleague in your *Management Group*. Click on “Link options” to explore settings. For example, you can zoom into a portion of the map you want to discuss and then send a personalized link via email or another application. You can even embed a view into a website.
15. Lastly, the “Print” tool can be used to create a map of an area of interest or of the entire map extent.

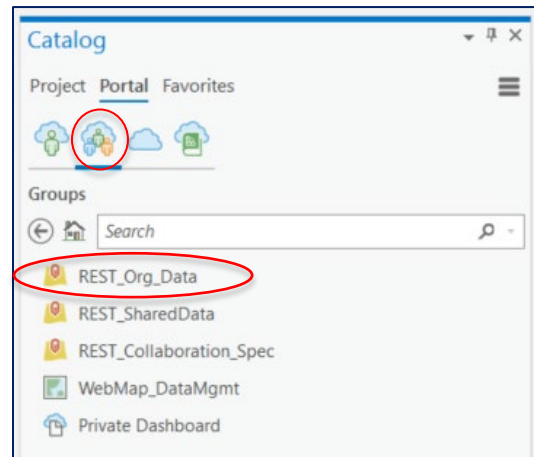
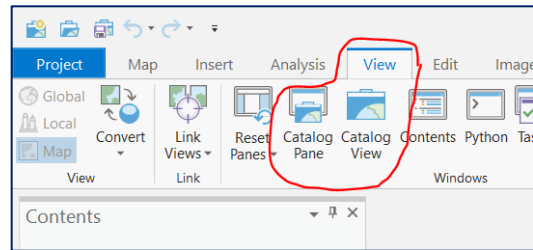


## Accessing and Editing Data in ArcGIS Pro

This section describes how to access your organization’s data in the Database using ArcGIS Pro. You can use these steps to work directly with your organization’s data to perform edits and run tools for importing and managing your data. After directly linking to your feature layers in the Database per the instructions below, use standard ArcGIS Pro editing tools on the Edit menu and geoprocessing tools to perform any necessary edits. **Important note:** any edits you make while directly accessing your organization’s data are saved directly to the Database. We strongly encourage you to save a local copy of your organization’s data as needed (see [Download a Database Backup](#)) to ensure that you do not lose any data.

### Steps to Access and Edit Database Records using the Catalog Pane

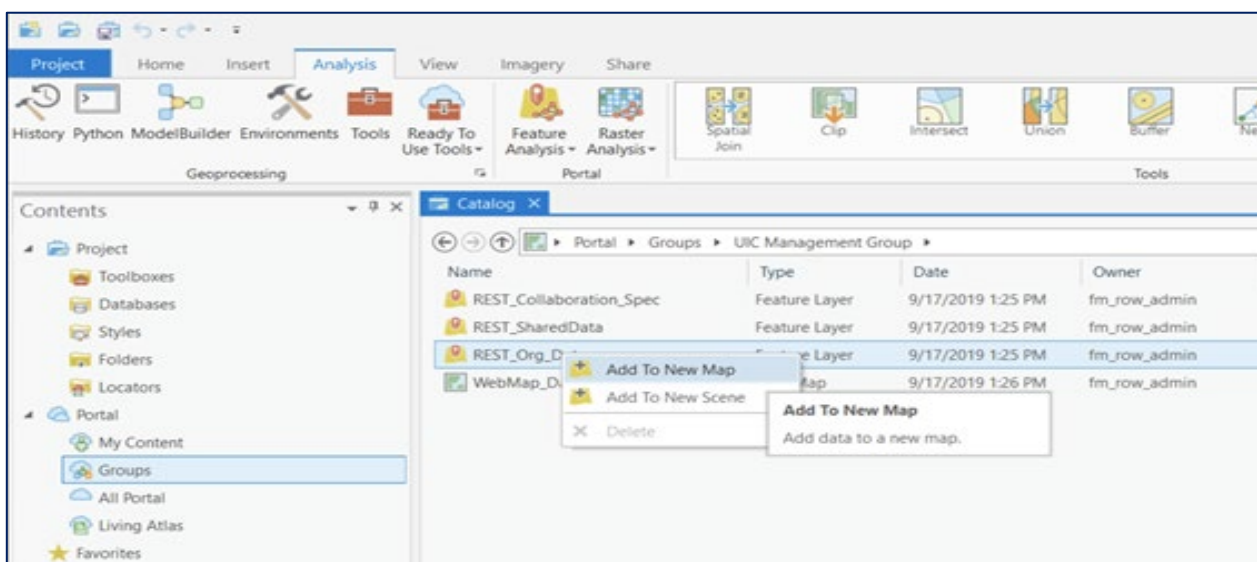
1. Open ArcGIS Pro and make sure that you are logged in with your Database ArcGIS Online account that has access to an ArcGIS Pro license and your organization's *Management Group*.
2. Make sure the Catalog pane is visible. If it is not, select it from the "View" tab.
3. In Catalog, click on "Portal" and select "My Groups" to view the permission groups you can access.
4. Double click on your organization's *Management Group* to reveal the objects and tools in the group.
5. Within your group are the REST endpoints, which are direct links to the data on the server. These include "REST\_Org\_Data" (your organization's data), "REST\_SharedData" (data shared by other organizations), and "REST\_Collaboration\_Spec" (your organization's sharing specifications).
6. Right-click on the REST endpoint you want to access and select "Add to New Map".



### Steps to Access and Edit Database Records using the Catalog View

1. Open ArcGIS Pro and make sure that you are logged in with your Database ArcGIS Online account that has access to an ArcGIS Pro license and your organization's *Management Group*.
2. Make sure the "Catalog View" is visible and active in the center window.
3. In the Contents pane, expand "Portal" and click on "Groups."

4. Right-click on the “REST\_Org\_Data” feature layer and select “Add to New Map.”



## DATA REPORTING AND EXPORTING

Your organization may wish to export Database records for a variety of reasons. In general, we strongly recommend that you periodically backup your data, particularly if you are preparing to make edits or upload new data to the Database (see [Download a Database Backup](#)).

The Database helps streamline tracking and reporting activities for participation in the U.S. Fish & Wildlife Service’s (USFWS) Monarch Butterfly Candidate Conservation Agreement with Assurances (see [Monarch Butterfly CCAA](#)). In addition, UIC periodically facilitates bulk reporting from the Database to the U.S. Fish & Wildlife Service’s Monarch Conservation Database (MCD).<sup>5</sup>

### CCAA Reporting Tool

*Premium Users* (see [Organizational User Levels](#)) have access to a query reporting tool that allows you to run summary reports of your monitoring data consistent with the annual reporting requirements of the Monarch Butterfly CCAA. The resulting PDF report includes the Monarch Butterfly CCAA biological effectiveness monitoring and adaptive management threshold tests,<sup>6</sup> and summarizes adopted acreage

<sup>5</sup> Learn more about the MCD here: <https://www.fws.gov/savethemonarch/mcd.html>

<sup>6</sup> Biological effectiveness monitoring is used to determine whether suitable monarch butterfly habitat exists where conservation measures have been applied. Adaptive management may be triggered if monitoring plots demonstrate a lack of adequate milkweed and/or nectar plant cover. The adaptive management tests summarized in the report are calculated consistent with the CCAA Monitoring Results Calculator, which is available by logging into the [ROWHWG website](#) and accessing the [CCAA Toolkit](#) (under the Monitoring tab). Additional details about the monitoring requirements and adaptive management thresholds can be found in Sections 14.2.1 and 14.2.2 (part 4) of the [Monarch Butterfly CCAA](#), respectively, and a related [Frequently Asked Questions](#) document.

(i.e., *Sites and Management Areas by Program*, if applicable) and *Pollinator Scorecard* points. The tool also generates a CSV report, which aggregates the following *Pollinator Scorecard* point monitoring data: Site ID, Plot Number, Assessor Name, Sampling Date, State, Sample Location, *Conservation Measure(s)* applied, Milkweed Count, Nectar Resources Present, Nectar Resources Percent Cover, Monarchs Observed, and Additional Notes.

### Steps to Generate a CCAA Report

1. Open ArcGIS Pro and make sure that you are logged in with your Database ArcGIS Online account that has access to an ArcGIS Pro license and your organization's *Management Group*.
2. Make sure the Tasks pane is open (if not, select "View" and then "Tasks").
3. In the Tasks pane, expand "Generate Reports and Spreadsheets" and then select "Run CCAA Report."

- **Report Title:** Title the CCAA report. This title is also used for the file name that will be generated.
- **Org ID:** Select your organization ID from the dropdown list. There should only be one option unless you are part of more than one subsidiary, or you are a contractor working for more than one organization.
- **Output Directory:** Select an output folder location using the folder icon (right).
- **Evaluation Year:** Select the evaluation year from the dropdown list for which you would like to generate the CCAA report.
- **Region:** Define your region (Midwest/East or West/South) using the dropdown list. If your organization spans multiple regions, you will need to run the CCAA reporting tool twice (once for each region). If you are uncertain which region your organization is located in, see Figure 6-1 on page 33 of the [Monarch Butterfly CCAA](#).
- **Include scorecards with baseline measurements:** Select this option to include *Pollinator Scorecard* points for plots that were classified as "baseline," i.e., monitored before conservation measures are in place, in the generated CCAA report. Do not select this option if you only want to report on *Pollinator Scorecard* points for plots that were monitored after conservation measures are in place (i.e., post-activity).
- **Include scorecards with no associated program:** Select this option to include *Pollinator Scorecard* points not associated with a *Program* in the generated CCAA report. See [Conservation Measures and Programs](#) for guidance on assigning *Programs* to *Pollinator Scorecard* points.



