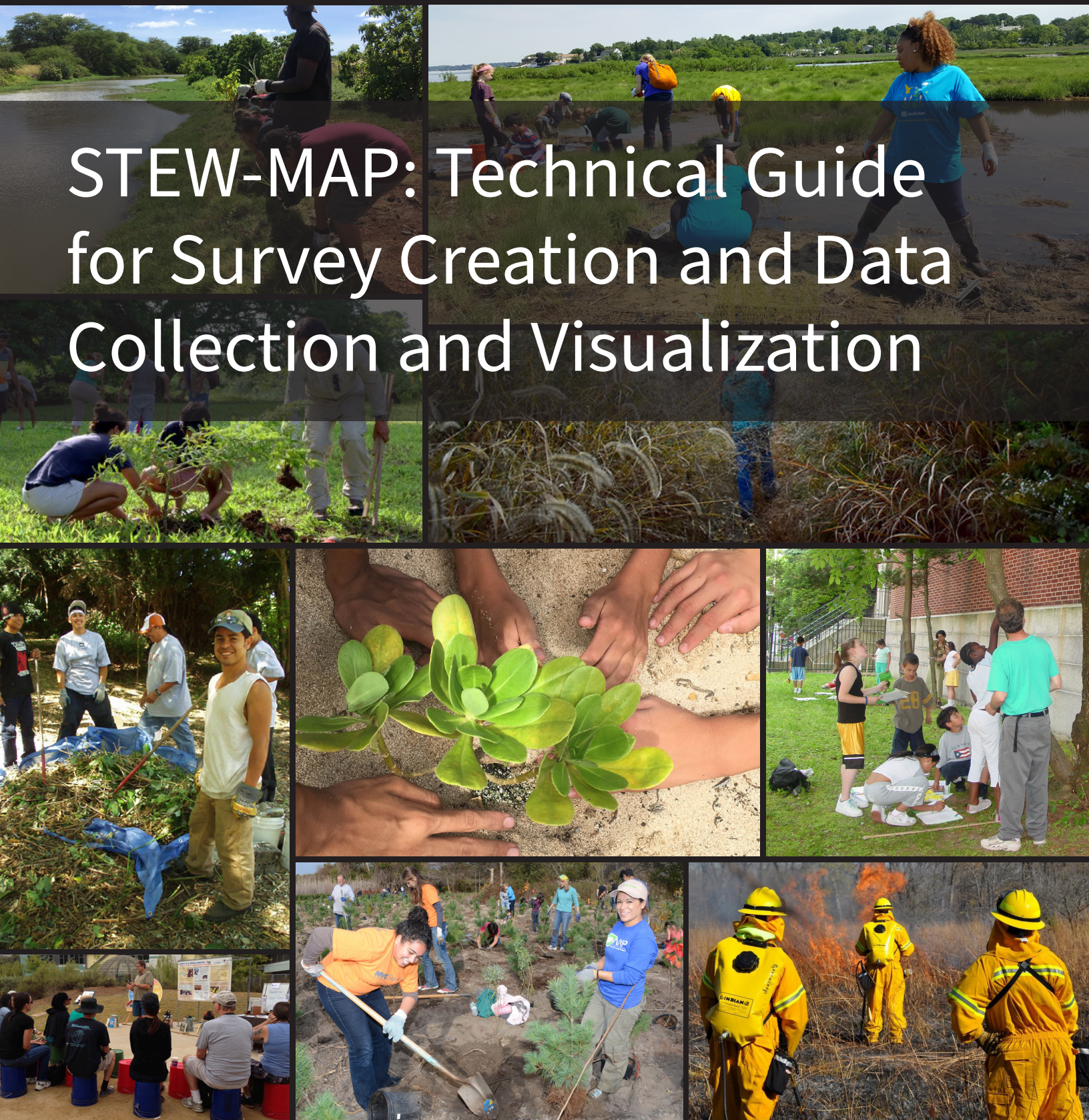




Forest Service
U.S. DEPARTMENT OF AGRICULTURE

STEW-MAP: Technical Guide for Survey Creation and Data Collection and Visualization



Citation

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Abstract

The Stewardship Mapping and Assessment Project (STEW-MAP) is a comprehensive way to survey, map, and track all groups that work to conserve, manage, monitor, transform, advocate for, or educate the public about their local environments. STEW-MAP methodology provides a common platform where a wide range of stakeholders who are interested in shared stewardship activities can support natural resource management and community development. It can also serve as a way for managers and communities to better understand and support stewardship in their area. The STEW-MAP data are represented in a web mapping application that is hosted in ArcGIS Online (AGOL), a cloud-based mapping and analysis software used to make maps, to analyze data, and to share and collaborate.

This technical guide helps STEW-MAP users successfully develop and implement the process in their cities, towns, regional landscapes, and national forests and grasslands. Although this guide is geared primarily toward USDA Forest Service geographic information system (GIS) professionals with experience using GIS desktop and online web applications, readers who are not familiar with the technologies referenced here can gain a basic awareness of the STEW-MAP process by reading the section introductions. Non-Forest Service users may have challenges because some of the links in the document are available only to users within the Forest Service firewall. These partners will need help from Forest Service ArcGIS Online administrators, who may be able to provide access to carry out the workflows. These exceptions are identified, and users are directed to resources to assist them.

Keywords: STEW-MAP, urban forestry, ARCGIS Online, stewardship

Cover Photographs

Top row, left to right: Stewards monitoring a wetland on O‘ahu, courtesy photo from Hawai‘i Department of Land and Natural Resources; NYC Parks wetland stewardship event at Joe Micheals Mile, courtesy photo from New York City Department of Parks and Recreation. **Second row, left to right:** Tree planting and stewardship workshop with Para La Naturaleza, courtesy photo from San Juan ULTRA; participants with Tookany/Tacony-Frankford Watershed Partnership in Philadelphia, courtesy photo from Tookany/Tacony-Frankford Watershed Partnership. **Third row, left to right:** Community members removing invasive plants along the Duwamish River in South Seattle, courtesy photo by Kathy Wolf; stewards planting beach naupaka (*Scaevola sericea*), indigenous to Hawai‘i, courtesy photo from Hawai‘i Department of Land and Natural Resources; youth environmental education program with GrowNYC, USDA Forest Service photo by Erika Svendsen. **Bottom row, left to right:** Environmental educator training in Los Angeles, courtesy photo by Michele Romolini; MillionTrees NYC tree planting, courtesy photo from New York City Department of Parks and Recreation; prescribed fire workers, courtesy photo from Greencorps Chicago-Calumet.

Disclaimer

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1 Introduction

The [Stewardship Mapping and Assessment Project](#) (STEW-MAP) is a comprehensive way to survey, map, and track all groups that work to conserve, manage, monitor, transform, advocate for, or educate the public about their local environments. STEW-MAP methodology provides a common platform where a wide range of stakeholders who are interested in shared stewardship activities can support natural resource management and community development. It can also serve as a way for managers and communities to better understand and support stewardship in their area. The STEW-MAP data are represented in a web mapping application that is hosted in [ArcGIS Online](#) (AGOL), a cloud-based mapping and analysis software used to make maps, analyze data, and to share and collaborate. STEW-MAP is an important tool for cities and towns as well as the public as they face challenges ranging from overstressed infrastructure to severe weather events. STEW-MAP helps enable a [shared stewardship](#) approach to being nimble and developing effective, locally driven solutions. STEW-MAP has already been implemented successfully in several locations, including New York and Baltimore, helping these large cities understand the social fabric of their landscapes and assisting land managers in making more informed decisions with stakeholders and stewards in mind.



Quick Link

See this [guide](#) for a framework for understanding community-based environmental stewardship.



Important

Before You Continue . . .

This guide includes links to help you navigate this document and to direct you to additional sources of information. Here are some other key features and explanations to get started:

ArcGIS Online Account—You must have a USDA Forest Service organizational account to view or create content in ArcGIS Online. Forest Service employees or affiliates may request an account [here \(requires being on the Forest Service network\)](#). Forest Service partners who do not have access to the Forest Service network should work with the appropriate [Forest Service Region, Station, or Area ArcGIS Online administrator](#) to get a partner account. As will be discussed in [Section 5.1](#), a Forest Service Notebook Analyst role is required for post processing and cleaning the survey data. You can request the role when you create your account to eliminate the need for another role change request later.

ArcGIS Online Overview—[Section 1.1](#) gives an overview of AGOL and defines some of the associated terminology. If you are already familiar with AGOL, content, roles, and sharing, skip ahead to [Section 2](#).

Glossary—Terms used frequently in this guide are defined in [Appendix E](#). Links are included for additional exploration.

ArcGIS Desktop Software—Some components mentioned in this guide require users to install ArcGIS Pro on their computer. If you do not have ArcGIS Pro installed, consult the Forest Service [ArcGIS Pro SharePoint page](#) (available only to users inside the Forest Service firewall). For those outside the Forest Service, ESRI offers 21-day [ArcGIS Pro free trials](#).

Training—To familiarize yourself with the STEW-MAP process, review the resources listed in [Section 6](#) of this guide. The links offer instruction for a better understanding of the technology and the guidelines established by the Forest Service.

Quick Link Boxes—The links in these boxes direct you to details on how to perform various steps of the workflow.

This technical guide has been created to help STEW-MAP teams successfully develop and implement the process in their cities, towns, regional landscapes, and national forests and grasslands. While this guide is primarily geared toward USDA Forest Service geographic information system (GIS) professionals with experience using GIS desktop and online web applications, managers and others not familiar with the technologies referenced in this guide can still benefit from reading the introductions to each section to gain a basic awareness of the STEW-MAP process. Non-Forest Service partners may also be tasked with implementing the steps in this guide, which may pose challenges because some of the links in the document are available only to users within the Forest Service firewall. In these cases, partners will need to work with Forest Service ArcGIS Online administrators, who may be able to provide access to carry out the workflows. Partners should plan to work through contacts listed in the following paragraph to connect with Forest Service ArcGIS Online administrators. Throughout this document, these exceptions are called out, and users directed to the right resources.

For GIS professionals tasked with implementing the technical aspects of STEW-MAP, this guide is a resource for creating new surveys for your location using Esri's¹ ArcGIS Survey123, downloading and processing the survey results, and creating data visualizations using AGOL Operations Dashboard and Insights. The technical workflow outlined in this guide assumes basic understanding of, and some experience using, GIS desktop software such as ArcMap and ArcGIS Pro, in addition to ArcGIS Web Maps and Web Applications. Also, some experience with html coding, the computer-programming language Python, and [ArcGIS Notebooks](#) is needed for some of the survey form development and post processing steps. For technical questions about any step in this guide, Geospatial Technical and Applications Center (GTAC) analysts and the STEW-MAP team can be reached during the process for technical support. Contact Nathan Robbins (nathan.robbins@usda.gov).

For more general questions about the STEW-MAP process and how to maximize survey responses from your [sampling frame](#), contact Michelle Johnson (michelle.l.johnson@usda.gov).

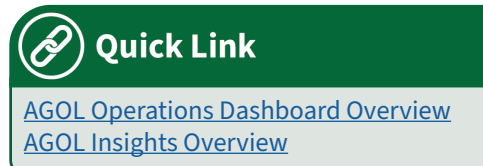
¹ Esri™ is a geographic information software company, headquartered in Redlands, CA. <https://www.esri.com>.

1.1 STEW-MAP AGOL-Based Products and the Geospatial Technology and Applications Center

In 2019, the STEW-MAP team approached the [Geospatial Technology and Applications Center \(GTAC\)](#), a division of the USDA Forest Service, National Forest System, for help in reconfiguring STEW-MAP's existing application. GTAC worked with the STEW-MAP team to replace their existing New York City STEW-MAP 2017 application with a new, off-the-shelf AGOL application, along with an AGOL Dashboard and AGOL Insights network visualization.

From this association, the following products were created:

- [New York City STEW-MAP 2017 Web Map](#)
- [New York City STEW-MAP 2017 Web Mapping Application](#)
- [New York City STEW-MAP 2017 Operations Dashboard](#)
- [New York City STEW-MAP 2017 Insights Visualization \(internal to Forest Service employees\)](#)



1.2 An Overview of ArcGIS Online

This section discusses the basics of ArcGIS Online (AGOL, henceforth) and defines some of the AGOL terminology used throughout this document. These terms and concepts provide a common language for discussing the different processes used to generate the STEW-MAP products covered in this guide. Also refer to the [glossary](#) for additional definitions.

AGOL is an online, collaborative GIS application that allows users to explore data, create maps, and share stories. Using AGOL, you can:

- Use and create maps
- Publish data as web layers, both internally and for the public
- Access ready-to-use maps, data, analytics, and application templates
- Use and explore corporate data
- Collaborate and share
- Create StoryMaps and visualize complex geographic scenarios
- Access maps from any device
- Create custom mapping and applications

For examples of AGOL content, visit www.arcgis.com/home/gallery.html.

1.3 AGOL in the USDA Forest Service

The [USDA Forest Service's ArcGIS Online](#) organization website provides an index of all users and content created by the Forest Service. This website makes all content created by groups and individual users within the agency available in one location. It allows users and administrators to create, access, edit, manage, and control access to content.

1.3.1 Region, Station, or Area Administrators

At the Forest Service, ArcGIS Online is administered at the region, station, or area (RSA, hereafter) level. This means if you work for Region 3 of the Forest Service, someone in the regional office will be the administrator for your content, or if you work for the Northern Research Station, someone in the station will be your AGOL administrator. When you set up a new AGOL account, that information is routed through the RSA administrator. That administrator oversees publication and management of all AGOL content generated within their area. The administrator has the responsibility to ensure that the processes used to publish content meet the needs of the agency and adhere to the criteria listed in agency documents, and to manage the content throughout its life cycle. In addition, the administrator tracks all public content and users within their RSA. Aside from managing public content and [web services](#), the administrator can help with a variety of tasks in AGOL. Please contact them via email for consultation. To find a list of current RSA administrators, please visit the [AGOL & Web GIS SharePoint site](#). This SharePoint link will only be accessible to those within the Forest Service firewall. If you are a partner, work with the Forest Service RSA administrator for your location to create a partner account.

1.3.2 AGOL Roles and Privileges

A role defines the privileges that a user has within the Forest Service AGOL organization. It determines what you are permitted to do within AGOL. The most common role for creating content is the Content Creator role. It allows you to perform all the necessary steps to create any kind of content (except sharing content with the public).

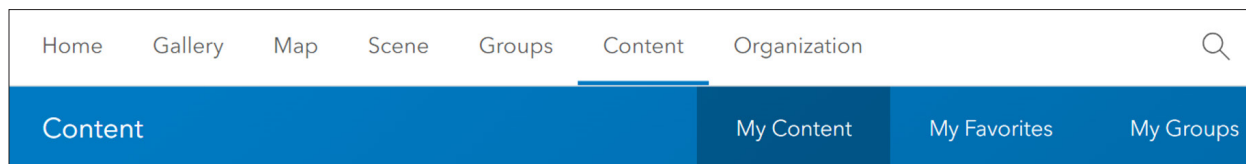
1.4 AGOL Content

Any item stored or created in AGOL is referred to as content. Examples of content include [web maps](#) and [web applications](#).

All content is “owned” by a single user within AGOL. If you create or upload content, you own it. Owning content means you have full control over the content. It also means you can dictate who has access to it.

All content in AGOL has an **Item Details** page that contains a variety of information, actions, options, and settings organized by tabs: Overview, Data, Visualization, Usage, and Settings. The tabs available, as well as the options and information available on the tabs, depend on the item type, your role within the organization, and whether you are the item owner.

Content can be accessed from the **My Content** page by right-clicking the drop-down arrow to the right of the content title. For more information, visit [ESRI's help documentation](#).



Header at the top of ArcGIS Online showing **My Content**.

The Content URL (uniform resource locator) is the link you provide to others to view your content. It can also be used to add your content to other apps. A common mistake is to use the URL of the item details page when you should use the URL of the actual content. The URL for the content can be found on the **Item Details** page, on the **Overview** tab at the bottom of the right-hand column.

The screenshot shows the 'Overview' tab for a 'STEW-MAP Template' in ArcGIS Online. The main content area includes a map thumbnail, a description of the STEW-MAP Viewer, and a details sidebar. The details sidebar contains information such as size, ID, API, purpose, share options, owner, tags, and credits. The URL field at the bottom of the sidebar is highlighted with a red box, showing the URL: <https://www.nrs.fs.fed.us/STEW-MAP/app>.

Location of URL for sharing ArcGIS Online content.

As of summer 2023, we also suggest using ESRI's [Experience Builder](#) as the preferred type of web application.

1.4.1 Sharing AGOL Content

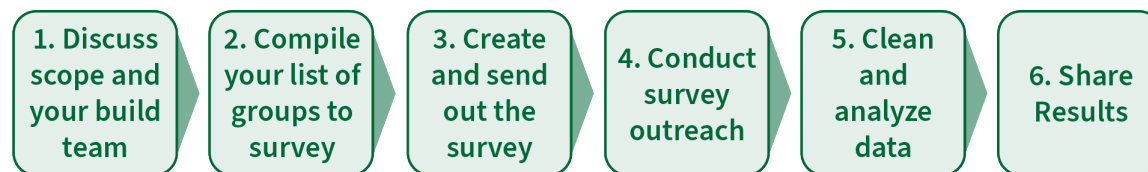
All content within AGOL can be shared. Sharing your content gives others access to view what you created. There are three categories with whom content can be shared:

- Specific groups
- Entire organization
- Public (everyone)

Consider these three categories as ordered by how much each restricts access to the data. Sharing with specific groups of users limits access the most, while sharing content with the public restricts access the least because everyone can view it. For more information about sharing content, visit [Esri's help documentation](#).

2 STEW-MAP Workflow Outline

STEW-MAP has been successfully implemented in many places over the last decade. The methodology can be adapted for a range of budgets, for cities or regions of various sizes, and in urban, suburban, and rural areas. The six main steps are described below. For additional information, see the list of resources in [Section 6](#). This guide covers steps 3, 5, and 6 in detail; step 2 is critical to the process and is covered briefly in this section, in [Section 3.8](#), and in [Appendixes A](#) and [C](#). For assistance with steps 1, 2, and 4, contact the [Forest Service Northern Research Station STEW-MAP team](#). You can also refer to additional resources identified in [Section 2.7](#).