- **Programs:** Select which *Programs* you would like to include. By default, all *Programs* are selected.
4. Click “Run” to run the tool.
  5. Navigate to the defined output directory folder, where the generated CCAA report will be in PDF and .csv format.

### Opt-In REST Public Data

Organizations registered with the Database may opt-in to share a subset of *Site*, *Management Area*, and *Pollinator Scorecard* feature data through a single public REST service (see [ArcGIS Server REST Services](#)). The REST endpoints can be viewed in ArcGIS Online or loaded directly into an ArcGIS Pro project outside of the Database. This service may be used to dynamically communicate conservation efforts with additional organizational staff (who do not have Database user accounts) and external stakeholders. Additionally, REST Public Data can be used to integrate ROW as habitat geospatial data with similar or related local or regional planning tools.

The table below summarizes *Site*, *Management Area*, and *Pollinator Scorecard* data fields included in the Public Data REST service, in addition to feature boundary data. See [Schema Guidance](#) for a more detailed description of data fields. Your organization may choose to contribute none, some, or all feature data by “opting-in” via the REST\_Admin Feature Layer in ArcGIS Online (see below). By opting-in, your organization agrees to making the following fields visible to all Database organizations and external stakeholders or the public.

Sites	Management Areas	Pollinator Scorecards
Organization Name	Organization Name	Organization Name
Site Name*	Management Area Name*	Plot Name
State	State	State
County	County	County
Status	Status	Evaluation Date*
Acres	Acres	Total Points*
Program Name	Program Name	Rating (Qualitative)*
		Program Name

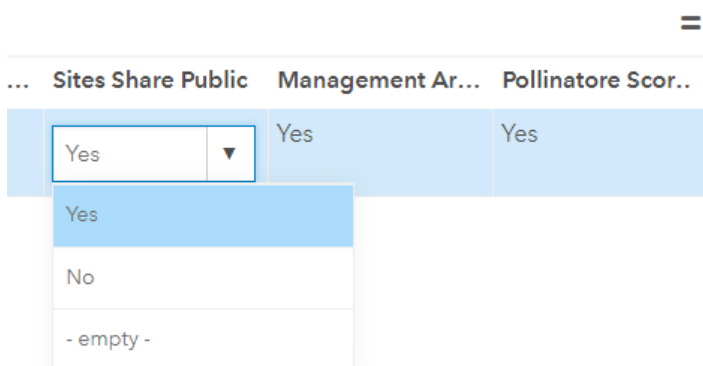
Asterisk (\*) indicates data field unique to the associated feature.

### Steps to Opt-In/Out of REST Public Data

1. Login to ArcGIS Online and make sure that you are logged in with your Database ArcGIS Online account that has access to your organization’s *Management Group*.
2. In your organization’s *Management Group*, select “Content” (top right menu) and then scroll down to find the REST\_Admin Feature Layer.

3. Open the Organization table and select “Data” (top right menu).
4. Click on the options icon (☰) and select “Show/Hide Columns.” In the dropdown menu, check ON the following fields: Sites Share Public, Management Areas Share Public, and Pollinator Scorecards Share Public. This action adds the Public REST Service fields to your Organization table.
5. Double-click each field to open a “yes/no” dropdown menu. For each feature class, choose “Yes” to **opt-in** to Public REST Service data sharing. Choose “No” to exclude your organization from the Public REST Service. See

- **Sites Share Public:** Select “Yes” to share a subset of Site fields with the Public REST service (see table above).
- **Management Areas Public:** Select “Yes” to share a subset of Management Area fields with the Public REST service (see table above).
- **Pollinator Scorecard Public:** Select “Yes” to share a subset of Pollinator Scorecard fields with the Public REST service (see table above).

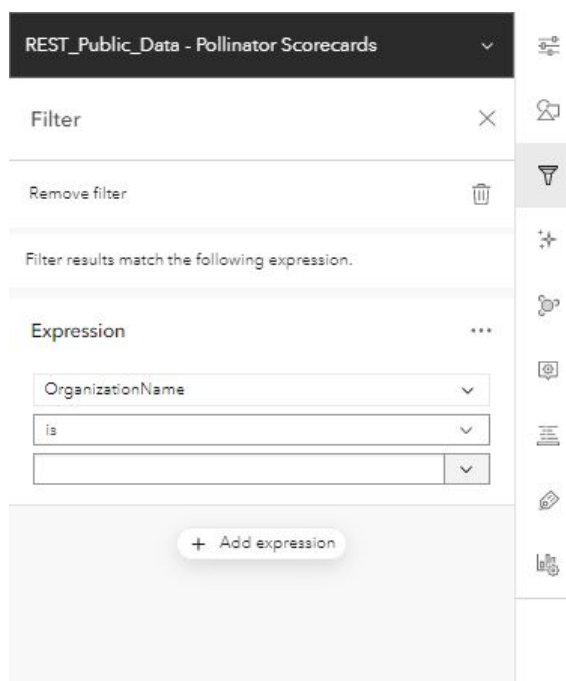


...	Sites Share Public	Management Areas Share Public	Pollinator Scorecards Share Public
	Yes	Yes	Yes

### Accessing REST Public Data in ArcGIS Online

1. Login to ArcGIS Online and make sure that you are logged in with your Database ArcGIS Online account that has access to your organization’s *Management Group*.
2. In your organization’s *Management Group*, select “Content” (top right menu) and then scroll down to find the REST\_Public\_Data Feature Layer.
3. Select “Open in Map Viewer” to view all data shared to the Public REST Service.
4. Show/Hide Layers by clicking on the Hide Layer/Show Layer icon (👁) in the Layers panel.

- By default, all organizations contributing data to the Public REST service will be visible in Map Viewer. Filter for your organization by clicking on the Filter icon, select “Add expression,” and selecting your organization name from the dropdown list.



### Adding REST Public Data into New ArcGIS Pro Project

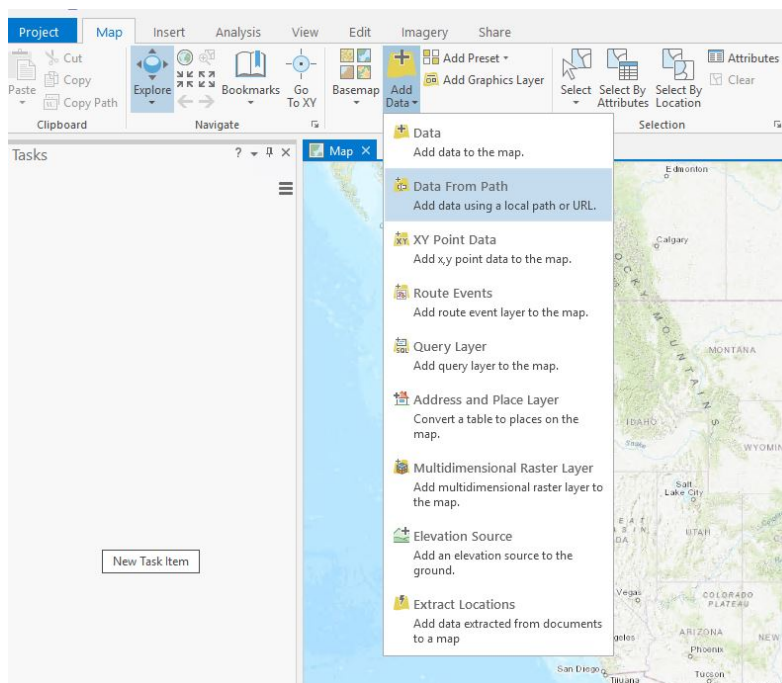
- Login to ArcGIS Online and make sure that you are logged in with your Database ArcGIS Online account that has access to your organization’s *Management Group*.
- In your organization’s *Management Group*, select “Content” (top right menu) and then scroll down to find the REST\_Public\_Data Feature Layer.
- Copy the REST service URL (bottom of page).<sup>7</sup>



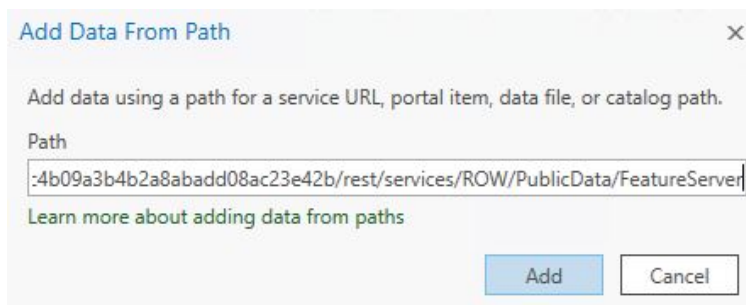
- Open a new or existing Project in ArcGIS Pro.
- Open “Menu,” then click “Add Data,” and choose “Data From Path.”

---

<sup>7</sup> This URL can also be copied into your browser address bar to view the service page.



6. Add the copied REST service URL into “Path” and click “Add.”



## DATABASE SECURITY

The Database ensures user organizations can control access to the data that they contribute. This section describes how the data is stored in the Database and the security measures in place to protect user organizations and the viability of the overall database system.

The data infrastructure is created when a user organization registers to participate in the Database. Database administrators have access to all components of the infrastructure. This includes personnel from the Energy Resources Center at UIC and a limited number of their contractors. Administrator access is audited periodically.

## SQL DATABASE

All data is stored in a set of relational database tables on a secure SQL Server on UIC's internal network. Tables that contain organization-specific data have a key field (Org\_ID) that is populated with a value that uniquely identifies the organization that owns the record. Records from different organizations are intermingled in the same set of tables. As an example, you can see in the image below that data from three different organizations reside in a database table.

OBJECTID *	GlobalID *	Org_ID	Area_ID	ProgramGUID *
1652	{747D5946-D052-4E00-A3C2-2B550DA9E2D7}	FM	<Null>	<Null>
2444	{48E10620-7F22-4510-B0BA-90D6F63C1C8B}	ERC	<Null>	<Null>
2446	{3A7F73D1-61C2-4DA4-A4D1-9BFD8B85697}	ERC	<Null>	<Null>
2447	{391B5220-0993-4405-925C-373382DE8574}	ERC	<Null>	<Null>
2448	{5BD2EE74-CAD0-44E2-8D1E-290F75BC6712}	ERC	<Null>	<Null>
2450	{5745105C-58B0-42FB-9014-7137FCF05E20}	ERC	<Null>	<Null>
2451	{DB1E09E6-A6D9-4498-A31C-DD206DF6148F}	ERC	<Null>	<Null>
2453	{9820E459-2D44-41B8-8035-DC40C8F6EBD0}	ERC	<Null>	<Null>
2454	{B6600173-F2D0-432C-9F5C-819322D083CE}	ERC	<Null>	<Null>
2045	{F4630CA5-7D4A-41B2-A30F-998087A90CDF}	UIC	Repalce w/rel record	{2315A5C0-D1E8-48F5-8031-2025B5B97CD9}
2046	{078FAAD6-26E8-4C4D-A326-7525F391837F}	UIC	Append w/rel record 1	{2315A5C0-D1E8-48F5-8031-2025B5B97CD9}
2047	{BB96587D-A9AB-4AF5-9BA2-5C1E42592257}	UIC	Append w/rel record 2	{2315A5C0-D1E8-48F5-8031-2025B5B97CD9}
2048	{EB827C02-61C1-4B3C-8F72-65F58F00AB6B}	UIC	Append w/rel record 3	{2315A5C0-D1E8-48F5-8031-2025B5B97CD9}

There are separate database tables for each of the four feature classes (i.e., *Centerlines*, *Management Areas*, *Sites*, *Pollinator Scorecards*). In total, there are over 20 database tables and views that hold intermingled organization-specific data.

## ARCGIS SERVER REST SERVICES

For each organization, a set of REST services (or endpoints) is published to a secure ArcGIS server on the UIC internal network. The services, which are password protected and encrypted, are accessible to ArcGIS Online via a secure HTTPS server. The REST services, using SQL select statements, serve only those database records owned by the organization. Organization users are not authorized to access the REST service directly. They must go through a proxy in the ArcGIS Online environment.

This table shows the set of REST services that is created for each organization:

ArGIS Rest Service Name	Description
<OrgID>	Read-write access to organization feature data and related tables

<OrgID>_collab	Read-only access to analytics tables and data shared from other organizations
<OrgID>_collab_spec	Read-write access to organization administration tables
<OrgID>_Pollinator_Scorecard_FW	Read-write access to organization <i>Pollinator Scorecard</i> feature data. Survey123 requires a dedicated REST service for this.

Each REST service contains one more layer. Each layer is associated with a single database table or view. The layer definition includes the SQL statement that subsets the associated database table or view, limiting it to just the records for the target organization.

## ARCGIS ONLINE FEATURE LAYER PROXIES

End user access is provided entirely within the ArcGIS Online environment. For each ArcGIS Server REST endpoint, an ArcGIS Online proxied feature layer is created, which delivers data between the ArcGIS Server REST endpoint and the ArcGIS Online environment. This ArcGIS Online proxied feature layer knows the password to its partner ArcGIS Server REST endpoint, but it cannot be retrieved by the user. In fact, user organization cannot access the feature layer until explicitly authorized through ArcGIS Online group membership.

**Note:** as with the ArcGIS Server REST endpoints, a set of proxied feature layers is created for each organization. They have identical names, but are stored in separate ArcGIS Online folders, all owned by the Database administrators.

## ARCGIS ONLINE GROUPS

Authenticated organization users can access their data through ArcGIS Online groups. Once the proxied feature layers are created for an organization, a set of ArcGIS Online groups is created. The feature layers are shared with the appropriate groups, then organization users are invited into the groups. It is through these groups that organization users can access not only their data, but also other objects such as web maps and dashboards that consume the data from the proxied feature layers. It is expected that users will typically interact with these higher-level objects instead of interacting directly with the proxied feature layers.

Two groups are created for each organization. One is directed at the needs of *Fieldworkers* (*Fieldworker Group*) and the other at *Account Administrators* and *Data Managers* (*Management Group*). The table below shows the content of the two groups.

Group content	Fieldworker Group	Management Group
Proxied Feature Layers		
<b>REST_Org_Data:</b> Read-write access to organization feature data and related tables	✓	✓
<b>REST_Shared_Data:</b> Read-only access to data shared from other organizations		✓
<b>REST_Org_Analytics:</b> Read-only access to analytics tables		✓
<b>REST_Admin:</b> Read-write access to organization administration tables		✓
<b>REST_Pollinator_Scorecard:</b> Read-write access to organization <i>Pollinator Scorecard</i> feature data	✓	
Other Content		
Full-feature web map		✓
Limited-feature web map	✓	
Survey 123 form for feature data input	✓	
Private Dashboard		✓
Data Management Web Application		✓
ROW Database Schema		✓

Group membership is initially determined by information provided when an organization registers to participate in the Database. Each group is assigned a “group manager” who is a member of the user organization. That member is entrusted to invite other users into the group and can even assign those users to be additional group managers. Note that the group managers can invite any ArcGIS Online user into the group, not just users that belong to their organization.

The screenshot displays the 'ERC Management Group' interface. At the top, there are tabs for 'Overview', 'Content', and 'Members'. Below the tabs is a search bar and an 'Invite users' button. On the left, there are filters for 'Group Role' (Owner and Group Managers, Member) and 'Date joined'. The main area shows a list of 6 members (1-6 of 6). The members are listed in a table with columns for Name, Group Role, and a status letter. The members are:

Name	Group Role	Status
Karen Klinger (kklinger_ERC)	Member	A
Don Morrison (DMorrison_ROW)	Member	A
Don TEST (DTEST_01_ROW)	Member	A
Mark Johnston (mjohnston_ERC)	Group Manager	A
Don Morrison (dmorrison_ERC)	Group Manager	J
ROW Admin (ROW_Admin)	Owner	J

## SERVER OBJECT INTERCEPTOR (SOI)

A critical element of this data protection scheme is maintaining the fidelity of data ownership, as indicated by the value of the Org\_ID field in each database record. One scenario that requires special attention is if a user organization creates a new record or modifies an existing record and specifies an incorrect Org\_ID value. If this were to happen, which could be done intentionally or unintentionally, the user could be injecting records into another organization’s data. This scenario is prevented by the Service Object Interceptor (SOI).

The SOI (.soe) is a custom C Sharp program installed as an extension to the ArcGIS server and is enabled on all REST services that allow updates to organization feature data. It intercepts incoming REST requests and if the incoming request includes feature data creation or modification, the SOI forces the Org\_ID field value to contain the value assigned to the requesting organization.

## RELATED PROGRAMS

The following programs have been mentioned throughout this document due to their relevance to the Database. Follow the links below to learn more about each program, including how the Database helps to further their conservation goals.