2.1 Step 1: Discuss Scope and Build Your Team

STEW-MAP may take different forms—from basic to deluxe—and can be implemented on several scales depending on your team’s capacity, team and partner needs and interests, and the size of your geographic area. The STEW-MAP team can discuss the potential scope and cost of the project, but to complete the process, a minimum 1-year commitment and one dedicated project coordinator are recommended. The team leader is responsible for overall project scope and engaging key stakeholders as both data providers and project advisors. The team leader builds a set of vested stakeholders/advisors who convene at each stage: building the database, finalizing the survey, sharing preliminary results, scoping needs for analysis and visualization, and disseminating results. Your team also should include people who are good with data, communication, and writing. You can also consider assembling a more formal advisory board made up of local experts.

2.2 Step 2: Compile Your List of Groups to Survey

Identify stakeholders and ask them to be data providers by providing a list of civic stewardship groups they work with and relevant contact information. Many groups will already have a contact list for their partners. As your contact lists start rolling in, you’ll need a method to store and organize your data. Create a Microsoft® Excel spreadsheet with one row per group and column headers for contact information and any other relevant information, such as the contact person’s social media handle or job title.

Some tips:

- Think of umbrella organizations, either government agencies or nongovernmental organizations (NGOs), that have a wide reach of civic stewardship groups.
- Try to reach every sector that might engage in stewardship—so not only environmental groups, but also organizations that focus on public health, education, youth, social services, and so on.
- Ensure that the entire geographic area is represented.
- Jumpstart your population by downloading publicly accessible lists of NGOs derived from the 990 federal tax forms required for all nonprofit organizations.
- Create a unique code for each organization. Typically, STEW-MAP projects call this code [PopID](#).

[Section 3.8](#) addresses the importance of creating this list of groups early in the process and refers to this list of groups as the basis for your [Master List](#). [Appendix A](#) discusses how to populate your survey form with the list of groups. [Appendix C](#) discusses how to use your Master List for merging with office locations.

2.3 Step 3: Create and Send out the Survey

Once the [sampling frame](#) is complete, you are one step closer to launching STEW-MAP. Start with the version of the STEW-MAP survey approved by the federal Office of Management and Budget (OMB) in [Stewardship Mapping and Assessment Project: A Framework for Understanding Community-based Environmental Stewardship](#).

Finalize all the questions on the survey with your team and save a final version of the survey. If you have put together an advisory board or small group of trusted stakeholders, ask them to review the questions and share opinions. It is also important to construct a cover letter to the survey that outlines why a group should want to participate in STEW-MAP. Determine whether you will be sending the survey by mail, electronically, or some combination of both. We recommend a simple and inexpensive survey software to manage your survey invitations and responses, such as SurveyMonkey®, Qualtrics®, or even a simple Google form. Upload your list of groups and their contacts and then hit send!

2.4 Step 4: Conduct Survey Follow up and Outreach

Consider ways to encourage and increase response from groups. You can be present at local events to meet people face to face, ask your stakeholders to share a blurb about STEW-MAP in their newsletters, and follow up with emails and phone calls to recipients who have not yet responded. You can also offer an incentive for groups to take the survey, such as giveaways, a raffle drawing, or a social media highlight. To prevent bias, it is important that every group in your population receives the survey in the same manner and the same number of times.

Here is an example of what your follow up strategy might look like:

- Send reminders: two email reminders (1 week after first send, then 2 weeks after first send) and/or two phone calls. On phone calls, offer to (1) complete the survey over the phone (preferred), entering responses into Survey 123 to avoid having to merge paper data with online data, or (2) offer to visit and complete the survey in person.
- Record all follow up in a tracking spreadsheet, building off the list of groups.
- Be systematic in your follow up: groups that have not already replied receive the same number of reminders, in the same way, at roughly the same time.

2.5 Step 5: Clean and Analyze the Data

Once the survey is completed and responses received, you will need to clean your data. Remove any duplicates so there is only one response per group. Identify groups with incomplete data and determine how you will follow up with them. You may also need to exclude certain groups that received the survey in error or are not actually civic stewardship groups.

You will also need to clean and standardize your geographic and network data, including mapping the geographic turfs of all respondents in a mapping platform or geographic information system. After your dataset of survey responses is finalized, you can review your responses and look for patterns and trends in the data.

2.6 Step 6: Share Results

Share results with your data providers and survey respondents and through social media, blog posts, white papers, and peer-reviewed publications. You can also display spatial data on the Forest Service ArcGIS multicity portal if you follow the formatting steps in the [Geospatial Guide \(pdf\)](#).

Other options for sharing your results include:

- Static maps
- Online interactive maps (for example, the AGOL products you create in [Section 5](#))
- Individual turfs, showing where each group works
- Stacked turfs, to show number of groups in an area
- Linked with network and organizational characteristic data
- Layered with other GIS datasets
- Datasets, including a GIS database, networks dataset, and spreadsheets
- Infographics and fact sheets
- Reports
- Research articles
- Network diagrams

2.7 Resources for Implementing the STEW-MAP Process

The following resources explain the process, survey questions, and implementation suggestions:

- [Overview STEW-MAP webinar](#) (requires free Adobe Connect software)
- [STEW-MAP step-by-step slide presentation \(pdf\)](#)
- [General Technical Report NRS-156](#)
- [NYC 2017 Survey \(pdf\)](#)
- [Implementation Guide 2.0 \(pdf\)](#)
- [Geospatial Guide \(pdf\)](#)
- [Networks Cleaning Steps Guide \(pdf\)](#)

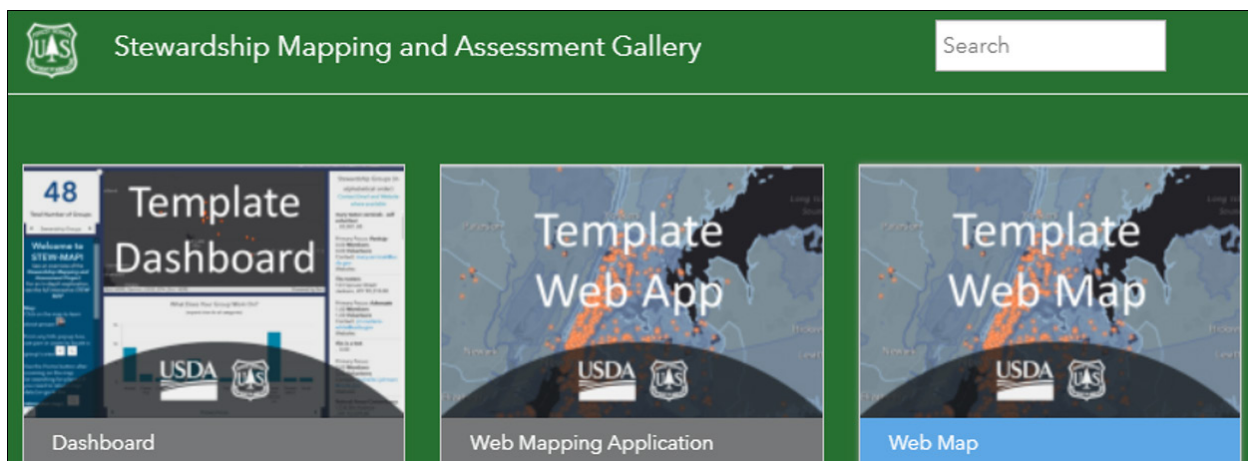
3 Create and Distribute a Survey

The remainder of this guide provides a step-by-step technical roadmap through the STEW-MAP process, focusing on Survey123, Operations Dashboard, and Insights software.



3.1 Access STEW-MAP ArcGIS Online Gallery

Access and download several templates, forms, and online tools available from an AGOL Gallery to create and eventually send out your survey. The [Stewardship Mapping and Assessment AGOL Gallery](#) contains map and application templates, forms, tools, and user guides relevant to STEW-MAP. Since this gallery is created and configured as an internal collaborative AGOL group, you must be a member of the Forest Service AGOL group to view and download the content. External (to the Forest Service) partners will need a partner AGOL account.



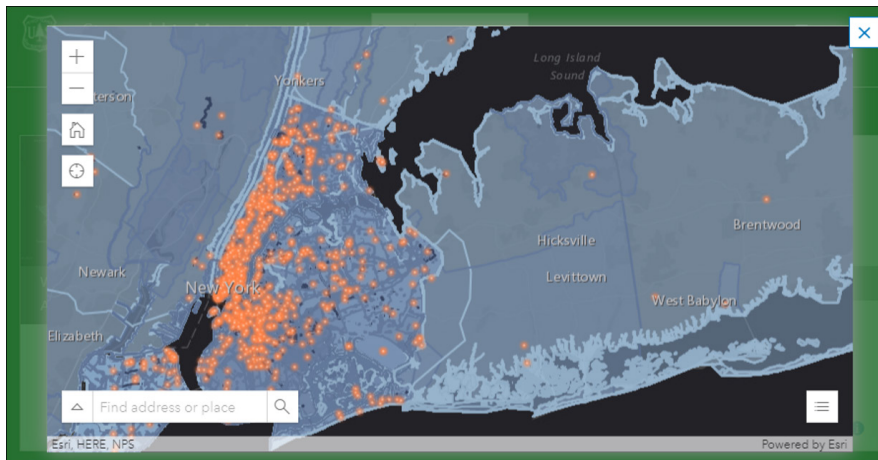
STEW-MAP AGOL gallery.

Note

An AGOL group is a shared collection of content in AGOL. It is a virtual place to organize and share content, as well as a mechanism to control access to that content. A group is owned (or controlled) by a single user, and that user defines who can be a member of that group. The owner can share content with that group, and all group members can view the content. Groups can also be configured so that members can share content with the group.

3.2 View Preview and Metadata for ArcGIS Online Gallery Items

By selecting a specific item in the STEW-MAP Gallery, you can open a preview of what the item looks like. For example, selecting the template **Web Map** icon will open a view of what the template map might look like, drawing upon an example geography. This is only a preview of the map and does not permit saving or viewing other details. Close the preview window by selecting **x** in the upper right corner.



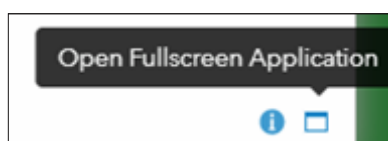
Preview of online map.

Select the small blue information icon **i** in the lower right of an item within the gallery to access additional AGOL item details, where you can view, edit, share, download, or review metadata descriptions.



Internal Data Overview Dashboard.

Select the small icon  next to the information icon **i** to open a full-screen application in view only mode.



Enlarged image showing where to select Open Fullscreen Application on the Internal Data Overview Dashboard.

3.3 Create Survey

After you have put together your team, discussed scope, and compiled a list of groups to survey, the next step is to create a new survey. The software you use will depend on your available resources and capacity. This user guide focuses on ArcGIS Survey123 (hereafter referred to as Survey123) software and describes each step to properly configure the software for your location.



Quick Link

See [Section 6](#) for tutorials and resources available from the Forest Service and ESRI. [AGOL Survey123 Overview](#) provides details for this software.

Survey123 is a complete, form-centric solution for creating and sharing surveys and analyzing survey results. This software comes with two options: Survey123 Web lets you quickly create surveys with a drag-and-drop interface, while Survey123 Connect lets you use a Microsoft Excel [XLS Form](#) to create surveys. Excel XLS simplifies the creation of forms, and Survey123 Connect allows you to preview your form files as you create or edit, publish your forms to AGOL, and create feature layers based on your form specification for data collection.

3.3.1 Survey123 Advantages and Disadvantages

Survey123 has several advantages:

- Allows for geographic input
- Connects to ArcGIS Online
- Excel forms are easy to replicate

Survey123 also has disadvantages:

- Limited customization
- Excel form changes must be made in spreadsheet, then uploaded to Survey123 Connect, then republished to AGOL (can cause issues with data if done during surveys)
- Excel form can be cumbersome and time consuming to edit
- Some graphical user interface (GUI) problems for users
- Data need to be post processed (Python script provided in processing surveys section below to help with this processing)
- For groups that do not input their office locations, latitude/longitude 0 must be fixed during post processing (addressed in Python script provided)
- Mapping more than one polygon per organization is not allowed
- Many limitations and difficulties associated with geographic turf creation

3.3.2 Survey123 Alternatives

There are several alternatives to Survey123 for collecting the data. The software options listed below create a unique ID for each organization in the list of groups, allow you to load your [Master List](#), send your survey to that list, track who responds to the survey, and send reminders to take the survey. In Survey123, these must be done manually.

Alternative software options include the following:

- SurveyMonkey
- Alchemer®
- Qualtrics
- Google Forms (has fewer features available than other software)

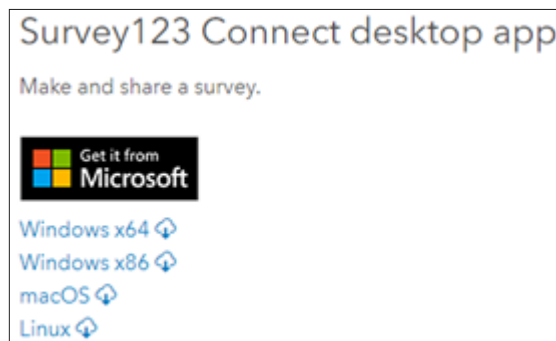
3.4 Create an Account on ArcGIS Online

If you are new to the ArcGIS Online environment, an ArcGIS Online account is required for creating and viewing maps and applications within the [Forest Service ArcGIS Online Organization](#). Refer to [ArcGIS Online Account](#) in the introduction to this guide for more information on how to create an ArcGIS Online Account.

3.5 Download and Install Survey123 Connect Software

Survey123 allows you to create a new survey form in a human-readable format starting with a spreadsheet template, but first you will need to download and install Survey123 Connect software. Forest Service users should be able to download this without a problem, but Forest Service partners may need to obtain access from the Forest Service AGOL administrator. Survey123 includes the Survey123 Connect desktop tool, which works along with your [XLS Form](#)-authoring tool to create XLS files. Survey123 Connect allows you to preview your XLS form files as you author or edit them, publish your forms to ArcGIS Online, and create feature layers based on your form specification (data dictionary) for data collection.

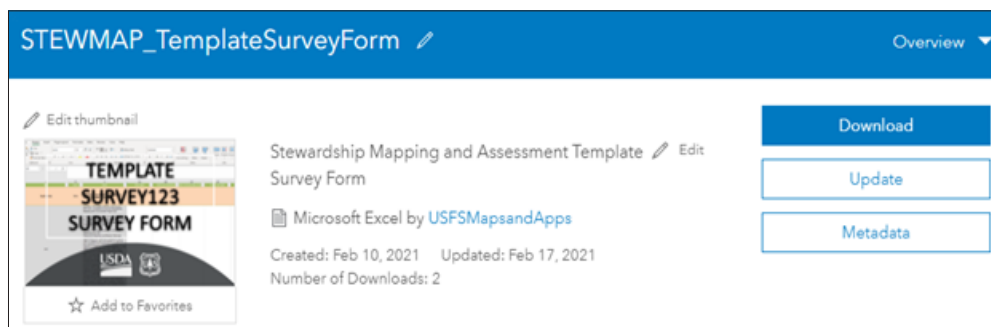
Download and install [Survey123 Connect desktop application](#) appropriate for your operating system.



Download Survey123 Connect software.

3.6 Download Survey123 Template and Create Survey

Navigate to the [Stewardship Mapping and Assessment ArcGIS Online Gallery](#) and download the Survey123 template. The template file is an [XLS form](#) titled STEW-MAP_Bridger-Teton.xlsx.



The screen from which the Survey123 template can be downloaded from the ArcGIS online gallery.

An updated survey form, created from this template, is required for a new survey and is hereafter referred to as an [XLS Form](#). (Once an XLS form is imported and viewable in a web browser through Survey123, it is referred to as survey or survey form in this guide.) The XLS form can be edited in Microsoft Excel as well as other software, including Kingsoft Spreadsheets, Google Sheets™, and Apache Open Office® Calc. There are also online X-forms builders that export XLS form spreadsheets that can be used with ArcGIS Survey123 as a survey form.



Quick Link

See [Section 6](#) for more links and tutorials on Survey123 form essentials and advanced topics

Starting with this template, you can edit the individual survey questions and drop-down choice options specific to your location to create your custom XLS form. **Become familiar with the form-editing Survey123 tutorials in [Section 6](#) before you attempt any edits.** The html tags Survey123 uses can be difficult to navigate, even for a seasoned web developer.

A standardized Survey123 survey template is available in the STEW-MAP AGOL Gallery for download and has been provided as a starting point, with many of the standard questions included. Your team may wish to alter this template based on your local needs. However, changes and adjustments should be as minimal as possible to ensure standardization. Keeping most of the survey the same as the template improves consistency and comparability, and customizations should be applied only when essential or for compelling reasons. For example, you may wish to add to the list of site types to better describe your landscape or add a particular environmental concern, such as a specific invasive species or fire management, to measure networks related to that issue.



Important

Ensure that the list of survey groups and their [PopID](#) (a manually created unique ID number) are included. Creating a unique ID number enables each stewardship group to carry a unique identifier throughout the steps of receiving and returning the survey, connecting their information to the right place on the map and highlighting their networks of partner connections. Refer to [Section 3.8](#) and [Appendix A.1.3](#) for more information on how to include the list of groups in your survey and populate their PopID.

3.7 Customize Survey123 Form to Create Your Survey

After you have downloaded the Survey123 template, open it in Excel (or another previously mentioned software) to become familiar with the layout. We recommend keeping items as standard as possible to allow for easiest comparability across STEW-MAP locations, while making local modifications where appropriate. In other words, maintain as many of the template features as possible, changing or editing only a minimum number of items. A STEW-MAP data dictionary in the survey form can be created for your location and will be a

good resource to consult as changes are made to customize the survey to your needs. To see an example of the data dictionaries used in previous STEW-MAP projects, refer to the [STEW-MAP data website](#).