## POLLINATOR SCORECARD

The *Pollinator Scorecard* was created by the ROWHWG Metrics & Targets Task Force to establish a consistent methodology for evaluating pollinator habitat and management on energy and transportation lands. The assessment tools were developed with ROW land managers in mind by offering flexible, multi-tiered assessment options depending on a user's experience level and objectives. In addition, the *Pollinator Scorecard* can be used by participating organizations to meet the monitoring requirements of the Monarch CCAA. More information can be found on the ROWHWG *Pollinator Scorecard* webpage: <http://rightofway.erc.uic.edu/pollinator-habitat-scorecard/>

## MONARCH BUTTERFLY CCAA

The Nationwide Candidate Conservation Agreement with Assurances (CCAA) for the Monarch Butterfly provides energy and transportation organizations the opportunity to voluntarily commit to pollinator-friendly management practices on their lands in exchange for regulatory assurances and operational flexibility. The agreement ensures that participating organizations, fulfilling specific conservation targets, will not be required to adopt additional conservation measures in the event that the monarch butterfly is listed under the U.S. Endangered Species Act (ESA). Learn more about the Monarch Butterfly CCAA and how habitat tracking on energy and transportation lands are essential to protecting monarch butterfly populations here: <http://rightofway.erc.uic.edu/national-monarch-ccaa/>

## APPENDIX 1. GUIDE TO USING SURVEY 123

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ArcGIS Survey123 is a free application that can be used to seamlessly collect, view, and modify *Pollinator Scorecard* data for the Database with digital devices in the field. This reference sheet guides users through account set-up, data collection, and data review using ArcGIS Survey123.

# Guide to Using Survey123

This reference sheet provides an overview of using ArcGIS Survey123 to collect Pollinator Scorecard data in the field and provides step-by-step instructions for users to follow.

## What is the Database?

The Rights-of-Way as Habitat Geospatial Database (the Database) is a central repository for tracking existing, restored, and potential pollinator habitat. It facilitates conservation partnerships within and across energy and transportation sectors. The Database can also help your organization communicate the conservation value of your land to the public, state and federal resource agencies, and other key stakeholders.

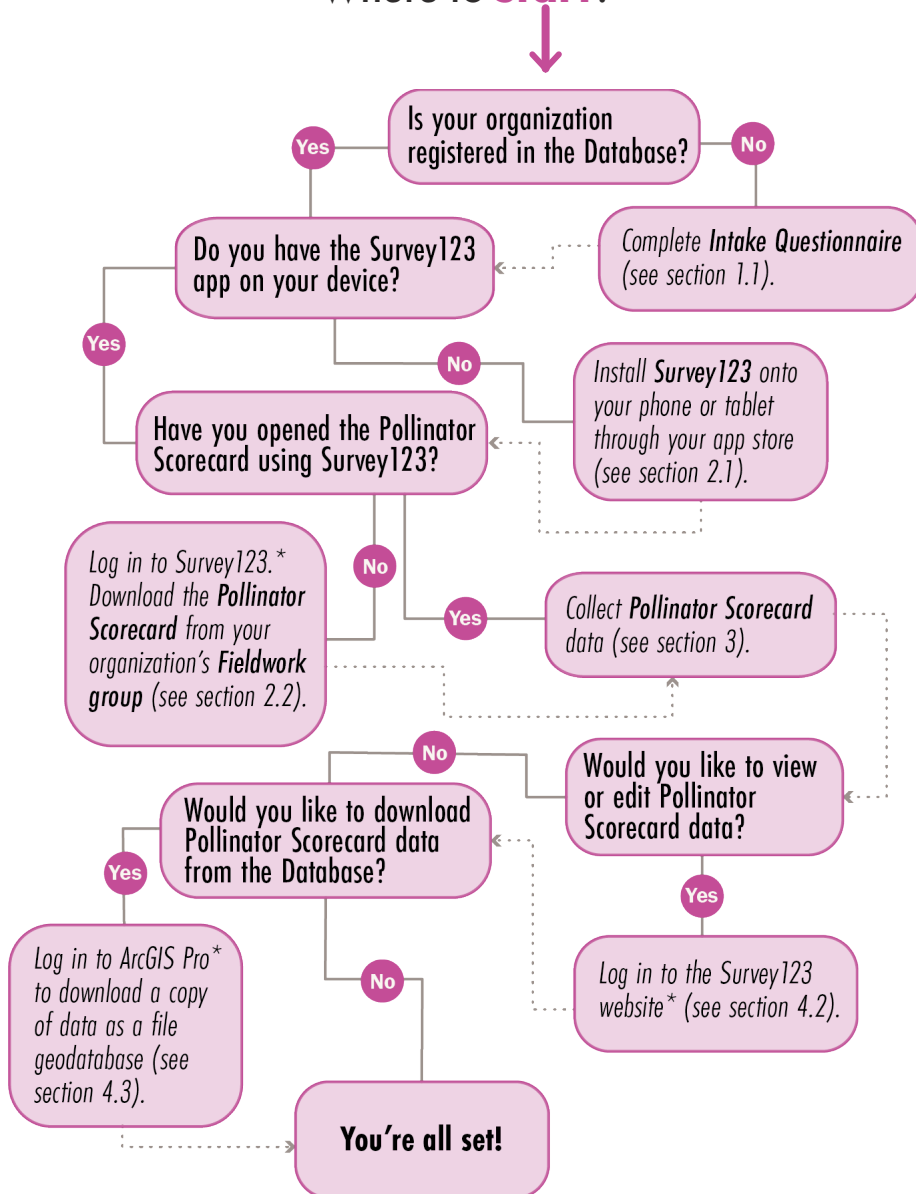
For more information, including access to additional guidance documents, visit:

[www.rightofway.erc.uic.edu/geospatial-database/](http://www.rightofway.erc.uic.edu/geospatial-database/)

## Why use Survey123?

- To collect, view, and modify Pollinator Scorecard data with a digital device in the field
- To facilitate tracking by seamlessly syncing habitat data and photos with the Database
- To streamline data collection and reporting for the Monarch CCAA
- To easily locate and navigate to previously monitored locations

## Where to **start**?



\*Log in using your ArcGIS Online account connected to the Database, which you receive(d) via email after completing the Intake Questionnaire. ArcGIS Pro licensing is available for all accounts associated with the Database.

# 1

## Account Set-up

- 1.1** Complete the Intake Questionnaire to set up your initial data access to the Database. Here, you will identify future Database users by user type, and data visibility preferences.

*See Database User Guidance ("Getting Started")*

- 1.2** Once approved, identified users will receive an email with ArcGIS Online account credentials. \* Your ArcGIS Online account gives you access to the Database, including your organization's Private Dashboard, Pollinator Scorecard data, and other services.

### Intake Questionnaire

Visit the ROW as Habitat Geospatial Database website: <http://rightofway.erc.uic.edu/wp-content/uploads/Database-User-Guidance.pdf>

### ArcGIS Online Login

Visit [www.arcgis.com](http://www.arcgis.com) to access your account

\* If using a previously created ArcGIS Online account, an email will not be sent. Instead, the user will need to log into their account and accept the invitation.

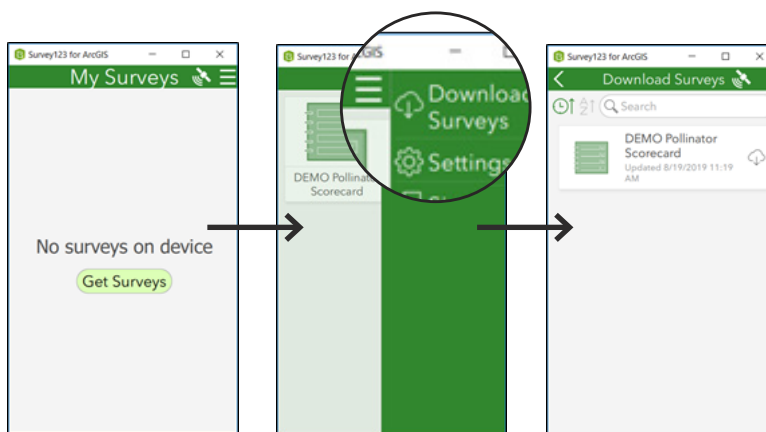
# 2

## Survey123 Set-up

- 2.1** On your phone or tablet, download and install the free ArcGIS Survey123 field app (📄). After opening, select the 3 lines (or your initials) in the top right corner and sign in with your ArcGIS Online account credentials.
- 2.2** Once logged in, select "Download Surveys" and click on the cloud symbol (☁️) to download your organization's Pollinator Scorecard survey.

### Tip

If you get an alert that an update has been made to the survey, select Updates Available and click on the arrows symbol ⇄ next to the Scorecard to update the survey.



# 3 In the Field

- 3.1** Establish your assessment area and select your plot location to conduct the Pollinator Scorecard assessment. Plot set-up instructions can be found in the Pollinator Scorecard User's Guide.\*

*See Pollinator Scorecard User's Guide*

- 3.2** In Survey123, click "Collect" to start a new assessment. Fields with a red asterisk (\*) are required.

The image shows two screenshots of the Pollinator Scorecard Survey123 app. The left screenshot shows the main survey screen with a 'Collect' button circled in blue. The right screenshot shows the 'Site Information' form with fields for Evaluation Date, Start Time, Monitoring Type, Geographic Region, Assessor(s), Assessor(s) Affiliation, and Survey Tier. The 'Collect' button is also circled in blue in the right screenshot.

- 3.3** Fill in the Pollinator Scorecard assessment fields: Site or Management Area information, plot information, habitat attributes, and land management information (if applicable). You will be prompted with fields that correspond to the Pollinator Scorecard tier selected.

*See Pollinator Scorecard User's Guide*

- 3.4** Submit the completed assessment. You can Send Now or Save in Outbox (e.g. if there is no internet access). If you choose Save to Outbox, click "Outbox" to edit and/or send completed assessments.

The image shows two screenshots of the Pollinator Scorecard Survey123 app. The left screenshot shows a 'Survey Completed' dialog with options to 'Send now', 'Continue this survey', or 'Save in Outbox'. The right screenshot shows the 'Outbox' screen with a list of assessments, including 'Site 1 - Plot A'. The 'Outbox' button is circled in blue in the right screenshot.

## Pollinator Scorecard User's Guide

Visit the Pollinator Habitat Scorecard website: <http://rightofway.erc.uic.edu/pollinator-habitat-scorecard/>

**\*Note:** A plot is 1500 sq. ft.

## ArcGIS Field Maps App

Sites and Management Area details and geographic boundaries can be viewed by phone or tablet using the ArcGIS Field Maps app. **Note:** ArcGIS Field Maps was launched in October 2020 and replaces the functionality of ArcGIS Collector, ArcGIS Explorer, and ArcGIS Tracker on the iOS and Android mobile platforms.

*See Database User Guidance ("Field Data Collection")*

## Key Functionality

- Plot GPS coordinates can be captured either for the current location or by selecting a location on a map. Survey123 will capture your current location if you are offline.
- There is the option to upload one or more photos of the plot. You can use the camera icon to capture a new image (if available on your device) or the folder icon to load an image found on the device. Once an image is loaded, you can delete it by clicking on the trashcan symbol or click on the 3 dots to view, rename, or rotate the image. It is recommended that you rename each photo to provide context for the image.

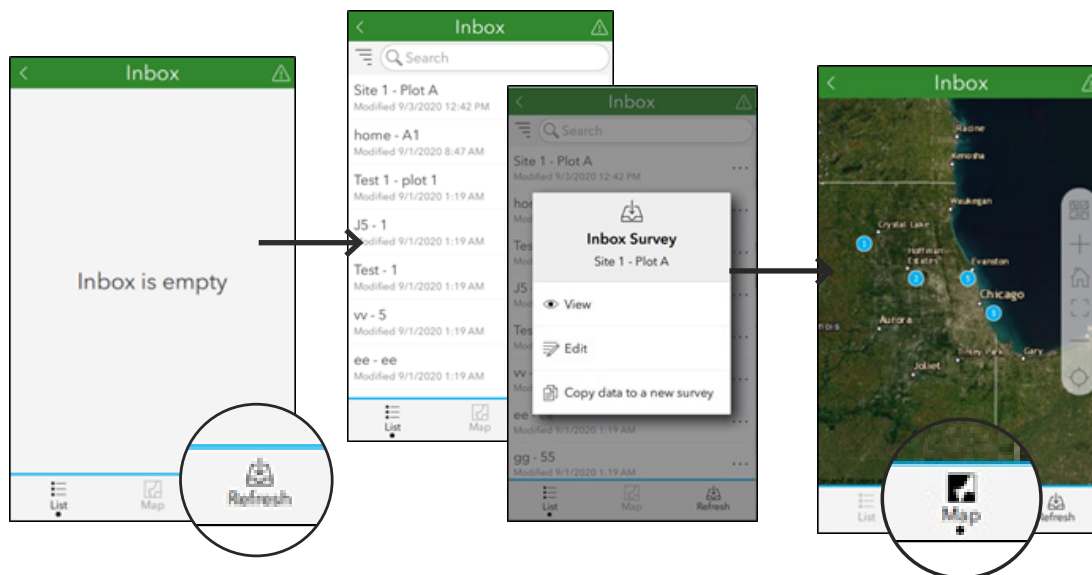
## Tip


Tier 3 species-level data is not available through Survey123 at this time. Species data should be collected on paper form as supporting documentation and may be uploaded in Survey123 as an image or PDF file.

- 4.1** To view or edit your organization's submitted Pollinator Scorecard records in Survey123, open the Inbox and click the "Refresh" button. When you click on a record, you will have the option to View, Edit, or Copy the data into a new assessment.

**Tip**

To narrow the records to a specific area, click on the Map button in the bottom middle, zoom into the desired extent, and click the Refresh button.



- 4.2** To view or edit Pollinator Scorecard data, visit the Survey123 website and login with your ArcGIS Online account credentials. Navigate to Organizations and select the Data icon (  ) in your Management Group. Users may also access data using ArcGIS Pro.\*

*See Database User Guidance "Data Management"*

**Survey123**

Visit the ArcGIS Survey123 website:  
[survey123.arcgis.com](https://survey123.arcgis.com)

- 4.3** To download a copy of your data as a file geodatabase, open ArcGIS Pro\* and do the following:

- Click on Settings
- Under Open and Portal, navigate to your organization's Management Group
- Open the ROW Tools V2 project
- Select View Tab
- Select Tasks
- Open the Importing & Exporting Data folder
- Run the Database Import and Backup Tools
- Choose your organization ID (should only be one option)
- Choose Output Dataset
- Run tool

*See Database User Guidance "Data Management"*

\*By default, all accounts associated with the Database have ArcGIS Pro licensing included. Login with your ArcGIS Online account credentials.

If you have questions on the Database or Survey123, send an email to [rowhwg@uic.edu](mailto:rowhwg@uic.edu) or post your question on the online Discussion Board under Working Group Access at <http://rightofway.erc.uic.edu/>

## APPENDIX 2. DATA SHARING LEVELS

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The Database supports internal tracking of habitat-related data as well as data sharing with partner organizations and the general public. This document summarizes the data attributes shared at the *Public*, *Basic*, and *Detailed* sharing levels.

## ROW as Habitat Geospatial Database

### Data Sharing Levels

The Rights-of-Way (ROW) as Habitat Geospatial Database supports internal tracking of habitat-related data as well as data sharing with partner organizations and the general public. The **Public Dashboard** provides a general understanding of the extent and value of ROW managed as habitat. ROW partners may choose to share limited data with other users of the database (**Basic Sharing**) and/or share additional data with select organizations (**Detailed Sharing**). Some data (**Internal Use Only**) are only visible to your organization and the database administrator, unless otherwise specified. For a more detailed description of sharing levels and feature classes, see [Database User Guidance](#) and [Schema Guidance](#).

*\*Organizations can independently select the level of sharing for each of the feature types: Centerlines, Sites, Management Areas, and Pollinator Scorecard.*

		Public Dashboard <sup>1</sup>	Basic Sharing Level	Detailed Sharing Level	Internal Use Only <sup>2</sup>
General	Organization ID		X	X	
	Organization type <sup>3</sup>	X	X	X	
	Program name		X	X	
	Location <sup>4</sup>	X	X	X	
	Last modified <sup>5</sup>				X
Center-lines	Line description <sup>6</sup>		X		
	Habitat boundary <sup>7</sup>				X
	Notes				X
Sites and Management Areas	Site/Management Area overview <sup>8</sup>		X	X	
	Location description			X	
	Owner type			X	
	Land overlap <sup>9</sup>			X	
	Total acres	X	X	X	
	Notes			X	
Pollinator Scorecard	Assessment overview <sup>10</sup>				X
	Number of Monitoring Points	X			
	Photos			X	
	Assessment details <sup>11</sup>				X
	Plot data <sup>12</sup>				X
	Adjacent land use		X	X	
	Milkweed <sup>13</sup>		X	X	
	Nectar plant percent cover <sup>14</sup>		X	X	
	Nectar plant count <sup>15</sup>			X	
	Additional habitat data <sup>16</sup>			X	
	Pollinators observed		X	X	
	Total points				X
	Qualitative rating		X	X	
	Threats and opportunities			X	
	Notes			X	

<sup>1</sup> Generalized at county level

<sup>2</sup> Only visible to your organization and database administrator (i.e., University of Illinois Chicago and its contractors)

<sup>3</sup> **Organization type** categorized as road, energy, or other (e.g. rail)

<sup>4</sup> **Location:** State, County

<sup>5</sup> **Last modified:** Modify Date, Modified By

<sup>6</sup> **Line description:** Line Name, Line Type (e.g. single), Start Point, End Point, Miles

<sup>7</sup> **Habitat boundary:** Non-Habitat (right), Non-Habitat (left), Habitat (right), Habitat (left)

<sup>8</sup> **Site/Management Area overview:** Site/Management Area Name, Status

<sup>9</sup> **Land overlap:** Management Area overlaps with lands managed by other entities (Y/N, %)

<sup>10</sup> **Assessment overview:** Site Name, Monitoring Type (i.e. baseline, post-activity), Survey Tier

<sup>11</sup> **Assessment details:** Evaluation Date, Start Time, Assessor Name(s), Assessor Organization, Survey Type (i.e. random/systematic, representative)

<sup>12</sup> **Plot data:** Geographic Region, Plot Number, Plot Location, Plot Description, Photo, Latitude, Longitude

<sup>13</sup> **Milkweed:** Milkweed for West/South (Y/N), Milkweed for Midwest/East (Y/N), Milkweed Abundance (e.g. 2-5 stems), Milkweed Stem Count

<sup>14</sup> **Nectar plant percent cover:** Ten Percent Nectar Plants (Y/N), Nectar Plant Cover (e.g. 6-10%)

<sup>15</sup> **Nectar plant count:** Number of Nectar Plant Species, Number of Native Nectar Plant Species

<sup>16</sup> **Additional habitat data:** Invasive Species and Noxious Weed Cover (e.g. 11-25%), Additional Habitat Resources (e.g. brush piles), Habitat Notes



## APPENDIX 3. DATABASE USER LEVELS

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Organizations can register for the Database at the *Basic* or *Premium User* level. This document summarizes the Database content and tools available at each organizational user level.