As previously mentioned, the html tags that Survey123 uses may be difficult to navigate, even for a seasoned web developer, potentially leading to minor glitches and mistakes in the process. In addition, if changes are inadvertently made to the wrong fields and naming conventions are not followed correctly, it can lead to errors and missed fields in the subsequent post processing workflow. After reviewing the Survey form and comparing it to your data dictionary, we

highly recommend that you compile and send a list of all the required changes to the GTAC and STEW-MAP team (nathan.robbs@usda.gov and michelle.l.johnson@usda.gov). A team member will work with you to complete the necessary edits to the template and provide an updated XLS form to use in Survey123 Connect to review and publish your survey. A basic overview of the components of the [XLS Form](#) is provided here so you can navigate easily and prepare a list of the needed updates.

When you open the Survey123 template, you will see four worksheets (tabs) along the bottom:

- **Survey**—gives your form its overall structure and contains the full list of questions and information about how they should appear in the form.
- **Choices**—specifies the answer choices for multiple choice questions.
- **Settings**—provides an optional worksheet that allows further customization of the XLS form.
- **Types**—contains a list of the questions you can enter in the **types** column of your form, what input is accepted for the question, and the field type that is created in the associated ArcGIS feature layer for that question when the form is published. Field types may include number integer, number decimal, number range, free text, geometry, or date. For more information about field types, see [ESRI custom columns](#).

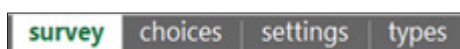


Image of the four worksheet options in the Survey123 template.

The **survey** and **choices** worksheets contain a set of mandatory columns that must be present for the form to work plus a set of optional columns that allow additional control over the behavior of each entry. Refer to [ArcGIS Surevey 123 XLSForm essentials](#) for additional information on these worksheets.



Quick Link

See [Appendix A](#) for how to customize the form for your location, including easy text and label changes. Too much modification of the form is highly discouraged, so the form is as standardized as possible.



Note

Some of the template updates are simple standard text and label changes that are easy and can be done prior to coordinating with GTAC. Refer to [Appendix A](#) for a list.

3.8 Add List of Groups

As described in [Section 2.2](#), a list of groups should be considered and discussed with your team early in the process, during the general workflow. The first and most critical step is to add this list of groups, along with each group's name and unique identifier ([PopID](#)), to XLS form so that each potential group is represented in the survey. This will be the basis for your [Master List](#) and will be used in the process described in [Appendix C](#) when you are joining network collaborators with office locations.

Prior to adding the list of groups to the XLS form, you will want to have identified a list of groups who will receive the survey. An example of how to format this list in a way that will integrate with the Survey123 template is to create the Master List in a Microsoft Excel spreadsheet in which each group has one row, and column headers are used for contact information and any other relevant information, such as the social media handle or job title for the group's contact person. At a minimum, each group should have a unique identifier and name for each group in a PopID and OrgName column that are identical to the columns found in the Survey123 template. Additional columns can be added to the Master List spreadsheet to store other critical information and do not need to follow a specific naming convention. This Master List will be updated after the survey closes, while the list of groups receiving the survey ([sampling frame](#)) will continue to include only those groups receiving the survey.

A	B
PopID	OrgName
1	AmPL Advocates for Multi-Use of Public Lands
2	Anaconda Trail Society
3	Backcountry Horsemen
4	Big Agnes
5	Bureau of Land Management

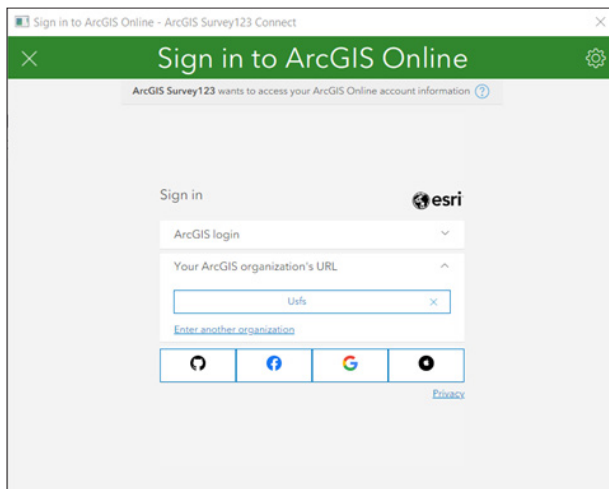
Portion of a spreadsheet showing one group per line, with the organization's PopID in one column and the organization's name (OrgName) in another column.

For the technical aspects of adding Master List groups to the Survey form, refer to [Appendix A.1](#).

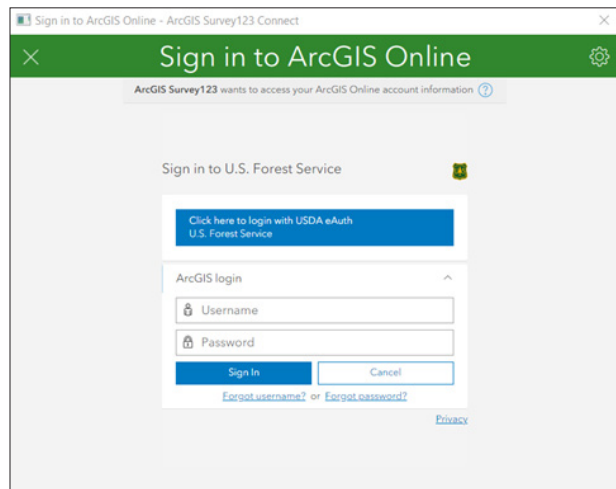
3.9 Create and Deploy Survey

After you have completed customizations to the Survey123 template (in coordination with GTAC and STEW-MAP teams and resulting in your [XLS Form](#)), you will be able to import this form into your desktop Survey123 Connection application, which you should have already downloaded to your computer in a previous step. (If you did not download and install Survey123 Connection application, go back to [Section 3.5](#). This application will allow you to import your XLS form and review changes throughout the process to ensure you are on the right track.)

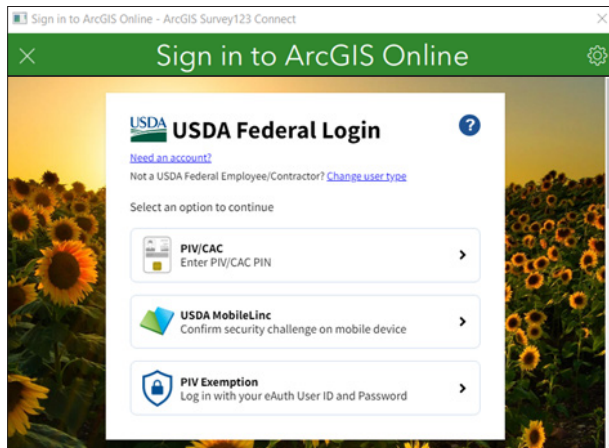
Launch Survey123 Connect and log into the Forest Service AGOL org. If logging in with USDA eAuth, you must login using your eAuthentication credentials. If logging in with a named Forest Service AGOL account, sign in to the ArcGIS Online login with your username and password.



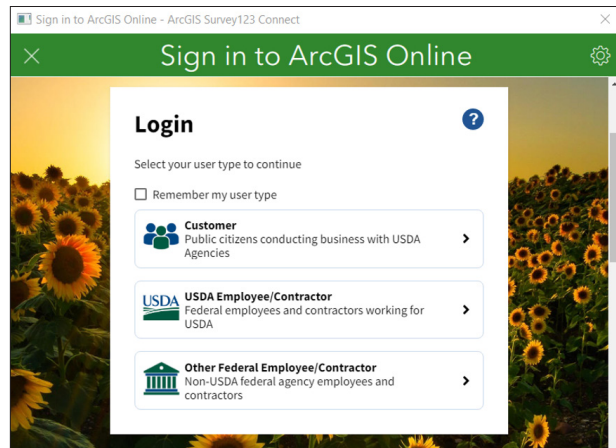
Sign in to ArcGIS Survey123 Connect software.



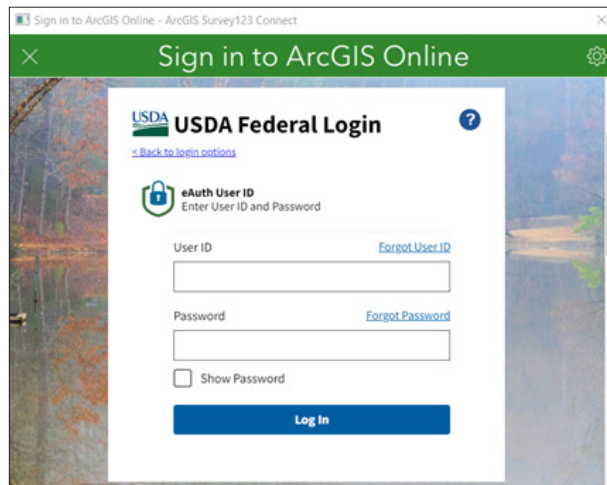
Sign in to Forest Service ArcGIS Online in ArcGIS Survey123 Connect software—ArcGIS login.



Sign in to ArcGIS Online in ArcGIS Survey123 Connect software—USDA eAuthentication login.

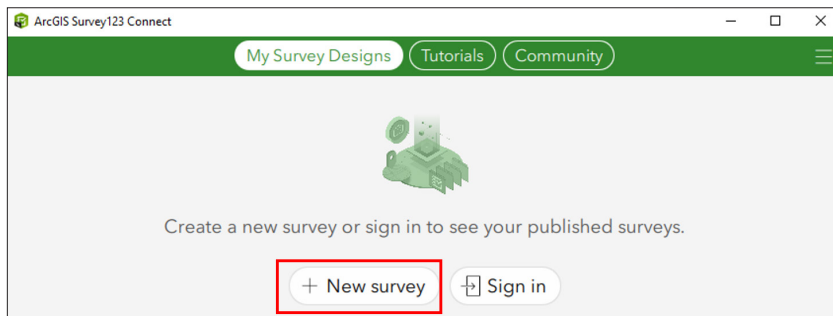


Sign in to ArcGIS Online in ArcGIS Survey123 Connect software—USDA eAuthentication login PIV Exemption.



Sign in to ArcGIS Online in ArcGIS Survey123 Connect software—USDA eAuth User ID and Password.

Select + **New survey**.

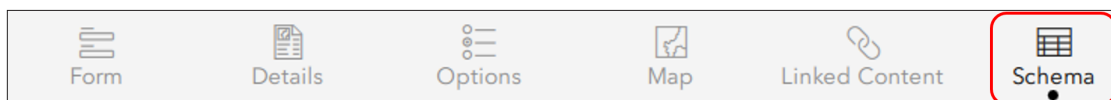


Create new survey in Survey123 Connect software.

Give your survey a title and select the [XLS Form](#) file from your computer.

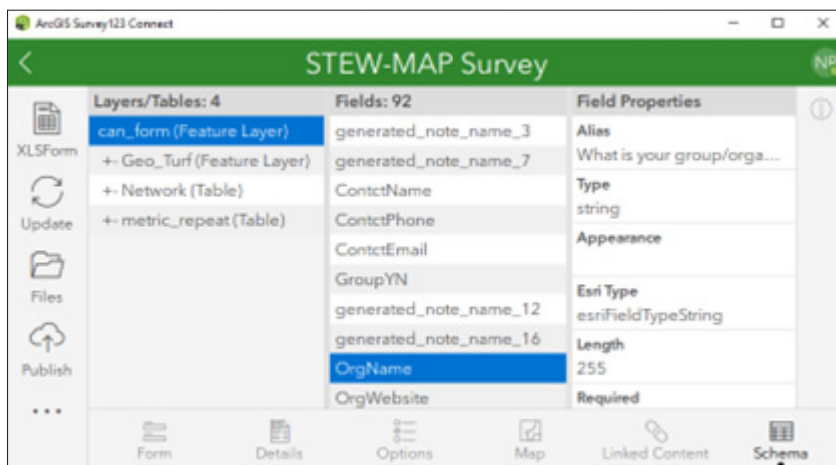
Select XLS form in Survey123 Connect software.

Once the XLS form has been imported, you can review the specifics of how the final survey form will appear by selecting the various icons along the bottom: Form, Details, Options, Map, Linked Content, and Schema.



Final survey form appearance choices in Survey123 Connect software.

Select the schema button to see the layers/tables, fields, and field properties for your survey and navigate through the various layers and tables to review the fields and properties for each. This is a good way to review the full design prior to publishing the survey to AGOL.



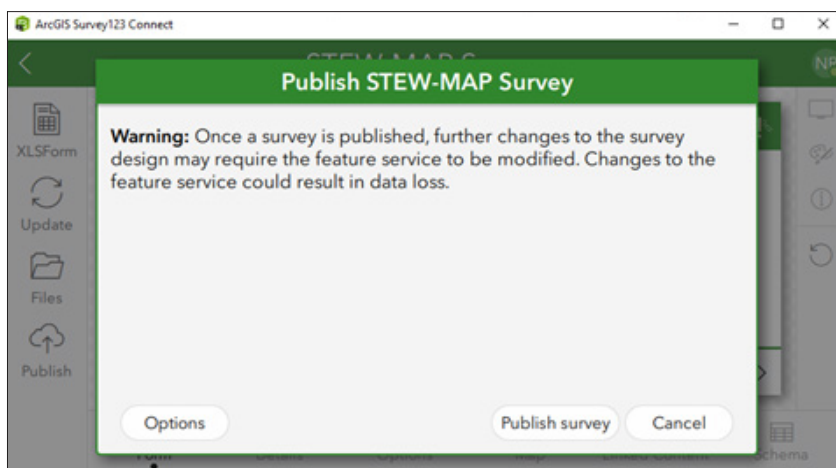
Review the fields and properties for each in the survey form in Survey123 Connect.

If, upon review, there are additional changes needed, such as changing the location name, tailoring introduction text, or adding additional categories to close-ended questions, you can further modify the XLS form. To do so, select the XLS form button on the top left in the navigation panel of the screen, which will open the form in Excel. When desired modifications are complete, save the form and close. Go back into Survey123 Connect, select **Update**, and then review the changes in the XLS form or schema sections.

Note

Any changes to the form may require the [feature service](#) to be modified, so ensure all required changes have been completed prior to publishing.

When the XLS form has been adapted and formatted as desired, select **Publish survey** to publish (you will be asked to login to AGOL by inputting your username and password for AGOL).

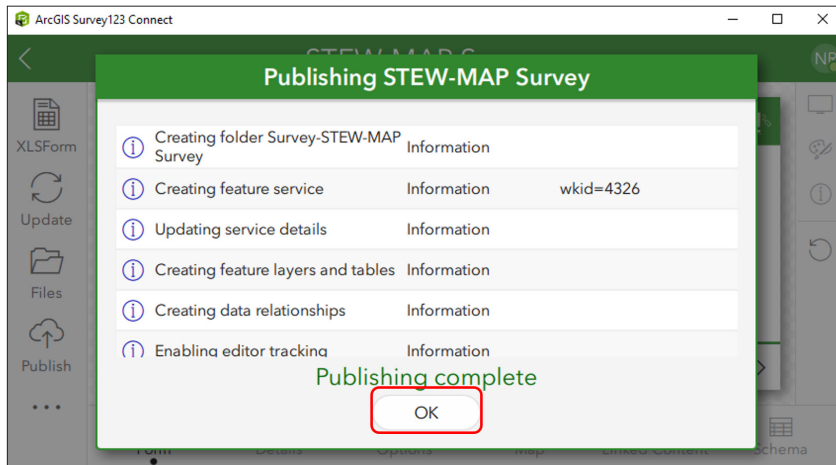


Publish survey form in Survey123 Connect software.

You will see the status as the survey is published. When complete, select **OK**.

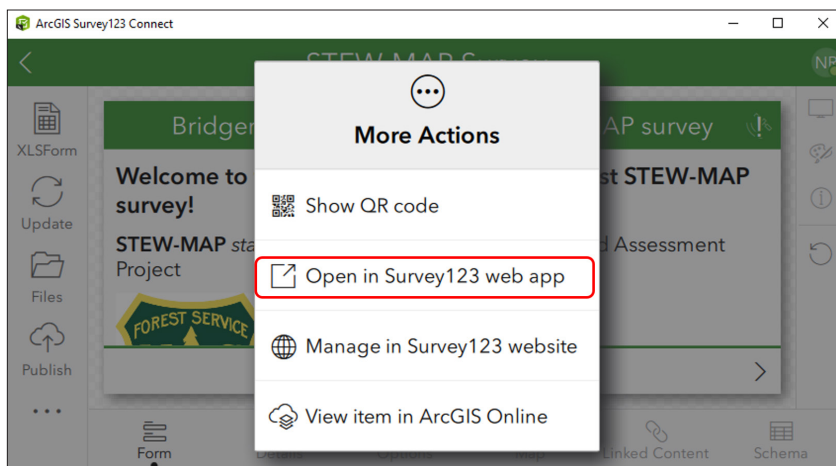
Note

Be aware that when using [repeat functions](#) in the XLS form, the page preview in Survey123 goes blank and can be viewed only after publishing the survey. In addition, some of the styling changes made in the template do not display in Survey123 Connect. These appear to be bugs in the software with no known workarounds.



Publishing survey screen in Survey123 Connect software.

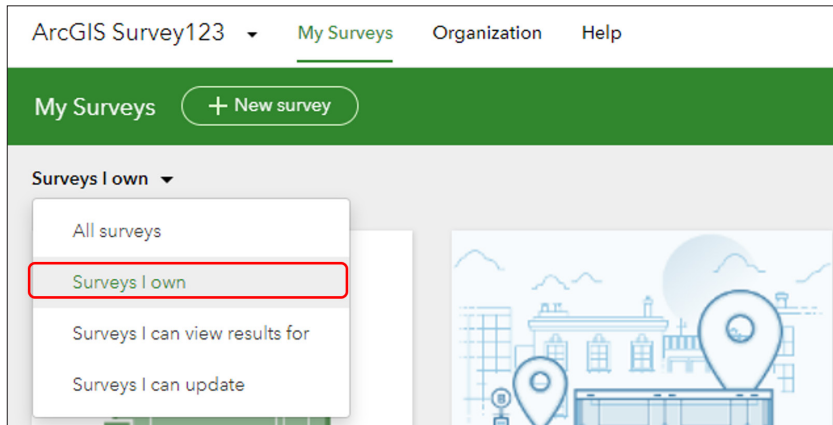
Select the **More Actions** button (below Publish) to see additional options for your survey.



Select **More Actions** for additional options for your survey in Survey123 Connect software.

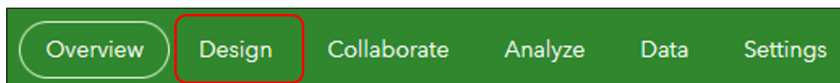
Select **Manage in Survey 123 website**, which will allow you to view and manage your survey on the Survey123 portion of the AGOL website, separate from the Survey123 Connect software. This will open a web browser and take you to the AGOL website.

On the AGOL website, sign in using your AGOL organizational account username and password to view all surveys published by your organization in addition to the surveys you own in the web-based version of Survey123. Change the view by selecting **Surveys I own** from the **My Surveys** menu. You should see the survey you just published at the top of the list. Select this survey, open, and review settings and design as the respondents will see it.



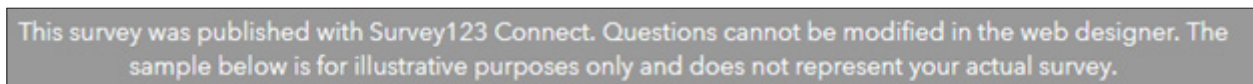
My Survey and **Surveys I own** in Survey123 Connect software.

Survey123 Web allows you to manage surveys you have published using the Overview, Design, Collaborate, Analyze, Data, and Settings tabs.



Tabs to manage surveys you have published from Survey123 Connect in Survey123 Web software.

When you select the **Design** tab, note the message displayed:



Message that displays when users select the Design tab.

Note

Since this survey was published with Survey123 Connect, you will not be able to edit the design in the browser-based Survey123 website. You must go back to the XLS form to make changes, then re-import into Survey123 Connect and republish to the Survey123 website. **However, as mentioned previously, all changes should be made in the Excel form and reviewed in Survey123 Connect prior to publishing the survey form to prevent data loss during survey data collection.** The Survey123 Web should only be used to view the statistics, such as number of participants, number of records, and so on. This website can also be used to collaborate and choose how the survey will be shared and with what groups in the AGOL organization.

When a new survey is published, the following components are automatically created in your AGOL content folders:

- **Web map**—an interactive display of geographic information that is available online; it is one of the most basic units of content in AGOL. Web maps contain a basemap, a set of data layers, and navigation tools to pan and zoom. For more information, visit [ESRI's help documentation](#).
- **Form**—an [XLS Form](#) file authored in Survey123 Connect using the [XLS Form](#) standard and uploaded into ArcGIS Survey123.
- **Feature Layer (hosted)**—a web service where the GIS resource is stored (hosted) in ESRI's server and made available in AGOL. For more information, visit [ESRI's help documentation](#).

Folders		1 - 3 of 3 in Survey-STEW-MAP Survey			
Filter folders		☐	Title		Modified ▼
Office of Sustainability and Climate		☐	STEW-MAP Survey	Web Map	Feb 11, 2021
StewMAP		☐	STEW-MAP Survey	Form	Feb 11, 2021
Survey-STEW-MAP Survey		☐	STEW-MAP Survey	Feature Layer (hosted)	Feb 11, 2021

Components found in the folder automatically created in AGOL when a new survey is published: **Web Map**, **Form**, and **Feature Layer**.

Note

Prior to having the XLS form and feature layer transferred to the official [headless public hosting account](#), it is recommended that you make a copy of the [hosted feature layer](#) in your AGOL content to keep for your records. You can also download it to your local computer as another backup option. The published survey form cannot be copied in AGOL, so the XLS form you modified on your computer will serve as a local backup.

The survey form and [survey feature layer](#) (hosted) need to be transferred to the official public hosting account to be branded as needed and shared with the public and the appropriate AGOL groups. Work with your Forest Service [RSA AGOL Administrator](#) to accomplish this step.

Public Data Collection

☒ Approve this layer to be shared with the public when editing is enabled.

If the public does not require editing on this layer, consider either disabling editing or [creating a read-only view layer](#) to share with the public. Disabling editing also improves performance, especially when sharing with the public.

Select the **Approve** box to allow public data collection or sharing layer.

Go to the settings for the hosted feature layer and modify the permissions for editing:

- Choose the **Add** option under **What kind of editing is allowed?**
- Select **Editors can't see any features, even those they add** option under **What features can editors see?**

• What kind of editing is allowed?

☒ Add
 ☐ Delete
 ☐ Update

• What features can editors see?

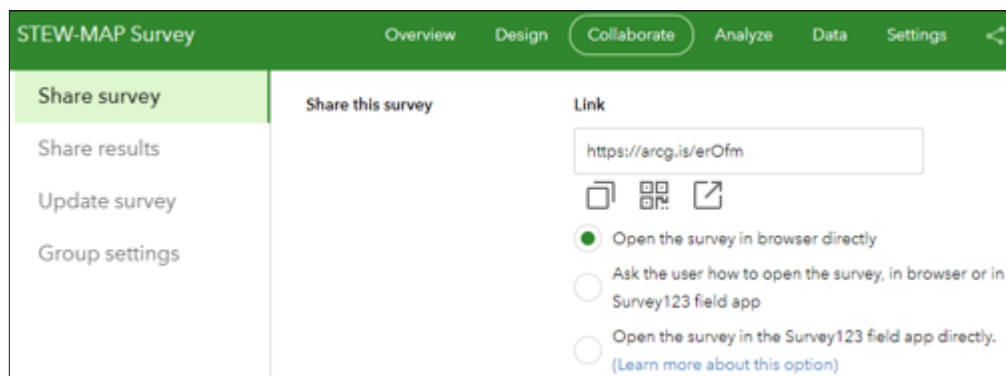
☐ Editors can see all features
 ☐ Editors can only see their own features (requires tracking)
 ☒ Editors can't see any features, even those they add

Selections to modify the kind of editing allowed and the features editors can see.

Selecting these restricts the feature layer to only those in the appropriate groups while still allowing new survey responses to be added. For more information, see the Esri document [Limiting Access to Public Survey123 Results](#).

3.10 Send the Survey

Once the survey form is shared and editing options are modified, provide the survey URL to organizations you hope will participate in the survey. This URL can be obtained by going back to the Survey123 website and selecting the **Collaborate** tab at the top. Change the option for how organizations will open the survey, if desired. For example, beneath the link box, select the **copy** button . Another useful option is to select **Show the QR code**  to download an image to be sent that can be scanned and opened from a mobile device.



Share the STEW-MAP Survey from Survey123 Connect.

You are now ready to send the AGOL Survey123 URL to all organizations in the [sampling frame](#). Once the survey is live, decide how long to accept responses and conduct outreach to your desired organizations. You may wish to host an in-person or virtual kick-off event that introduces your targeted organizations to the project and previews the survey process. While the survey period is ongoing, you may consider several tactics for encouraging responses, such as sending email reminders, mailing post cards, and making phone calls. Many STEW-MAP projects have found it helpful to track which organizations have responded to the survey in a spreadsheet.



Quick Link

See [Section 2](#) for more information; [2.7](#) provides additional resources.

3.11 Visualize Survey Results with Internal Operations Dashboard (Optional)

After the survey is published, you will begin seeing results submitted through the Survey123 website. This is a useful resource for viewing basic information about the survey responses and tracking responses. However, it will be much more useful to have a live view into the actual responses as they are submitted and to visualize trends and patterns. An internal-only [AGOL Operations Dashboard](#) can be created to monitor survey results, make decisions, inform others, and see trends.



Quick Link

See [Section 6.2](#) for additional links and tutorials on Operations Dashboard and how to create and configure one.

3.11.1 Ask AGOL Administrator to Create a View Layer

Ask your USDA Forest Service [RSA AGOL Administrator](#) to create a view of the hosted feature layer that was transferred to the [headless account](#) for public publishing. To do this, the administrator would navigate to the live public [hosted feature layer](#) that was published as part of the survey, go to the item details, and select **Create View Layer**. This new view should then be shared with the organization and with the appropriate AGOL groups so it can be seen by all collaborators on the project. No editing is allowed on this view.

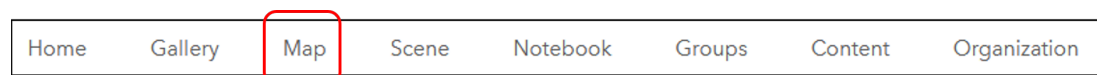


Note

If you are creating a survey with the USDA Forest Service AGOL account, the following steps must be performed by your [RSA AGOL Administrator](#) because they will be the owners of the content.

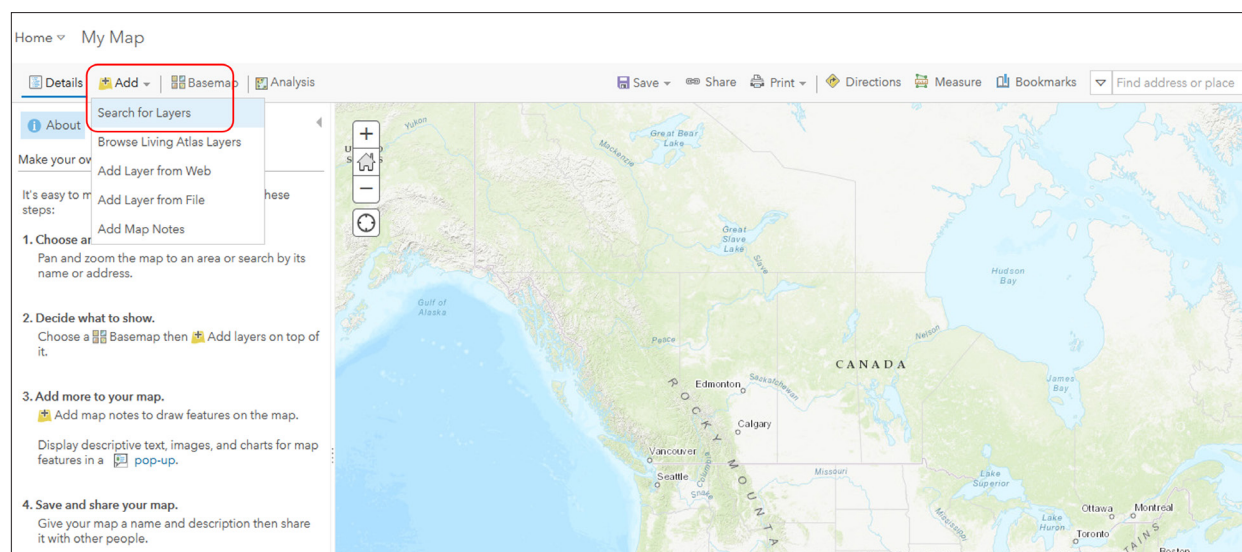
3.11.2 Create Web Map

A [web map](#) is an interactive display of geographic information that you can use to tell stories and answer questions. A web map forms the background and is necessary for an AGOL Operations Dashboard. The first step to creating a dashboard is to log into your personal AGOL account and create a new web map by selecting **Map** in the AGOL Menu at the top of the web page.



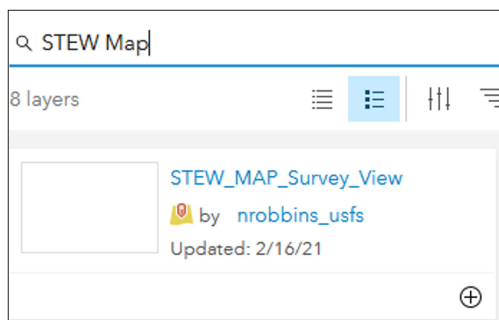
Select **Map** in the AGOL Menu to create a new web map.

In the web map, select **Add layer from Web**, then **Search for Layers**, and search for the new [hosted feature layer](#) view that was just created by your RSA AGOL Administrator from the hosted [survey feature layer](#).



Select **Add layer from web** and then select **Search for Layers** in the web map.

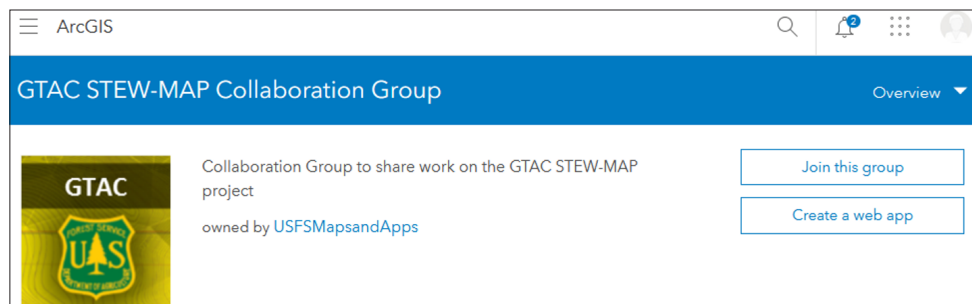
Add the layer to your web map by selecting the **Add** button. Save the web map, which will add it to your content folder.



Select the **Add** button to add the survey feature layer to your web map.

3.11.3 Request Access to GTAC STEW-MAP Collaboration Group

To make copies of the dashboards, maps, and apps in [Stewardship Mapping and Assessment AGOL Gallery](#), your AGOL user account must be invited to the GTAC STEW-MAP Collaboration Group. To request access, go to the [AGOL item details page](#) for this group and select **Join this group**.

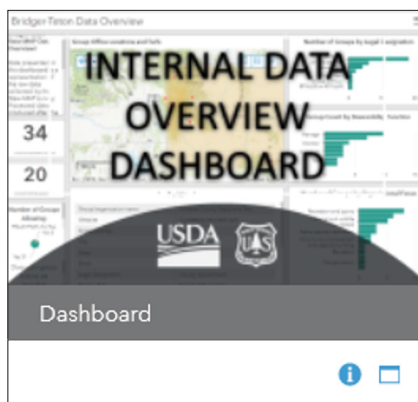


GTAC STEW-MAP Collaboration Group AGOL item.

Your membership request will be sent to the group administrator for review. After the administrator reviews your request and adds you to the group, you will be able to edit items in the group and make copies of the templates.

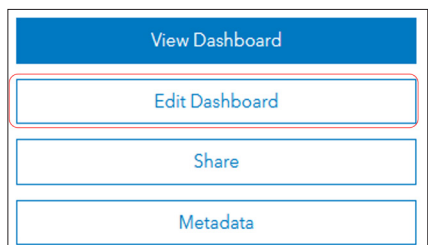
3.11.4 Download, Save, and Configure Operations Dashboard

Once you have been added to the GTAC STEW-MAP Collaboration group, you can go to the [Stewardship Mapping and Assessment AGOL Gallery](#) and find the Internal Data Overview Dashboard. Select the small blue information button **i** at the bottom right to open the template item details page.



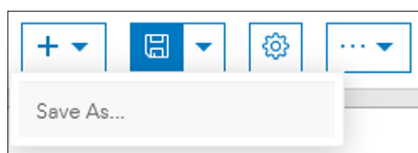
Internal Data Overview Dashboard template item in AGOL.

If you were added to the GTAC STEW-MAP Collaboration group, you will see the **Edit Dashboard** option.



Select **Edit Dashboard** button.

With the dashboard open, select **Save As...** from the icon on the top right.

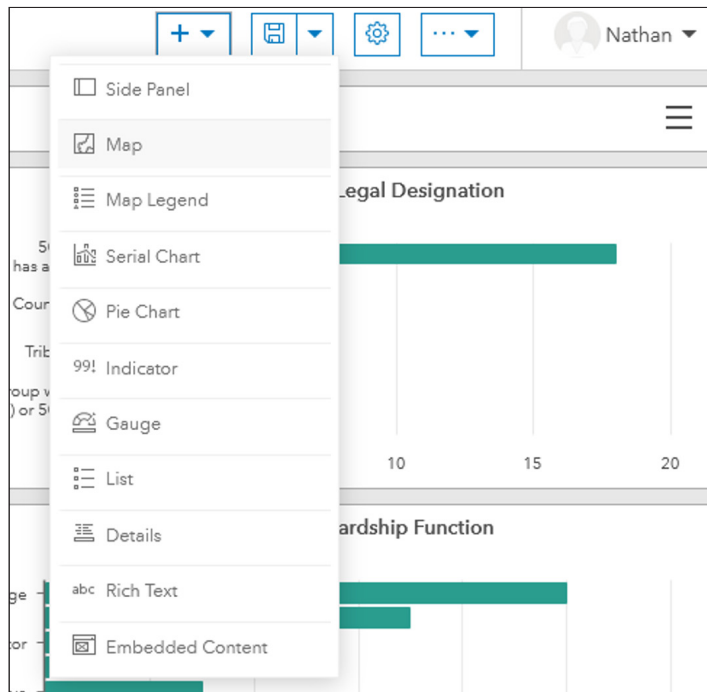


Select **Save As...** option on the Dashboard template.

Give the dashboard a title, tags, summary, and specify which AGOL content folder to save it in. Then select **Save**.