# Geospatial Database User Levels

This reference sheet provides an overview of Rights-of-Way as Habitat Geospatial Database user levels.

## What is the Database?

The Rights-of-Way as Habitat Geospatial Database (the Database) is a central repository for tracking existing, restored, and potential pollinator habitat. It facilitates conservation partnerships within and across energy and transportation sectors. The Database can also help your organization communicate the conservation value of your land to the public, state and federal resource agencies, and other key stakeholders.

For more information, including access to additional guidance documents, visit:

[www.rightofway.erc.uic.edu/geospatial-database/](http://www.rightofway.erc.uic.edu/geospatial-database/)

If you have additional questions, email:  
[rowhwg@uic.edu](mailto:rowhwg@uic.edu)

## Why choose Premium?

1. Streamlined reporting to the monarch butterfly CCAA
2. Greater data accessibility through a Private Dashboard interface
3. Support the ongoing management and future functionality of the Database

**REGISTER HERE**

## Basic User Level

**Free**

- Free organizational Database account including Account Administrator, Data Manager(s), and Fieldworker roles
- Anonymous county-level data sharing on the Public Dashboard
- Ability to view and share basic or detailed data with other ROW organizations
- Access to Survey123 web app to collect monitoring data in the field and automatically sync it with the database
- Complimentary ArcGIS Pro license(s) (if needed) to perform bulk data uploads to the Database
- Editing interface through ArcGIS Online to review and fix data errors

## Premium User Level \*

**\$2500/yr**

Organizations that register at the Premium User Level have access to all content and tools included at the Basic User Level, plus:

- A customized Private Dashboard to review key information about your organization's data, including a suite of dashboard analytics, popup survey photos, program stats, and an easy interface for reviewing detailed validation errors
- The Data Management Web Map Application to quickly edit data errors
- An easy-to-use query and reporting tool that pulls and filters monitoring data, runs calculations, and formats compliance reporting with the annual monarch butterfly Candidate

\* All new Database organizations are given a 60-day Premium trial period, after which Premium content and tools can be previewed through the DEMO Fieldworker and Management Groups in ArcGIS Online.

## APPENDIX 4. WEB INTERFACE

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**Key Metrics and Public Dashboard** - The web interface includes Database-wide metrics accessible to the public in two locations. Three metrics (i.e., Monarchs Supported, Total Reported Acres, and Participating Organizations) are featured prominently on the main landing page to quickly communicate the status of monarch habitat conservation efforts across energy and transportation lands. These key metrics are pulled directly from the Database and will update as it becomes more widely used. “Monarchs Supported” estimates the number of monarch butterflies supported by the addition of estimated milkweed stems added to the landscape. This figure is derived using a study of monarch butterfly overwintering density (Thogmartin et al., 2017).<sup>8</sup> The *Public Dashboard* includes these and other metrics (e.g., Total Monitoring Points, Organizations by Sector Type) available through the ArcGIS Online public gallery and is accessible on the web interface (click “Launch the Map”). Additionally, individual habitat areas reported by energy and transportation organizations are generalized by county and state to show the collective impact of ROW organizations where data are available.

**Intake Questionnaire and Esri Additional User Request Form** - Prospective Database users can navigate to the “Getting Started” tab located within the web interface submenu in order to access the *Intake Questionnaire*. The *Intake Questionnaire* establishes initial Database user accounts and data sharing permissions for an energy or transportation organization, which can be later changed through ArcGIS Pro, if necessary. Completion of the *Intake Questionnaire* is required in order to register a new organization into the Database. If an organization wishes to add additional users after initial registration, they can request ArcGIS Online account credentials and ArcGIS Pro licensing through the [Esri Additional User Request Form](#).

**Tutorials and Resources** - The “Tutorials and Resources” submenu landing page contains helpful decision-making tools for existing and prospective Database users. This includes short video tutorials (e.g., “Introduction to the Geospatial Habitat Database Web Interface”), related webinars (e.g., “Managing Multi-Organizational Habitat Data Using ArcGIS Online and ArcGIS Server”), and quick reference documents (e.g., “Survey123 Guide”). “Tutorials and Resources” content may be a more accessible compared to technical documentation contained in the “Downloads” submenu and thus provides an excellent point of entry into the Database.

**Downloads** - All technical Database documentation is available through the “Downloads” submenu. These files are intended for *Data Managers* or *Account Administrators* seeking detailed Database schema information in PDF, spreadsheet, or template geodatabase format. Users may choose “All” to

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<sup>8</sup> Thogmartin WE, Diffendorfer JE, López-Hoffman L, Oberhauser K, Pleasants J, Semmens BX, Semmens D, Taylor OR, Wiederholt R. 2017. Density estimates of monarch butterflies overwintering in central Mexico. *PeerJ* 5:e3221 <https://doi.org/10.7717/peerj.3221>

download a .zip folder containing all documents. Alternatively, users can find a summary of Database schema documentation on the “Tutorials and Resources” landing page (i.e., Data Sharing Levels).

**Login for Registered Database Users** - Registered Database users can access their ArcGIS Online accounts through the “Login Here” button, which prompts users to enter their ArcGIS Online credentials associated with the Database. *Account Administrators* and *Data Managers* may access and edit boundary and habitat data through the ArcGIS Online interface. **Note:** The ArcGIS Online login is separate from the ROWHWG login used to enter the Working Group Access portion of the ROWHWG website.

## APPENDIX 5. SITES AND MANAGEMENT AREAS

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*Sites* and *Management Areas* are used to characterize land areas tracked in the Database. This document further defines *Sites* and *Management Areas* through examples and illustrations.

## Sites vs. Management Areas

An Introduction to Habitat Areas in the Rights-of-Way as Habitat Geospatial Database

### Key Database Terms

**Sites** are land areas (e.g., parcels or groups of parcels) where *Conservation Measures* are tracked on an individual basis with location-specific measures.

**Management Areas** are land areas managed programmatically (as a group) with similar *Conservation Measures* across several locations.

**Pollinator Scorecard** points are locations where an assessment has been performed at one of three monitoring levels (tier 1, 2, or 3) to assess pollinator habitat quality.

**Conservation Measures** are the specific conservation actions that are taken (e.g., conservation mowing, selective herbicide treatments, native seeding, etc.) on a land area.

**Programs (for Management Areas)** are used to apply one or more *Conservation Measure(s)* across *Management Areas*. This is the only way to specify *Conservation Measures* on *Management Areas*. Multiple *Management Areas* can be designated under one program if they share the same management properties (e.g., type, frequency, etc. of conservation actions). These *Programs* also serve as “sampling groups,” so that *Pollinator Scorecard* points across similar *Management Areas* in a *Program* can be evaluated together.

**Programs (for Sites)** are used solely to define “sampling groups.” In this case, *Programs* do not allow for information on *Conservation Measures* since this is already defined uniquely for each *Site*. A *Program* can be assigned to a single *Site* (unique) or assigned to a group of *Sites* (shared) if an organization wishes to evaluate *Pollinator Scorecard* points across a set of similarly managed *Sites*.

**Programs (for Pollinator Scorecard points)** are used to cluster *Pollinator Scorecard* points into “sampling groups” so that habitat assessment results can be examined at a single location or across multiple land areas that share the same or similar *Conservation Measures*.

## Sites vs. Management Areas

An important determination your organization will need to make is whether conservation land areas should be entered as “Sites,” as “Management Areas,” or a combination of each. *Sites* are managed individually, which allows for the most detailed data tracking of what conservation actions have been applied to which land areas (i.e., a granular tracking approach). In this case, *Conservation Measures* are recorded for each location individually and include details such as the type of measure applied, implementation organization, implementation status, implementation frequency, and date of last activity. Organizations can also record the percentage of the *Site* on which a *Conservation Measure* was implemented (e.g., conservation mowing occurred on 30% of the *Site*).

Alternatively, *Management Areas* track conservation actions at a programmatic scale across many land areas and thus does not allow for detailed, site-specific information. Organizations first develop a “Program,” which is a set of *Conservation Measures* that can be applied to multiple locations that are similarly managed. The table below illustrates which *Conservation Measure* attributes can be identified for *Sites* and *Management Area Programs*.