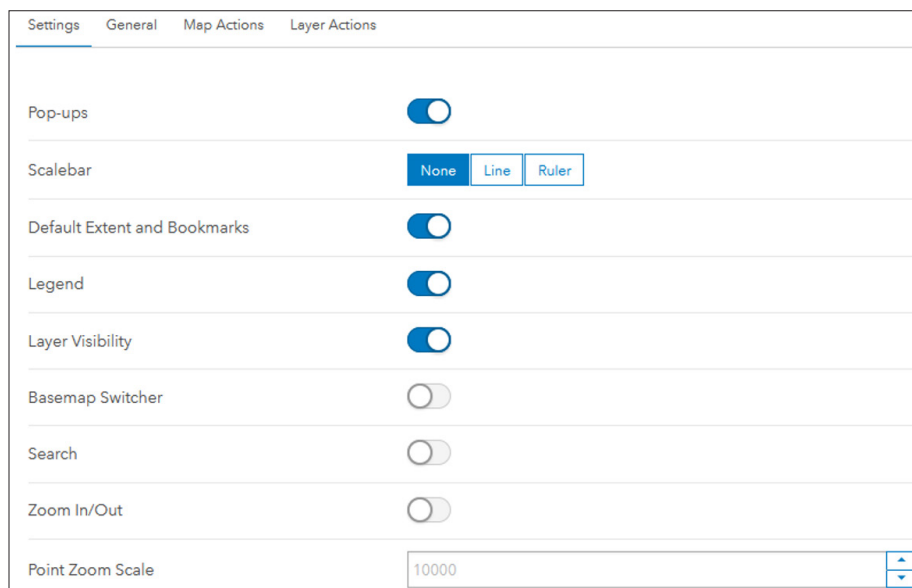
Give the dashboard a title, tags, summary, and specify an AGOL content folder in which to save it.

Select **+** and then **Map**. Select the map created in [Section 3.11.2](#).



Select **+** then **Map** button to add a map to the dashboard.

Enable the following settings: Popups, Scalebar (select **None**), Default Extent and Bookmarks, Legend, and Layer Visibility.



Enable settings to the web map for Popups, Scalebar, Default Extent and Bookmarks, Legend, and Layer Visibility.

Apply the following **Map Actions** to enable filtering by the Attribute Table.

The screenshot shows the 'Map Actions' tab in a settings panel. Under the heading 'When Map Extent Changes', there is a button labeled 'Add Action'. Below this, under the heading 'Filter', there is a button labeled 'Add Target'. In the list of targets, 'Attribute Table' is selected with a checkbox, and a trash icon is visible to its right.

Apply a **Map Action** to enable filtering of the Attribute Table.

Apply the **Layer Actions** to enable Pan for the selection changes for point (can_form) and polygon (Geo_Turf) datasets.

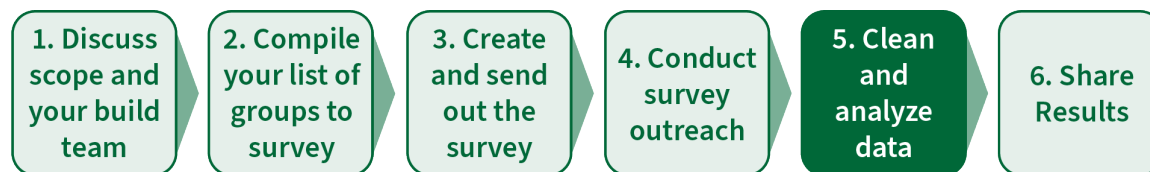
The screenshot shows the 'Layer Actions' tab in a settings panel. Under the heading 'When Selection Changes For:', there are two entries. The first entry is 'STEW_MAP_Survey_View - can_form', which has an 'Add Action' button. Below it, the action 'Pan' is selected, with an 'Add Target' button. The target 'STEW-MAP Data Overview Map' is listed with a checkbox and a trash icon. The second entry is 'STEW_MAP_Survey_View - Geo_Turf', which also has an 'Add Action' button. Below it, the action 'Pan' is selected, with an 'Add Target' button. The target 'STEW-MAP Data Overview Map' is listed with a checkbox and a trash icon.

Apply the **Layer Actions**.

Select the **Configure** option for each of the dashboard elements (dashboards are composed of configurable elements, such as maps, lists, charts, gauges, and indicators that can be stacked or grouped in various ways) and change the layer to the view in your new web map. Ensure all options are configured properly and the data display as intended and look like the original template dashboard. Make sure any actions are also properly defined for each chart. Once all elements in the dashboard are properly updated and configured, you can delete the original map that was part of the template. Save this dashboard and share it with the appropriate AGOL groups.

4 Clean Survey Data

Post-survey processing of the data is an important step in the STEW-MAP workflow. The process removes erroneous responses, deals with duplicate or incomplete responses, cleans up and standardizes field names according to the data dictionary, standardizes group names, assigns unique identifiers, edits geographic turf boundaries, and standardizes network collaborator names.



A key component of the post-survey processing is the data dictionary, a digital file used to document and communicate the structure and content of data and provide descriptions for individually named data objects. Any edits to the data dictionary and customizations need to be applied to the survey and any post processing steps. To see an example of the data dictionaries and the standard data structure used in previous STEW-MAP projects, refer to the [STEW-MAP resources webpage](#). Fields that are suggested to be included in a STEW-MAP data dictionary are:

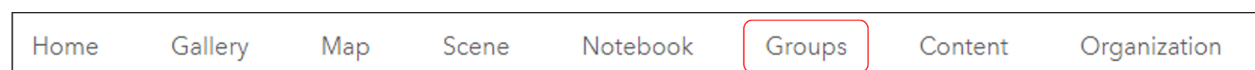
- **Field Name**—the name of each field in the dataset
- **Data Type**—identifies whether the field is text, number, data, etc.
- **Codes**—identifies how to interpret the responses in a particular field, if acting as shorthand (e.g., Y = yes, 1 = strongly agree)
- **Common AGOL Data Dictionary**—if possible, compare against the data dictionary on the STEW-MAP resources webpage linked above and include whether your field is included and identically formatted to the Common AGOL Data Dictionary with a Y or N
- **Notes**—include any additional notes needed

It also is advisable to include survey questions as a column, for where field names are associated with a particular survey question. This can serve as an easy way to cross reference the survey with the dataset.

	FieldNameModified	Count	FieldName	FromSurveySoftware	Common AGOL Data Dictionary	DataType	Codes	Notes
1	ResID	5	Respondent	respondent	N	Number		
3	Research	8			N	Text	Y/N -10%/N - 5%/blank	Only for research purposes. N - 10% and N - 5%
4	PublicMap	9			N	Text	Y/blank	Indicates the group is willing to be on the public map
5	InRespRate	10	InRespRate				Y/blank	
6	NYC/region	10			N	Text	NYC, region	
7	From990s	8			N	Text	Y/N	Indicates method of how group was included
8	GroupToMap	10			N	Text	Y/blank	
9	Language	8	Language	lang_code	N	Text		

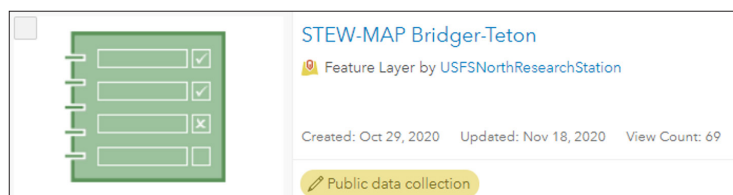
Sample of data dictionary.

Recall that a [hosted feature layer](#) is created as part of the Survey123 process (see [Section 3.3](#)). This layer has been transferred to the official headless public hosting account as part of the process. To navigate to this hosted feature layer in AGOL, log into AGOL and select the **Groups** tab.



Select the **Groups** tab in AGOL to navigate to the hosted feature layer.

Locate the group that the hosted feature layer is shared with by the Forest Service [RSA AGOL Administrator](#) for your location. Within the group, find the feature layer owned by the appropriate public hosting account. For example, for those working in the Northern Research Station, the layer will be owned by “USFSNorthResearchStation.” The feature layer will also have a yellow highlighted “Public data collection” indicator, meaning it is the live layer being used to collect survey responses.

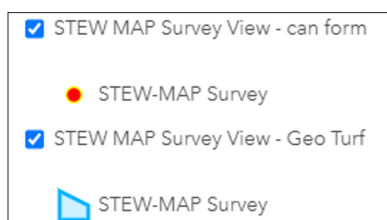


Public data collection enabled for hosted feature layer.

4.1 Overview of the Survey123 Database Structure

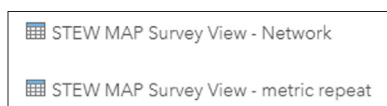
It is important to have a clear understanding of how the different data layers and tables relate to each other prior to processing and cleaning survey data. When you create a new survey using Survey123, a geographic layer ([hosted feature layer](#)) is created. As stewardship groups respond to the survey, this new feature layer will contain the following elements:

- **Geo_turf layer**—contains the geographic turf boundaries, in the form of a polygon, drawn by the survey responders representing where a group stewards the local environment. If the responder does not draw a polygon on the map, there will still be an “empty” row in the table representing the information. Each row without a polygon is referred to as empty geometry, meaning it does not contain any geometric information such as area or length. The template calls this Geo Turf.



ArcGIS Online Web Map table of contents showing office location point layer (can form) and Geo Turf layer.

- **Office location point layer**—contains the geographic office locations for each survey response in a table structure. There is a one-to-one relationship between the office location points and the turf polygons, meaning there is one turf for each office, so the number of records in the office locations and geo-turf polygon layers should match. The template calls this “can form.”
- **Network table**—contains the individual collaborator names and the nature of the group’s work together with them. There is a one-to-many relationship between the office locations and the network collaborators, meaning each office location point can have many network collaborators.
- **Metric repeat table**—contains one record for each additional implementation and outcome added by the survey respondent. There is also a one-to-many relationship between the office location and the metric repeat table.



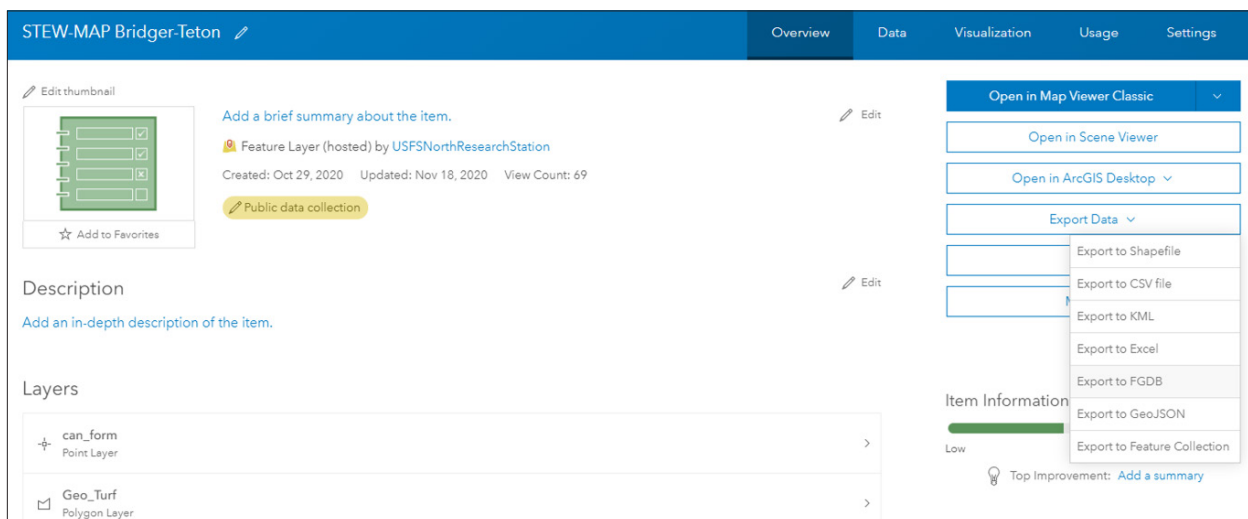
ArcGIS Online Web Map table of contents showing Network and metric repeat tables.

4.2 Make Backup Copy of Survey Data

Make a backup copy of your live survey data using the **Export Data** option and save it to the AGOL content folder and on your local drive before the next steps (removing erroneous and duplicative responses and turf editing). You will need to follow this backup step each time you remove erroneous responses or edit turfs. For example, if you remove erroneous responses or edit turfs one day and then a week goes by before you edit again, you must make another backup copy.

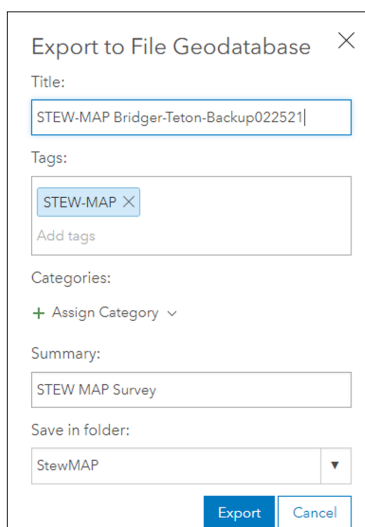
The **Export Data** option allows for export to various formats, and it is recommended that you save your survey as a file [geodatabase](#) (FGDB). When using the Export option, the file will be saved to your AGOL content folder and then can be downloaded from AGOL to your computer if you would like to have a copy on your local drive.

To begin making backup copies, locate the live public hosted feature layer, go to **Item Details**, and select **Export Data** followed by **Export to FGDB**.



Export to FGDB file geodatabase option for hosted feature layer.

Give the FGDB file a title, indicating backup, and the current date.



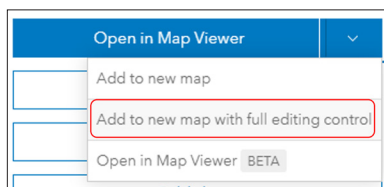
Give the backup file a title that indicates the date and the term backup.

When export completes, you will be taken to the item details for the FGDB. A separate download step is needed to save this file to your local hard drive. Select **Download** and choose a location for the file. This will save it as a .zip file that can be used to update and append data to the existing [survey feature layer](#).

4.3 Remove Test and Duplicate Responses

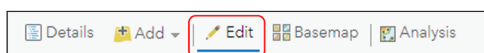
Review all survey responses as they come in, when the survey is complete, and after you have created a backup file. Examine responses to determine whether any are incomplete and which are to be retained or excluded, such as test entries that are often added prior to launching the survey. In addition, a group may accidentally respond more than once, in which case you will need to determine which response to keep. You can refer to [Stewardship Mapping and Assessment Project: A Framework for Understanding Community-based Environmental Stewardship](#) for more details on this step.

To review the data and remove test and duplicate responses, open the hosted feature layer with the live survey results (instead of clicking on **View survey results**) in an AGOL web map viewer. To do this, you must add the data to a map viewer with full editing control.

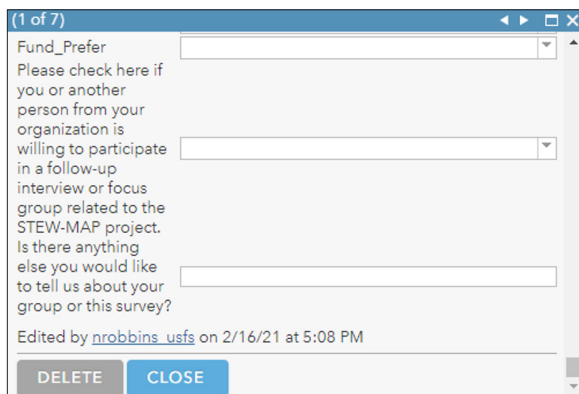


Open in Map Viewer and select **Add to new map with full editing control**.

Select **Edit**, then select an erroneous feature by clicking the turf or office point on the map and **DELETE** in the resulting popup.



Select **Edit** in the Map Viewer.



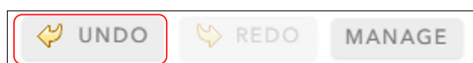
Popup for turf locations with arrows to scroll through features.

When you click on a point, it will select all the office location points and geo_turf features in that location, so make sure to delete the correct one. The small white arrows in the top right of the popup can be used to scroll through features selected. If you accidentally delete the wrong feature, you can select **UNDO** at the bottom left of the screen. If you accidentally remove some data that should be included, refer to [Appendix B](#) on how to restore from a backup copy of the survey data.



Quick Link

[Appendix B](#) gives instructions on restoring your live survey data from a backup copy.



UNDO option in AGOL while editing features.



Note

Each time you review the survey data and remove duplicate or incomplete responses, make a backup copy of the data to your AGOL content and to your local drive first so that you can access the data for follow-up or research purposes or restore the data from backup if a mistake is made. [Appendix B](#) has detailed instructions on how to append and update from a backup.

4.4 Edit and Create Geographic Turf Boundaries

An important component of the STEW-MAP workflow is the creation of geographic turf boundaries. This puts the MAP in STEW-MAP. To clarify, a turf is **not the office address**. It is an area unique to each group that signifies the primary geographic area of that group's stewardship activities.

To help visualize these areas, a polygon is created by the survey respondent in the Survey123 form. However, the Survey 123 response environment is quite limited, and post processing of the data is necessary to revise and refine the boundaries and add new boundaries for areas the groups choose not to draw on the map. In addition, the Survey123 software is limited to allowing only one polygon area per response, so groups that steward multiple areas are not able to draw these on the map. The cleanup process allows the turf to be drawn correctly and multiple additional areas (or parts) added to the same polygon, thus creating a multipart polygon. The survey form allows input of text descriptions to help with the mapping of the turf boundary. For a full list of turf boundary terms and an in-depth turf-cleaning workflow, please refer to the [STEW-MAP Geospatial Turf Guide](#).

Decide whether to work on editing turfs all at once, when the survey is complete, or during survey data collection. The process will be the same for both, **but always make a backup copy of the data before you begin so that any lost data can be restored**.



Quick Link

[Section 4.2](#) gives instructions on how to make a backup of your live survey feature layer prior to editing turfs.

The process described below uses ArcGIS Pro, not ArcMap. If you are not familiar with ArcGIS Pro or do not have access to this software, edits can be performed in ArcMap, but the process will be different. Refer to the [ESRI ArcGIS desktop documentation](#) about editing data from feature services.

This user guide addresses the creation and editing of turfs using Survey123 and ArcGIS Pro processes. For information on how to create and incorporate the geographic components of your STEW-MAP survey using alternative methods, please refer to the [STEW-MAP Geospatial Turf Guide](#).