**Table 1. Comparison of Conservation Measure Attributes by Sites and Management Area Programs**

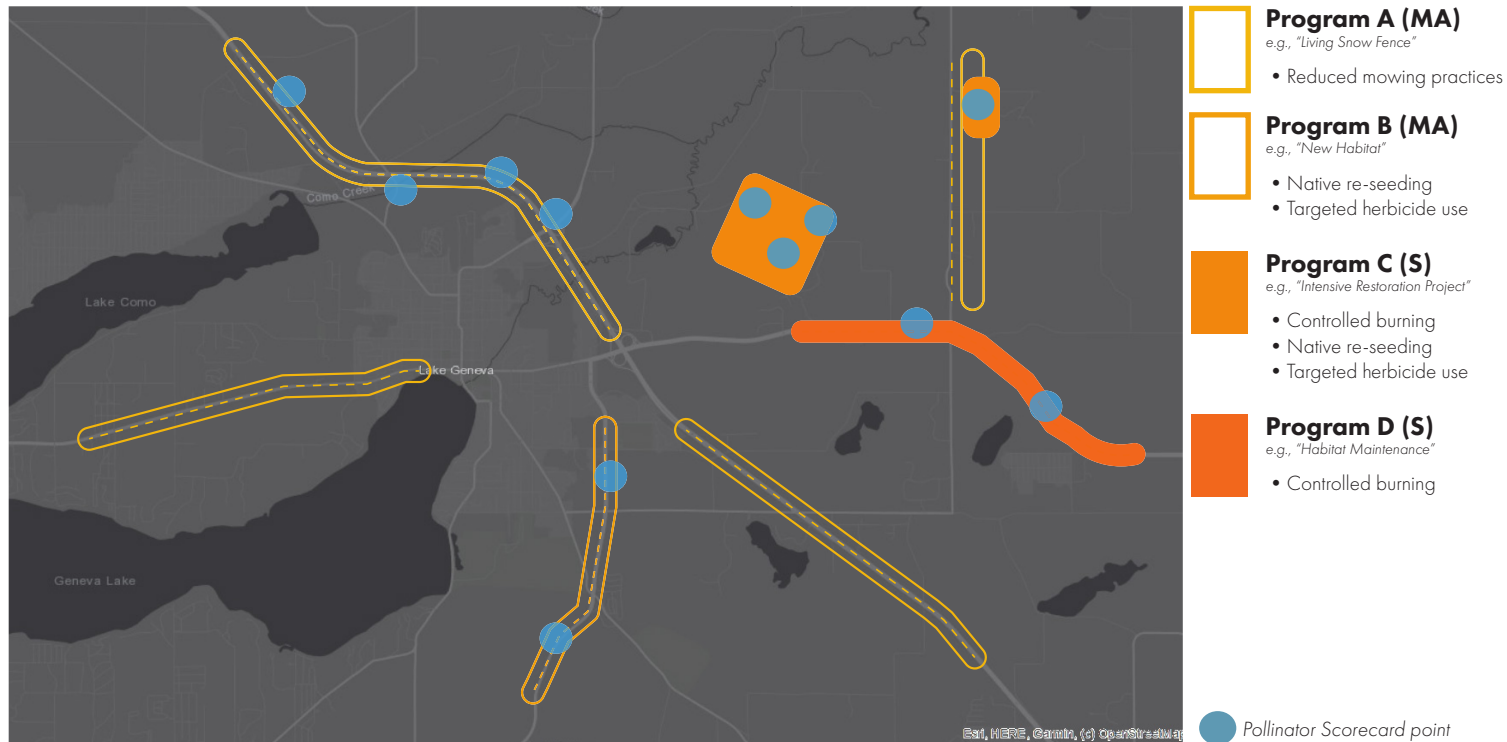
Conservation Measure Attribute	Can be Identified for Sites?	Can be Identified for Management Areas through Programs?
Conservation measure (e.g., seeding and planting, conservation mowing, targeted herbicide, etc.)	✓	✓
Implementation organization (i.e., organization responsible for implementing the conservation measure)	✓	✓
Implementation status (dropdown options: implemented, not yet implemented)	✓	✓
Implementation frequency (dropdown options: one-time occurrence, more than once a year, annually, once every 2 years, once every 3-5 years, once every 6-10 years)	✓	✓
Percent of Site in which measure was applied (e.g., conservation mowing occurred on 65% of the Site)	✓	
Activity start date	✓	✓
Activity end date	✓	✓
Notes	✓	✓

It is important to note that for both approaches, *Pollinator Scorecard* points (i.e., habitat assessments) are tied to a *Program*. For *Management Areas*, the *Program* is used both to (1) identify *Conservation Measures* and (2) group *Pollinator Scorecard Points* across multiple land areas. For *Sites*, the *Program* is used solely for grouping *Pollinator Scorecard* points across related land areas (note: it is also possible to identify a unique *Program* for a single *Site* if an organization wishes to manage its habitat assessments separately).



# Sites and Management Areas

Guide for determining how to designate habitat areas in your system.



## Site

Sites define specific Conservation Measures on an individual land area basis. They are managed individually, which allows for detailed tracking. Sites should be used when:

1. Site-specific Conservation Measures are tracked for each land area, and
2. Individual tracking of when management activity occurs is desired for each land area.



## Management Area

Management Areas identify land areas that have similar management practices. Used alone, they do not allow for the identification of specific conservation measures, but this information can be defined through corresponding Programs (see below). Management Areas should be used when:

1. Many land areas are generally managed in the same way (e.g. programmatic mowing policy), and
2. Sampling across a Management Area may be used to generally determine habitat quality of other similarly managed lands in the Program.



## Pollinator Scorecard

Pollinator Scorecard points are locations where pollinator habitat quality has been assessed at one of three monitoring levels (Tier 1, 2, or 3). Scores are used to characterize individual Sites, groups of Sites, or Management Areas under a Program.

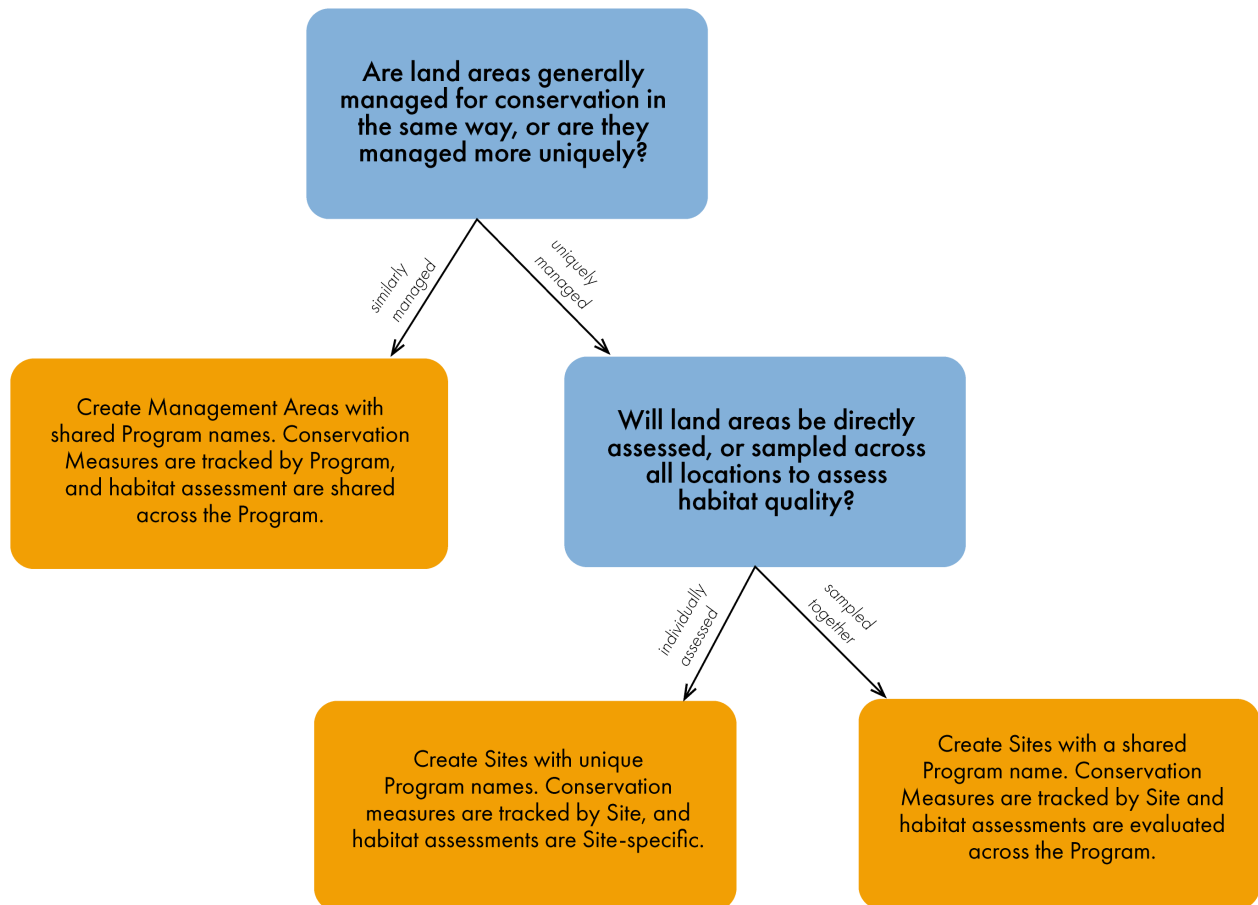
## Program

Programs allow users to associate Pollinator Scorecard points with a particular land area or group of land areas. Programs allow users to group Management Areas or Sites for ease of tracking habitat quality, conservation strategies, or special projects.