Please note that the turf-editing process in ArcGIS Pro ([Section 4.4.2](#)) updates the live hosted survey feature data in real time. If mistakes are made in this process, a backup can be used to restore the data to the state it was in prior to the error. This should be rare if editors are careful during the editing process to ensure that any new survey responses are not accidentally excluded when performing an update and appending from a backup file. Refer to [Appendix B](#) on how to restore from a backup copy of the survey data.

4.4.1 Open ArcGIS Pro and Explore Survey Data

Once the data are cleaned and exported, you are ready to explore the data. Open ArcGIS Pro on your local computer and add the [survey feature layer](#) into your map ([after first downloading a backup copy](#)). If you do not have ArcGIS Pro installed, contact the Forest Service [ArcGIS Pro SharePoint page](#) (available only to users inside the Forest Service firewall). For those outside the Forest Service, ESRI offers 21-day [ArcGIS Pro free trials](#).



Quick Link

See [Section 6](#) for additional links and tutorials on ArcGIS Pro and how to use the software for editing data.



Note

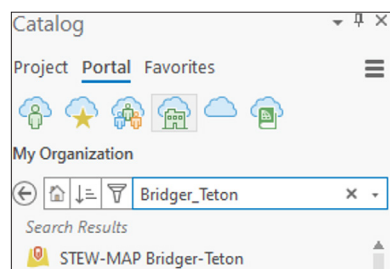
Some users may find it easier to export the AGOL survey data as an Excel spreadsheet to edit the turf boundaries as x and y coordinates. (Download **Geo_Turf** as a [shapefile](#) first and then open the table in Excel to get x and y coordinates.) If desired, the survey data office locations and turfs may be exported into Excel to do the cleaning and removal of any duplicate or test data prior to opening them in ArcGIS Pro. In addition, some users may find it easier to use the familiar Excel layout rather than editing geo turfs in ArcGIS Pro because of the potential challenges of dealing with overlapping polygons and the responses with missing area polygons. Users may also wish to input the default town boundary latitude and longitudes as the turf area for the organizations that did report their turf. **This step may be easier to do in Excel than ArcGIS Pro. If this alternate method is used, the data must be imported back into the AGOL feature layer after edits and updates are complete.**

If you are using ArcGIS Pro software for the first time, you will see a person icon at the top with the text **Not signed in**. Select **Sign in** and input your AGOL username and password.



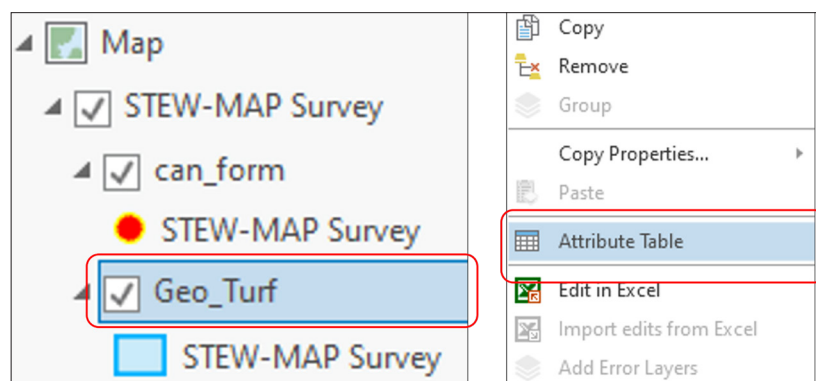
Not signed in to ArcGIS Pro.

Once you are signed in, go to **Catalog**, select **Portal**, and search within **My Organization** for your live survey results. Type in a search text to filter results.



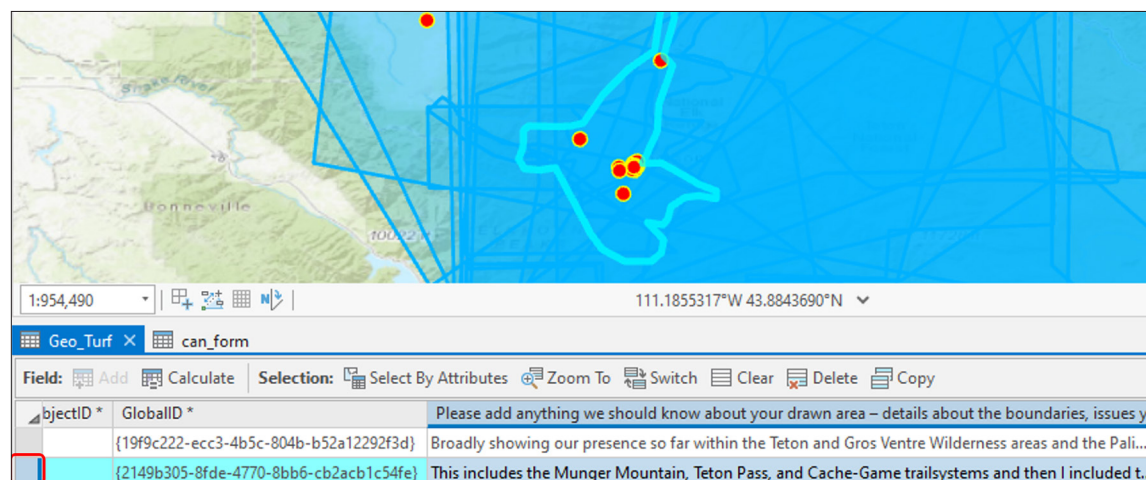
ArcGIS Catalog search for layers and maps in AGOL Portal.

Drag the desired feature layer from Catalog into your map area to add it. The survey layers will be added to the map's table of contents on the left. Right click on the **Geo_Turf** layer and select **Attribute Table**.



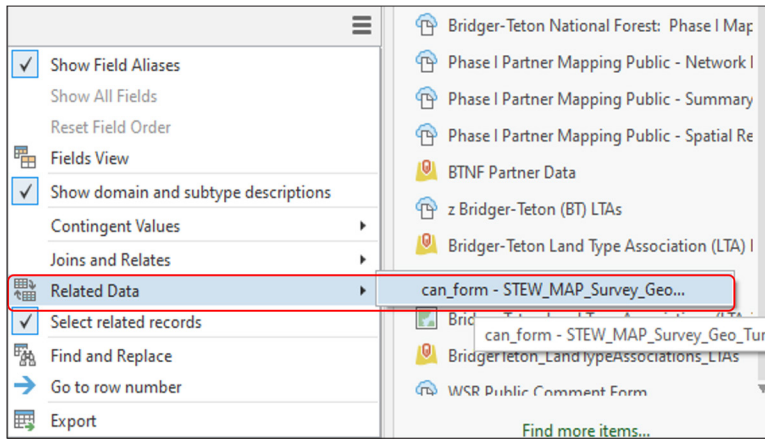
Right click **Geo_Turf** layer in the table of contents in ArcGIS and select **Attribute Table**.

This opens a table containing all the attributes for the turfs added by survey respondents. There is a one-to-one relationship between this table and the survey point features, meaning that for every turf there will be one office location in the points layer. Each point should have a corresponding turf polygon. You can click on the small gray area on a row in the table (column to the left of Object ID in the following screenshot) to highlight and select that turf polygon on the map (in turquoise in the screenshot).



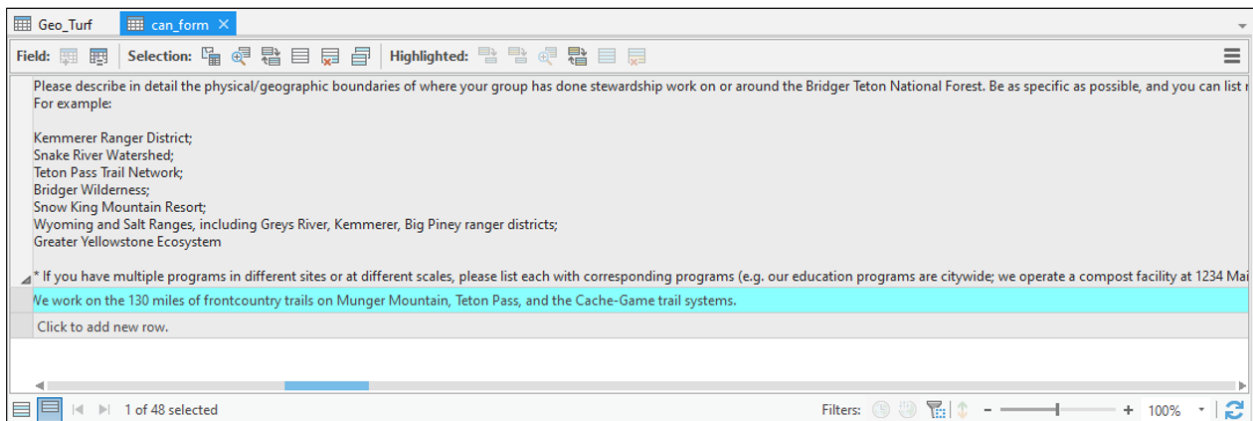
Click on small gray area on a row in the attribute table to highlight and select the turf polygon on map.

Then look at the top right of the attribute table and select the three stacked lines  to show the related office location with attributes collected during the survey, including descriptions about the area where the respondents work.



Click **Related Data** and select the **Survey123** form to show all related attributes for the layer.

The related point attributes will open in a new tabbed attribute table, and you can scroll through the attributes to find their physical/geographic boundaries description.



Related point attributes open in new tabbed attribute table.

If the respondent inputting data into the form chose not to draw a polygon for their turf location, the Geo_Turf attribute table will have a record for it, but it will have no geometry (borders). You can easily identify these by looking at the Shape_Area and Shape_Length fields. If <Null>, then there is no polygon geometry and one will need to be created.



Quick Link

See [Section 6](#) for additional links and tutorials on ArcGIS Pro and how to create and edit polygons, including multipart.

Shape_Area *	Shape_Length *
0.445838	2.97703
0.053515	1.535706
<Null>	<Null>

Shape_Area and Shape_Length Null values in attribute table.

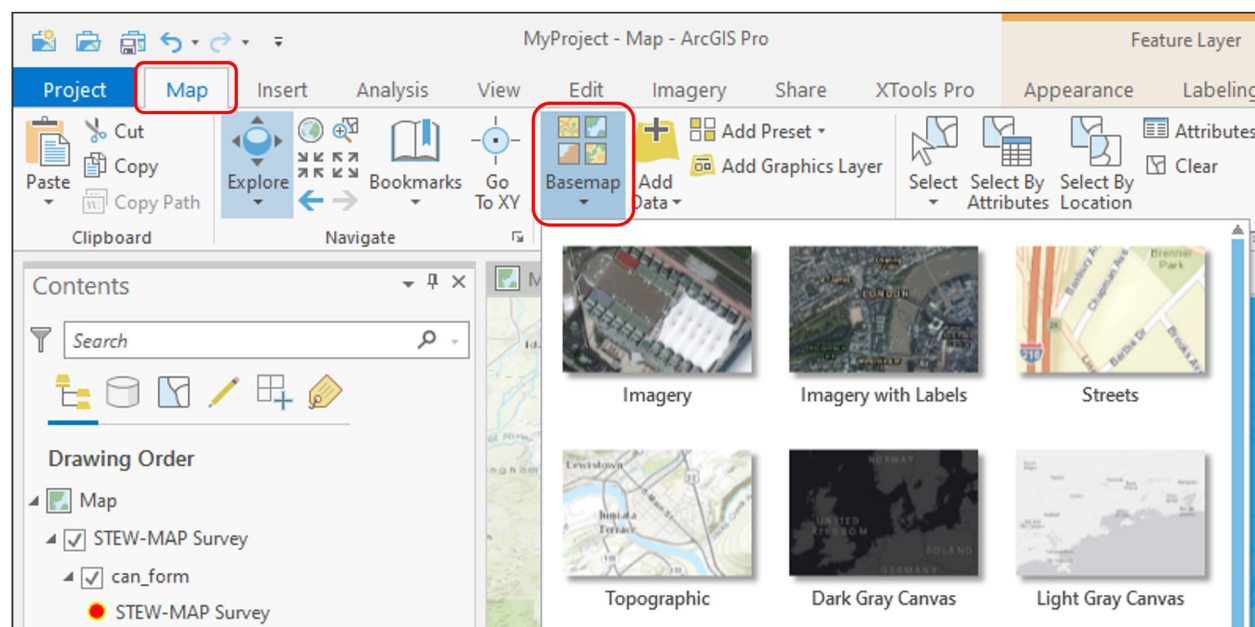
For groups that did not map a polygon, if respondents select yes to the survey question about having a GIS file showing the boundaries of where they work, obtain the data from them and use that to create their turf boundaries.

4.4.2 Use ArcGIS Pro to Edit Turf Boundaries

Because the Survey123 form provides only a simple map interface that creates a rough polygon shape, turf data will need to be revised and refined. And as previously mentioned, multiple areas cannot be mapped in the survey form, so edits must be made to the data using GIS software to provide multipart turfs. Use any text provided in the physical/geographic boundaries fields in the Geo_Turf table or in the related office location point attributes to update or draw a new turf shape. Refer to the [note about using Excel for editing turfs](#) if you are more comfortable editing the data in a spreadsheet format.

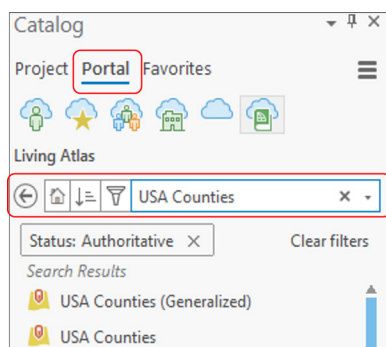
4.4.2.1 Tracing Turf Boundaries from Other Datasets

Add reference data to the map. Many organizations reference their boundaries with the names of streets, counties, zip codes, waterways, parks, or other institutions. You can add any of these reference layers to your map as [feature classes](#) and use them as you line up or trace the turf boundaries. In addition, ArcGIS Pro, by default, has several basemaps you can toggle between as you update the turf boundaries. Select the **Map** ribbon and a **Basemap**.



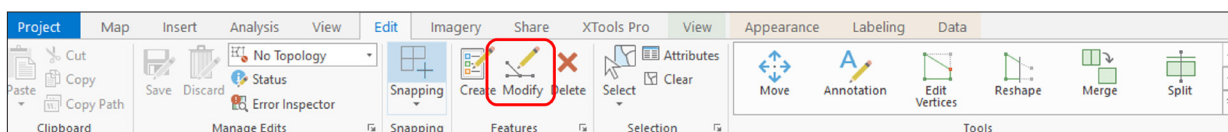
Select **Map** ribbon and a **Basemap** you prefer for the ArcGIS Pro map.

Many reference services are available in AGOL and Esri's Living Atlas. For example, a search of USA counties in the Living Atlas, where Status = Authoritative, returns several feature services that may be useful as you update turfs. Other resources exist for finding and mapping turf boundaries, including the Census Bureau GIS database and your local community GIS resource page. Access these resources as needed for additional data. Potential sources include [U.S. Census Bureau TIGER/Line Shapefiles](#), [National Park System Boundaries](#), and [Open Street Map](#).



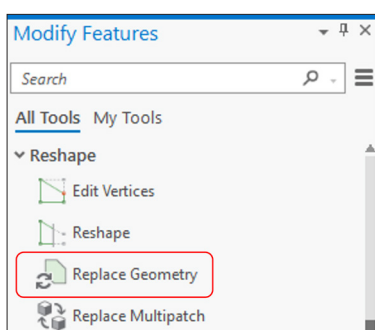
ArcGIS Catalog search for layers and maps in AGOL Portal Living Atlas.

To begin editing a turf, select the **Feature**, or row, in the attribute table, and then, in the **Edit** tab, select **Modify**.



Select **Feature** in attribute table and then select **Modify** in the **Edit** tab of ArcGIS.

In the **Modify Features** window, select **Replace Geometry**.



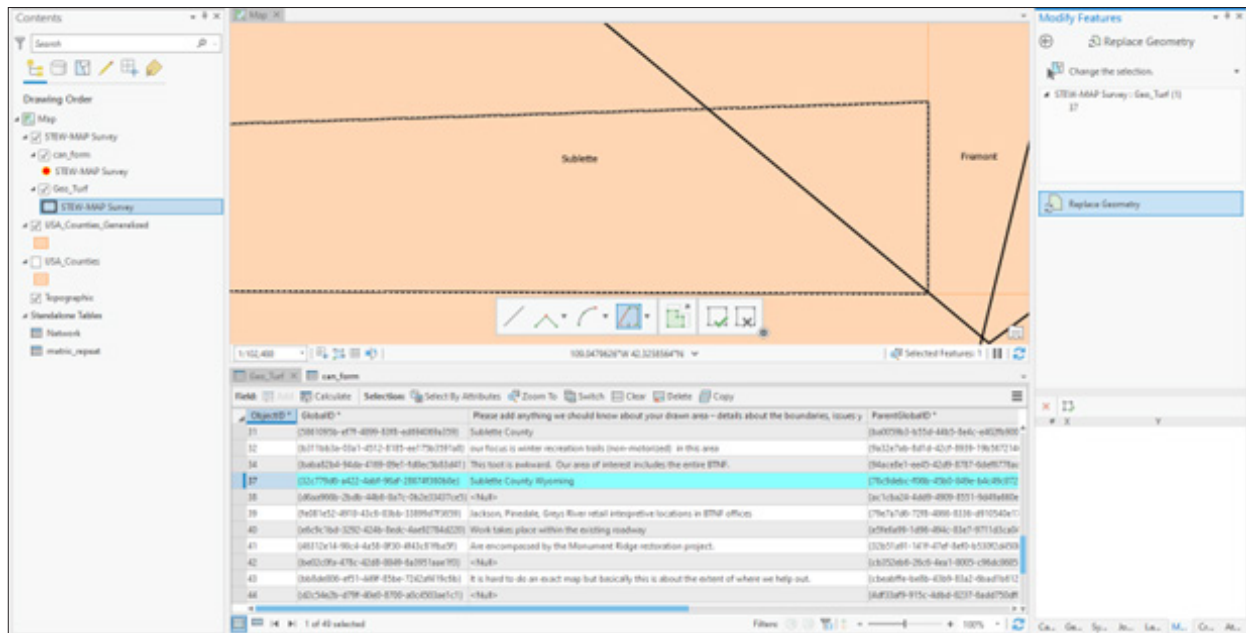
Select **Replace Geometry** in the **Modify Features** window.

If the data you want to trace is a reference feature layer added to the map or a downloaded [shapefile](#), you can select the polygon option (highlighted in the following screenshot) to trace an existing feature.



Tool to trace a reference feature layer that has been added to the map.

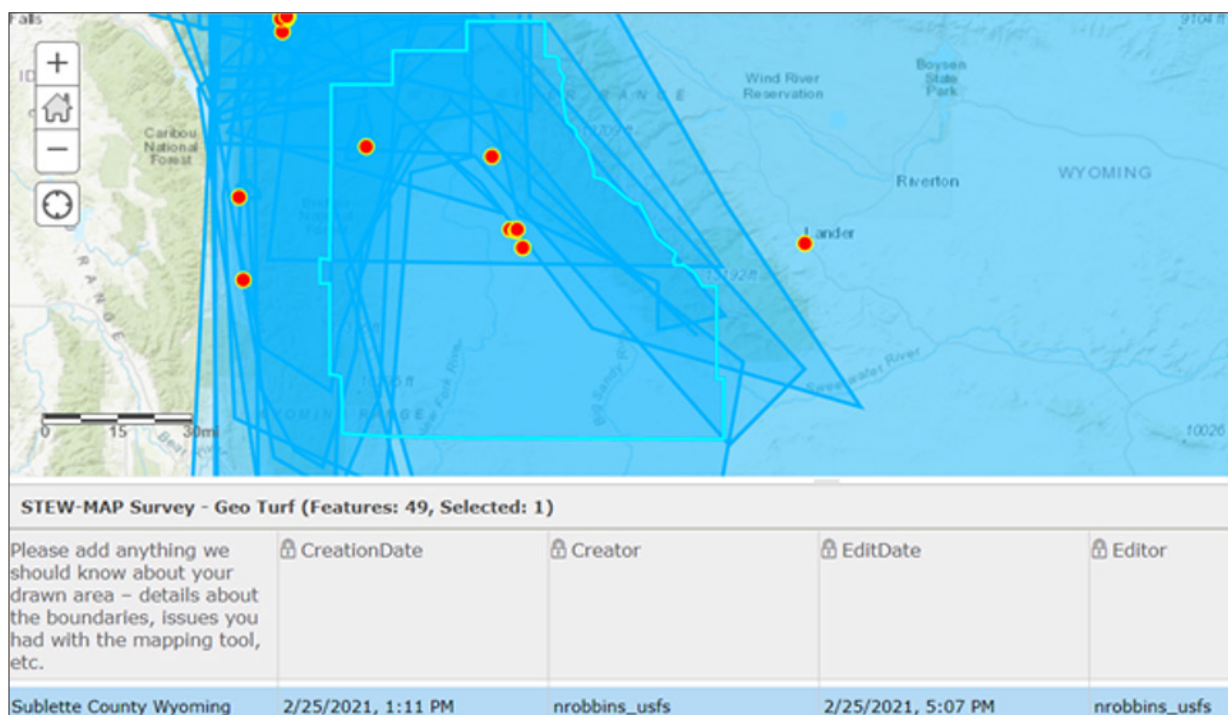
Zoom into the area and click on the outline you would like to trace. You will see a line added to the map as you drag your cursor along the boundary. Use **ctrl+C** to pan the map while you are in edit-tracing mode.



Select the outline of the feature you would like to trace on the map.

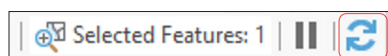
When you have finished tracing the whole feature, right click the mouse to end tracing and the turf feature will be updated. On the **Edit** tab, select **Save** and confirm in the popup to save all edits. Zoom out to ensure the full feature was replaced correctly.

The edits are immediately saved and synchronized to the live hosted feature service in AGOL. If you view the feature layer view in an ArcGIS web map, you should see the updated feature along with creation date, editor, and editor date. If you can't see all the fields, select **Options** from the stacked three lines at the top right of the table  and then click Show/Hide columns.



Selected turf in the map with attributes shown.

While editing in ArcGIS Pro, remember to save edits often. Sometimes when you add a new feature, it will disappear from the map viewer unless you have the feature selected in the table. Ensure the Shape_Area and Shape_Length fields have values, and if they do, the feature is present. You will need to select **refresh** on the lower right for the feature to appear completely.

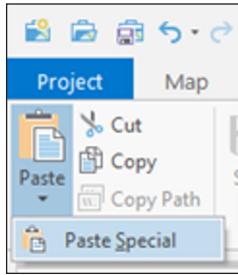


Select **refresh** button on bar.

4.4.2.2 Copying Turf Boundaries from Other Datasets

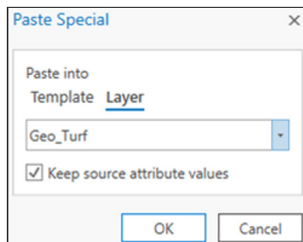
An alternative to tracing a feature from another layer is to copy and paste a feature from data that is sent to you or downloaded from the web as a file [geodatabase](#), [feature class](#) or [shapefile](#), or alternatively, that comes from a [feature layer](#) from a [web service](#).

You need to create a new feature and then copy the attributes of the existing feature before deleting the existing feature that is not correctly mapped. Add the feature layer or shapefile or feature class to your map. On the **Edit** tab, open the **Select** tool. Within the map, select the geographic polygon feature you want to copy. Select **Copy** on the Edit toolbar, then **Paste Special**.



Paste Special on selected turf in the map.

A dialog box will open. Choose **Layer** and select **Geo_Turf** from the drop-down menu. Select **OK** and the feature will be added as a new record in the turf layer.



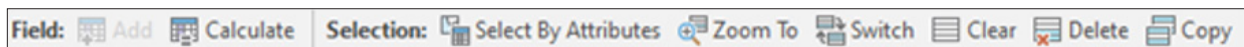
Paste Special dialog; check **Geo_Turf** and keep source attribute values on selected turf in the map.

Go to the attribute table and find this new feature, which should be selected and highlighted. Add your comments to a comments field (by first **Adding a Field**). Other attributes, if they exist, should also be transferred to the new feature record. Make sure to copy and paste the **PopID** value from the feature you are updating or replacing so the relationship to office location is maintained. This step is extremely important and should not be skipped because without a PopID value populated for a feature, the link to related office locations and survey results is broken.

48	{85c99153-e2f2-4ccc-8118-dccc0c7b7fd}	<Null>	{48d2d32e-cc2d-479e-8d42-735301f8a5c0}
49	{156aebc0-e3f0-4281-8911-e13ff5cd46fe}	We have presented educational programs in person in seven w...	{3268151f-9876-4956-8333-57d2b64262da}
50	{3c0caa0c-8a1f-41a2-86e3-e8612b880e4e}	<Null>	{b1e64f11-b090-4ee9-8d10-f2a9676af505}
51	{9a2a05c4-1567-4227-856d-f3b4f8cdc371}	Sublette County Wyoming	{76c9debc-f06b-45b0-849e-b4c49c872b10}
52	{7cc0b1b8-cad0-4438-82f4-f6a9fc1eb1a8}	<Null>	{cb148388-573b-42a8-8ad8-c52daa7541ef}
54	{C74FAB1D-E90B-47D3-8FBC-C6E680D10566}	Added this from an existing feature layer of forest boundaries.	{CB148388-573B-42A8-8AD8-C52DAA7541EF}

Turf attribute table showing new feature added.

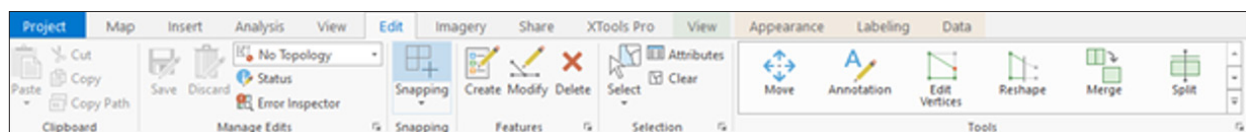
Finally, select the feature you have updated/replaced and select **Delete**.



Edit features; select **Delete** option.

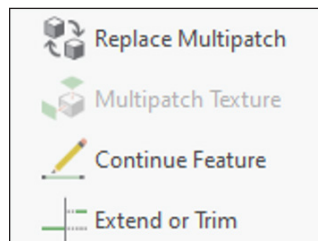
4.4.3 How to Create a Multipart Turf Polygon

Some groups can have multiple turf locations where they work. Since the Survey123 form does not allow survey respondents to create polygons with more than one part, the back-end survey analyst performing turf edits will need to create a multipart polygon with separate parts for those groups to represent each area they work in. To create a new part on an existing polygon, select the feature in the attribute table and in the **Edit** tab and then select **Modify** in the Features box.



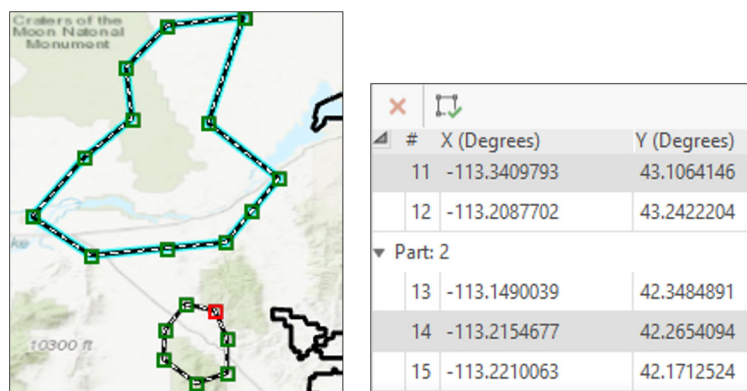
Modify features option in **Edit** tab of ribbon in ArcGIS.

In the Modify Features window, select **Continue Feature**.



Select **Continue Feature** in the **Modify Features** window.

Select the map to begin a new part of the multipart polygon. Each vertex will appear as a green square as the new part is drawn. The Modify Features window will add a new part with the vertex number and coordinates as you draw. Double click to finish. You can continue this process to add as many parts as needed to the turf polygon.



Multipart polygon edit features workflow showing x and y coordinates.

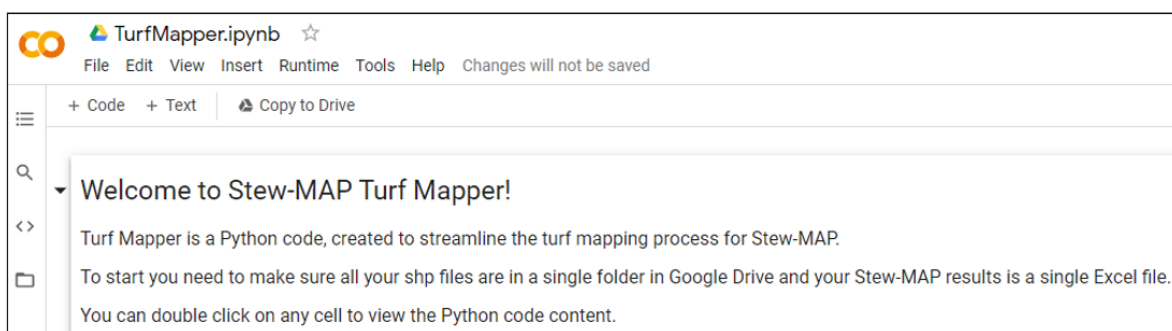
4.4.4 Mapping Turfs from Survey Descriptions with a Geocoder

Although Survey123 allows respondents to provide geographic input for their turfs, there are many limitations and difficulties. In addition, the Survey123 map environment used to capture geographic turfs can be difficult to navigate and create polygons, especially for those not familiar with GIS. The Survey123 software also does not allow survey respondents to input more than one polygon area per survey. The editing process is quite cumbersome and can be difficult for people performing those edits to grasp, especially if they are new to using GIS software. For these reasons, we acknowledge that some survey participants might prefer not to use this option.

To assist those processing the STEW-MAP survey data, we have developed a geocoder in Python called STEW-MAP Turf Mapper. This geocoder uses a set of data layers and boundaries compiled in a folder within Google Drive™ to map and process all survey responses in a single Microsoft Excel file. Python script can be viewed [here](#). This process can assist with mapping turfs from descriptions, but you can also map turfs manually if preferred.

The geocoder steps are as follows:

1. Prepare the coding environment by opening the Python script and setting up your files and folder structure.
2. Provide access to your Google Drive.
3. Import boundary datasets from data sources such [U.S. Census Bureau TIGER/Line Shapefiles](#), [National Park System Boundaries](#), and [Open Street Map](#).
4. Correct abbreviations (break down **Stewardship Boundaries** field into separate fields and entities for geocoding).
5. Upload survey results from Excel spreadsheet where directed in the Python script.
6. Determine possible matches (full or partial).
7. Use the Bing [Geodata API](#) to get boundaries for undetermined locations.
8. Verify the results and export data.



Welcome to STEW-MAP Turf Mapper Python code.

For examples of data to include in Google Drive folder, see this list of sample data sets in the following screenshot. Many datasets are available via the USDA Forest Service AGOL portal, and this tool can automate the process of pulling data from these sources. For other datasets that have APIs, you can download this data in the code and pull it into the project for geocoding. The [Open Street Map](#) (OSM) data have been found to be very useful on other STEW-MAP projects for streets and highways, and an

official dataset can be used with defined geographic boundaries so that only the portion of the dataset needed for the project is downloaded, not the full U.S. dataset. Also, you can put together some national datasets, add them to AGOL, and point the code to those for processing the turfs.

data	name	source	url
geo_export_85a0ea4b-122a-4bf3-b380-00f4f2d5d204	LA County Zipcodes	API	
CA_Counties_TIGER2016	Counties	Census TIGER/Line	
CA_Places_TIGER2016	Places (Including Unincorporated Places)	Census TIGER/Line	https://data.ca.gov/dataset/ca-geographic-boundaries
CA_State_TIGER2016		Census TIGER/Line	
GU_CountyOrEquivalent	County	Census TIGER/Line	
GU_MinorCivilDivision	Minor Civil Division	Census TIGER/Line	
GU_NativeAmericanArea	Native American Areas	Census TIGER/Line	
GU_Reserve	Reservations	Census TIGER/Line	
CA_Parks	Parks	data.ca.gov	
LA_County_Neighborhood_2	Neighborhoods	LA Open Data Portal	https://data.lacity.org/A-Well-Run-City/Neighborhoods/ykhe-zspy
Countywide_Parks_and_Open_Space_Public_-_Hosted	Nationwide National Parks	NPS	https://www.nps.gov/subjects/gisandmapping/tools-and-data.htm
gis_osm_natural_a_free_1	Natural Features	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_places_a_free_1	Places	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_pois_free_1	POI	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_railways_free_1	Railways	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_roads_free_1	Roads and Freeways	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_water_a_free_1	Waterbodies	OSM	downloaded through geofabrik.de but we can look into API
gis_osm_waterways_free_1	Water Ways	OSM	downloaded through geofabrik.de but we can look into API
LA_Regions	Regions	USC Data Portal	https://usc.data.socrata.com/dataset/LA-County-Regions-Map/v5sg-uqcf

Datasets available in the USDA Forest Service AGOL portal.

4.5 Post Processing Script for Survey Responses

[ArcGIS Notebooks](#) allow you to create [ArcGIS API for Python](#) scripts in the Python programming language that can be used to manage or manipulate your AGOL content. You can use hosted notebooks in your AGOL account to answer questions, drive insights, and create visualizations of your data. A notebook script has been created to import the live Survey123 results and run several post processing steps on the data, including the following:

- Installing geocoder to geocode addresses or zip codes in a later step
- Importing Survey123 results
- Converting feature collection to data frame
- Dealing with survey responses without office locations
- Filling geometries by geocoding addresses or using zip code geometry geometric centers (used for defining geographic locations when an office location is not defined by respondent)
- Plotting geocoded points to see where they are on a map
- Converting text field data to machine readable format and plotting the total counts
- Converting information sharing question results and plotting them on a graph
- Correcting formatting errors from the feature layer
- Converting volunteer hours to per-year units
- Formatting driver questions
- Correcting column names
- Correcting time series information
- Performing basic calculations (week, month, year)


Quick Link

See [Section 6.2](#) for links and information on ArcGIS Notebooks and how they are used within AGOL.

- Ordering data to fit data dictionary
- Exporting points to a new cleaned feature layer
- Joining turf data to office locations
- Cleaning up the turf polygon data and removing data without any geometry prior to exporting to a new polygon feature layer

4.5.1 Request Forest Service Notebook Analyst Role

To use a Notebook script in AGOL, you will need to be granted the Forest Service Notebook Analyst Role. Go to [USFS – ArcGIS Online – Web GIS SharePoint \(internal to Forest Service\)](#) to request an upgrade to your account role type. Partners should work with the Forest Service RSA AGOL Administrator to get the necessary access. **For new AGOL users, if access is granted to this role when the user account is created, this step can be skipped because the Notebook Analyst Role will have been applied.**

The screenshot shows a web form for requesting an account role upgrade. The form is titled "Request type" and has a dropdown menu set to "Update requester account role type". Below this, there are several sections for user information and role details.

- * Account type:** Radio buttons for "ArcGIS Online & Web GIS" (selected), "ADS CIO development project work account", and "FSGeoportal".
- Access requested for:** Radio buttons for "Myself" (selected), "Another FS employee", "Internal contractor or volunteer (has an '@usda.gov' email)", and "External partner (any non '@usda.gov' email)".
- * Requestor name:** Text input field containing "NATHAN ROBBINS".
- * Requestor organization:** Text input field containing "FS-NFS-WO-Engineering-Geometronics Service Center".
- * Requestor email:** Text input field containing "nathan.robbs@usda.gov".
- * Requestor region/station/area:** Dropdown menu set to "Region 4".
- * Requestor phone:** Text input field containing "801-975-3730".
- * Requestor forest:** Dropdown menu set to "Boise National Forest".
- Request type:** Dropdown menu set to "Update requester account role type".
- Account role:** Dropdown menu set to "USFS Notebook Analyst".
- Account Role Description:** Text box containing "Same as USFS Content Creator but includes Notebook Standard and Advanced (ArcPy) privileges, Notebook scheduling and Imagery publishing and raster/imagery analysis privileges."