In addition, Programs are used to define Conservation Measures for Management Areas. One or more Conservation Measure may be used to

## Decision Tree

This decision tree helps identify if your organization's land areas should be recorded as *Management Areas* or *Sites*, which affects how *Conservation Measures* are specified. It also helps determine if *Programs* should be defined as shared or unique, which affects how habitat assessments are evaluated across land areas.



## Example Scenarios

**Org-A** has multiple corridors that they manage for habitat conservation. They use several different *Conservation Measures* that are applied generally across the corridors. They assess habitat areas systematically across their corridors. Over the years, from one field season to the next, Org-A wants to generally know how their management program is doing in terms of providing habitat. **Recommendation:** Use *Management Areas* with one or more *Programs*.

### Organization A

**Priority:** How is our Program doing overall in terms of providing habitat?

**Solution:** Create Management Areas with shared Program names. Conservation Measures are tracked by Program, and habitat assessments are evaluated across the Program.



**Org-B** has special focus areas where conservation actions are “site-specific” (i.e., uniquely tailored for each location), and each is independently assessed. From year to year, Org-B wants to be able to pull statistics from all of their sites to compare how well each individual site is performing relative to other sites, and how their results may be correlated to the specific applied *Conservation Measures*. **Recommendation:** Use *Sites* with unique *Programs* for each *Site*.

### Organization B

**Priority:** How well are individual Sites performing relative to other Sites, and how can their results be correlated to their applied Conservation Measures?

**Solution:** Create Sites with unique Program names. Conservation Measures are tracked by Site, and habitat assessments are site-specific.

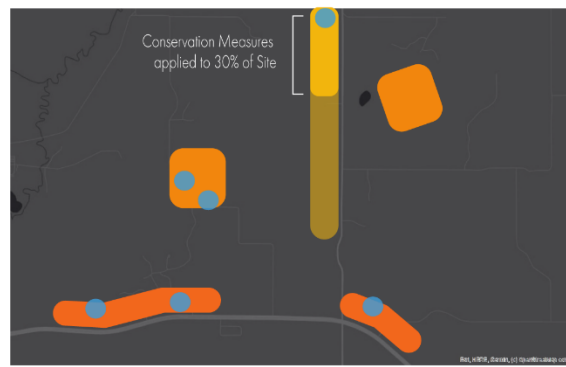


**Org-C** has large corridors with an overarching conservation management plan. Despite similarities along corridors, they would like to track specific details about the implementation of *Conservation Measures*. Org-C might also like to track the percentage of a land area where *Conservation Measures* were applied each year. When it comes to habitat assessments, it would be too time consuming to sample each and every location. Instead, Org-C would like to group several land areas together, so they can then randomly sample from a subset of these locations as a general indicator of habitat conditions across the group. Over the years, Org-C would like to know how habitat in each group compares relative to other groups, and they would like to be able to view site-specific management activities. **Recommendation:** Use *Sites* with one or more shared *Program(s)* for conducting habitat assessments across a subset of *Sites* and record the percentage of the *Site* where a *Conservation Measure* is implemented.

## Organization C

**Priority:** How is each Program doing relative to other Programs, and what are their site-specific conservation activities?

**Solution:** Create Sites with a shared Program name. Conservation Measures are tracked by Site, and habitat assessments are evaluated across the Program.



## APPENDIX 6. PUBLIC DASHBOARD

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The *Public Dashboard* can be accessed without login credentials through this link:

<https://arcg.is/110qO9>

Data shared on the *Public Dashboard* are summarized to county and state scales. Summary information includes the number of organizations, *Pollinator Scorecard* counts, acreage totals across *Management Areas* and *Sites*, and by sector (e.g., energy, roads, rail). These data are summarized across all organizations that are contributing data to the Database. The following quick reference guide provides additional information.

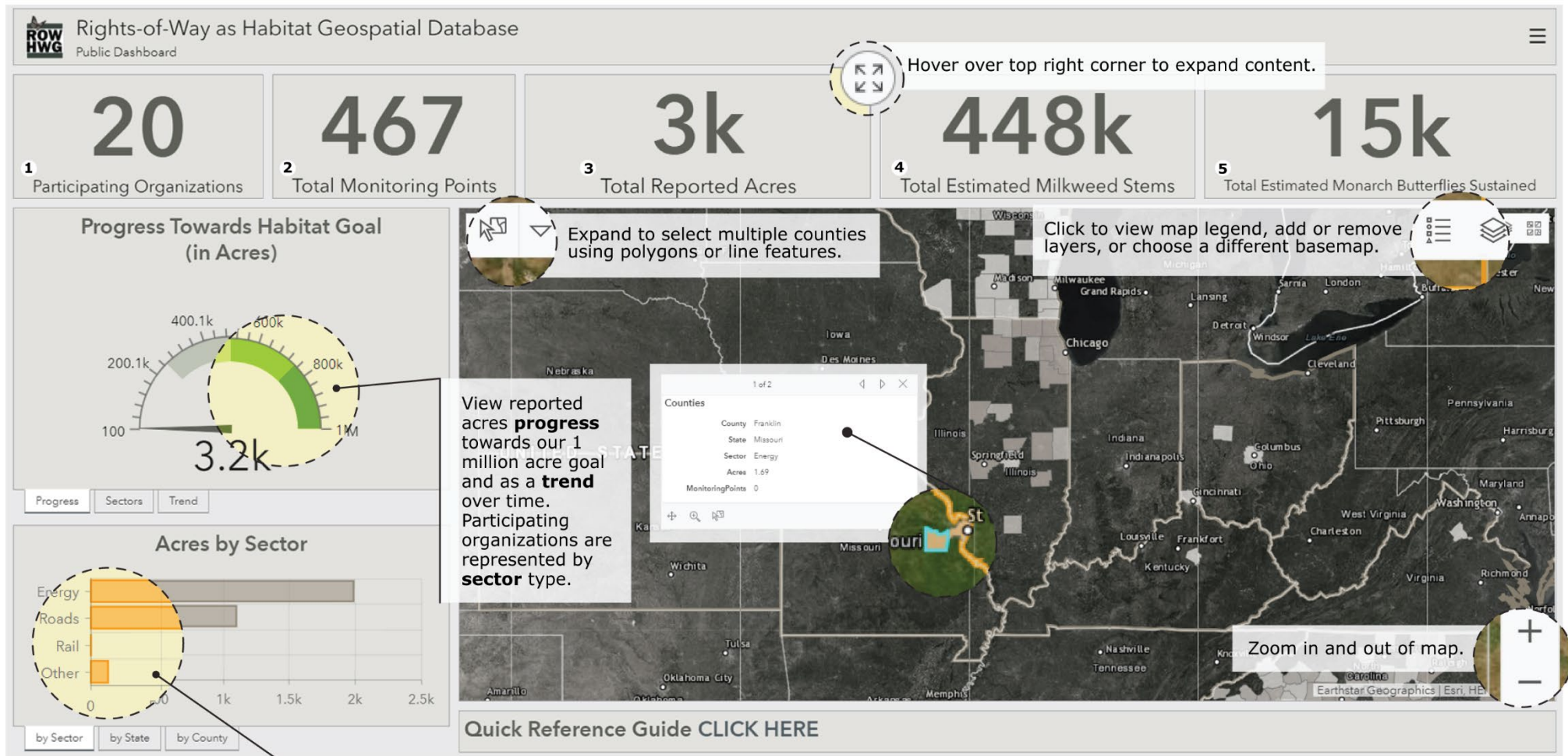


# Public Dashboard | Quick Reference



The Rights-of-Way as Habitat geospatial database Public Dashboard documents pollinator habitat conservation efforts led by participating utility and transportation organizations.

- 1** The number of utility and transportation organizations reporting data into the database.
- 2** The number of Pollinator Scorecard surveys conducted as reported by participating organizations.
- 3** Acres managed for habitat as reported by participating organizations.
- 4** Estimated milkweed stems added, which is calculated based on average milkweed densities for rights-of-way.\*  
*\*Thogmartin et. al, 2017*
- 5** Estimated monarch butterflies supported by the addition of milkweed stems.



Total acres managed for habitat generalized by **sector**, **state**, and **county**.

For more information, visit:  
<http://rightofway.erc.uic.edu/geospatial-database/>

## APPENDIX 7. PRIVATE DASHBOARD

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Organizations registered at the *Premium User* level have access to a *Private Dashboard*, which provides key statistics at a glance for your organization and visualizations and summaries by *Program*. The *Private Dashboard* is accessed through your organization's ArcGIS Online *Management Group*.

Individualized *Private Dashboards* for each organization provide key information about the data that has been uploaded to the Database, including feature counts, acreage totals by *Program*, habitat ratings, and feature validation issues. The following quick reference guide provides additional information. **Note:** *Private Dashboards* are only accessible to members of the organization's *Management Group* via ArcGIS Online.