ArcGIS Online access requests.



Skip to [Section 4.5.3](#) if you do not need to make edits to the code. If you did not make any major changes to the Survey123 form template, you can simply open and use the post processing code in the Template Notebook without any modifications.

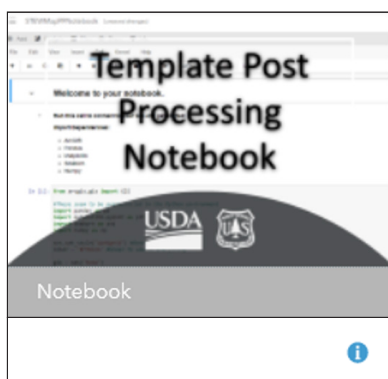
4.5.2 Download Template Post Processing Notebook



Note

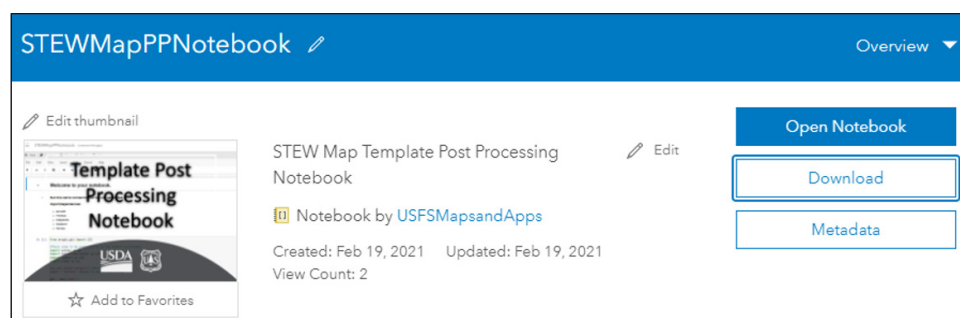
If you made any changes to the XLS form when you created your new survey, you may need to make some code updates to this notebook script. For example, if you have inserted specific columns to the survey or made other field changes, the code may need to be updated prior to running. For technical assistance with this process, reach out to the STEW Map or GTAC team (michelle.l.johnson@usda.gov or nathan.robbsins@usda.gov).

Go to the [Stewardship Mapping and Assessment Gallery](#) and find the **Template Post Processing Notebook** icon. Select the small blue information icon **i** on the bottom right to open the item details



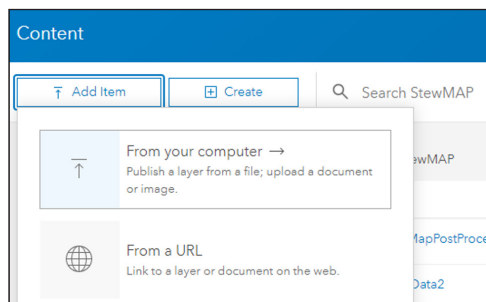
Template Post Processing Notebook in STEW-MAP ArcGIS Online Gallery.

Select **Download** and save the file on your computer. Make any necessary changes to the code or consult with the GTAC and STEW-MAP team for help in updating the code. A new Python file may be provided to you, which you can re-import to your AGOL content.



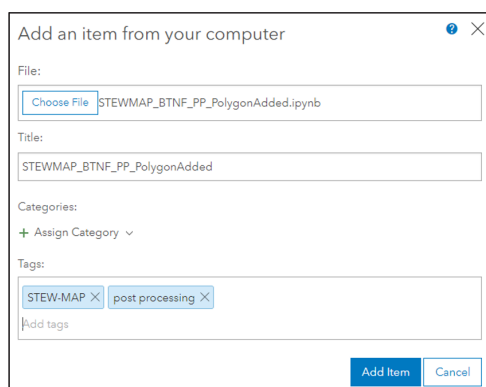
ArcGIS Online STEWMAP Post Processing Notebook item.

Go to your AGOL content and navigate to the folder where you want to store the modified post processing script. Select **Add Item** and then **From your computer**.



Add item from your computer and choose location to store your ArcGIS Online STEW-MAP Post Processing Notebook item.

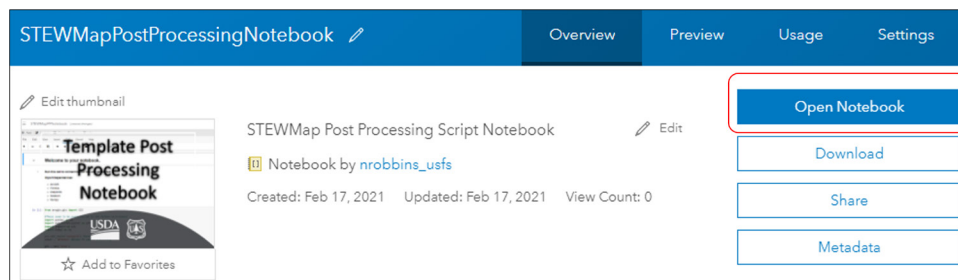
Select **Choose File** and select the Python post processing .ipynb file you just downloaded and modified. Name the file and provide tags. Then select **Add Item**.



Add an item from file and choose your Python post processing notebook.

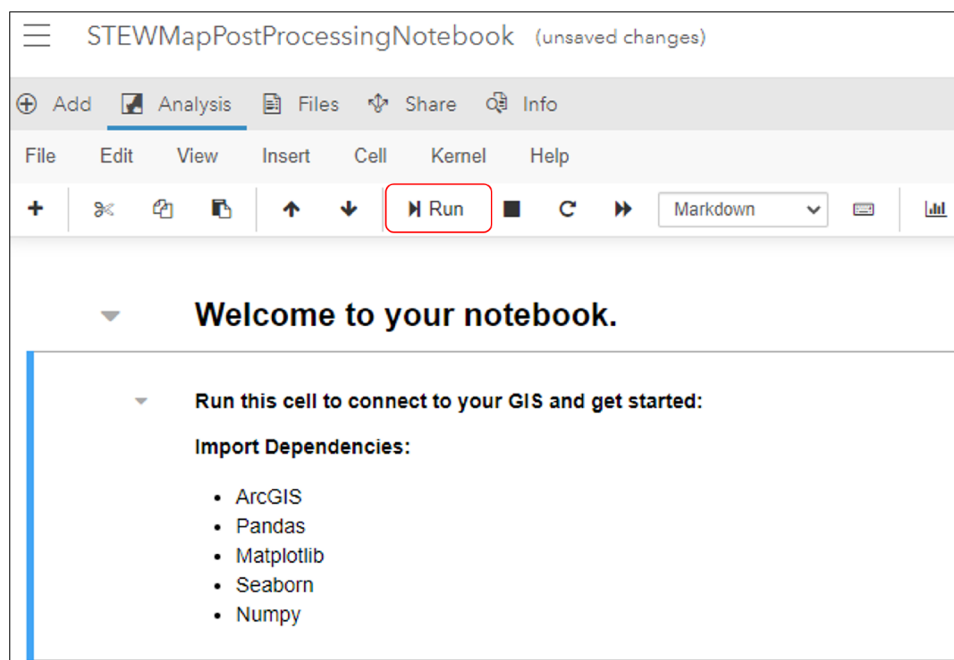
4.5.3 Open Notebook and Run

The new notebook will be created and added to the content. Go to the item details for this new item and select **Open Notebook**.



Open ArcGIS Online STEWMap Post Processing Notebook item.

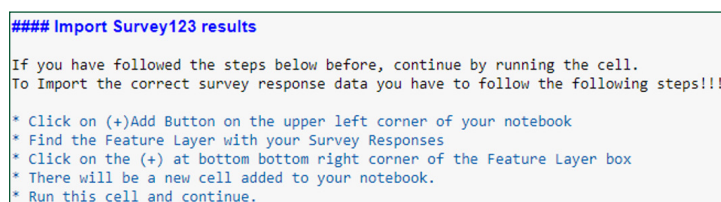
You will see the code presented along with instructions in each cell. Click on the cell you want to run, beginning with the first section to connect to your GIS account. Select **Run** in the toolbar or click **Shift+Enter**.



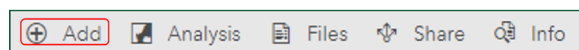
Run your ArcGIS Online STEWMAP Post Processing Notebook.

Once it runs, the focus will automatically shift to the next cell in Notebook. Select **Run** or **Shift+Enter** again.

Follow the instructions provided in the **Import Survey123 results** window to import your live public survey responses [hosted feature layer](#).



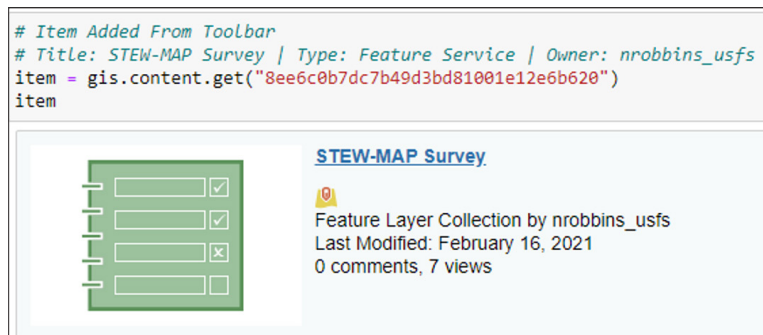
Follow the instructions provided in the Import Survey123 results window.



Choose **Add** option to import your live public survey responses hosted feature layer.

Once imported, the data will show up in the notebook under the code in an **Out Box** as a feature layer collection. Run this cell.

```
# Item Added From Toolbar
# Title: STEW-MAP Survey | Type: Feature Service | Owner: nrobbins_usfs
item = gis.content.get("8ee6c0b7dc7b49d3bd81001e12e6b620")
item
```



STEW-MAP Survey
Feature Layer Collection by nrobbins_usfs
Last Modified: February 16, 2021
0 comments, 7 views

Data show up in the **Out Box** as a feature layer collection in the Python notebook script.

Continue the **Run** process for each cell in the notebook. As each cell runs successfully, you will see results show up in the Out Box.

Toward the end of the script where the code cell reorganizes the order of columns, it is important to review the outputted table to make sure none of the important fields are missing. The following columns, added by AGOL, are not part of the survey and can be ignored in this review: CreationDate, Creator, EditDate, Editor, x, y.

Order the Data to fit the Data Dictionary

Orders the data by specifying each column in order. May require further automation.

This cell will print the columns that were not matched at the end of the process.

Please check nothing significant is missed. The following columns are added by ArcGIS Online and are not a part of the survey: CreationDate, Creator, EditDate, Editor, x, y

Order the data to fit the Data Dictionary.

Notebook script will export the cleaned office locations to a new hosted feature layer titled Survey Results. In addition, the script will import the turf polygon data, joined with the cleaned office locations, and export to a new hosted feature layer titled SurveyResults_Polygons.

These layers will be saved in your AGOL content folder along with a file [geodatabase](#) of the corrected office locations survey results. Rename these files if you want.



Note

For the turf polygons, all rows without geometry will be removed in this process, so it is vital that you completely edit and update all the turfs using the ArcGIS Pro editing process described in [Section 4.4.2](#). Rows with no geometry will be deleted.

☐ Title		Modified
☐ Survey Results	File Geodatabase	Mar 5, 2021
☐ Survey Results	Feature Layer (hosted)	Mar 5, 2021
☐ SurveyResults_Polygons	File Geodatabase	Mar 5, 2021
☐ SurveyResults_Polygons	Feature Layer (hosted)	Mar 5, 2021

Survey Results layer will be saved in your AGOL content folder.

Open the feature layers in a new web map and review the results. These are the layers that you will use in the ArcGIS web maps, applications, and dashboards; creation of these features are described in [Section 6](#).

4.6 Process and Standardize Network Collaborations

Export and clean the network collaborator table that is part of your Survey123 feature layer. This table is populated with all the organizations your survey respondents identify as collaborators. For the purposes of this guide, the organization that names another organization as a collaborator will be referred to as a Sender. An organization that is named by a Sender as a collaborator will be referred to as a Receiver. For a complete list of network terms and an in-depth network-cleaning workflow, refer to the [STEW-MAP Networks Guide](#). Ideally, you will clean network data after the survey is completely closed, but with some modifications, you can conduct this process in an iterative fashion, being careful with version control.

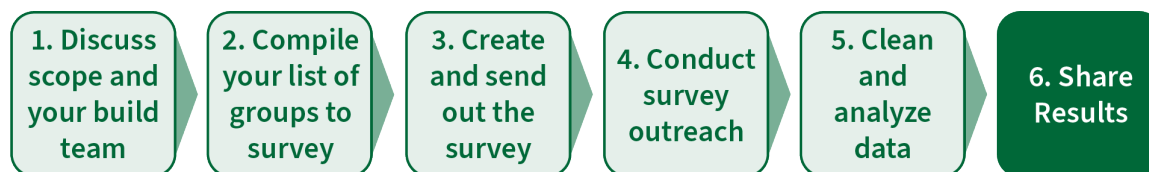


Note

See [Appendix C](#) for a step-by-step workflow on cleaning networks and preparing for use in ArcGIS Insights.

5 Create ArcGIS Online Products

Now that you have created the survey, conducted survey outreach, and cleaned and analyzed your data, you are ready to share results with the public and members of your organization. Interactive maps and web applications are two of the flashier and more interesting ways to visualize data collected by the survey.



5.1 Create AGOL Web Map and Web Application

The STEW-MAP [web map](#) and [web application](#) can be made publicly available. Both allow users to map and visualize the data that were collected and perform simple queries on the data, such as selecting organizations by name, type, or focus area. The web app allows users to print a map of a selected portion of the project area. Users may also export data for the entire project area or data selected in a query. The web map and web app are hosted in AGOL and may be accessed via the internet.

Important: Please note that the guidance for web applications hosted on the Forest Service server is to switch from Web App Builder to [Experience Builder](#). We suggest using the web application examples here as guidance and using Experience Builder in practice. Future versions of this guide will update this section.

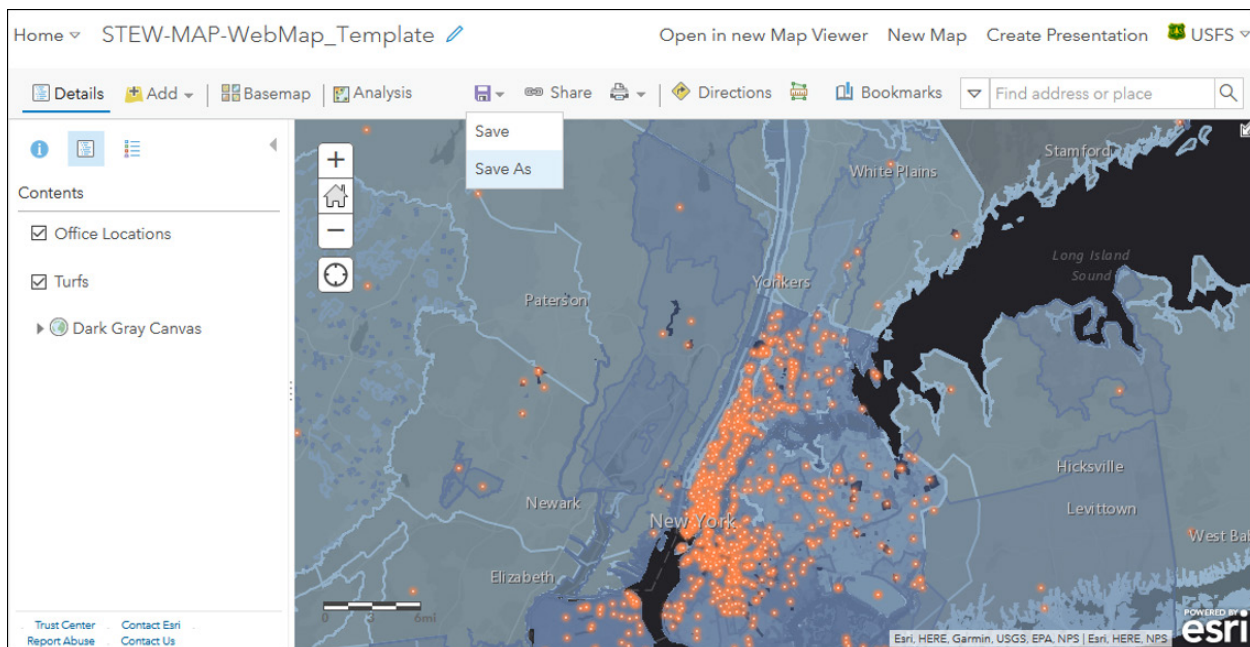
5.1.1 Create Web Map

Open the **Web Map** template in the [STEW-MAP Gallery](#) by clicking on the blue Information icon on the bottom right side of the STEW-MAP_Template_Web_Map_ icon. This opens the **Item Details** page, where you can open the web map in Map Viewer (upper right).

 **Quick Link**

See [Appendix D.1](#) for resources on how to update symbology and use [Arcade Expressions](#) to customize popups.

Save the map to your content on AGOL by clicking the down arrow next to the Save icon and choosing the Save As option. Add the new office locations and turfs feature layers that were created in [Section 4.4](#). Zoom to the new location by clicking on the icon to the right of the feature layer in your table of contents and choosing Zoom To. Update the symbology if needed. Update the popups and save the web map. For more information on updating the symbology and popups in the Web Map, see [Appendix D.1](#).



STEW-MAP Web Map Template in ArcGIS Online.



Note

Popups bring to life the attributes associated with each feature layer in the map. The default popup appearance for a layer is a list of attributes and values. As a map owner, you can reconfigure the popups to define the list of visible and hidden fields and alter how the information is presented. The STEW-MAP web map uses custom-formatted text and [Arcade Expressions](#) to highlight relevant information about each organization. More information about popups is available [here](#).

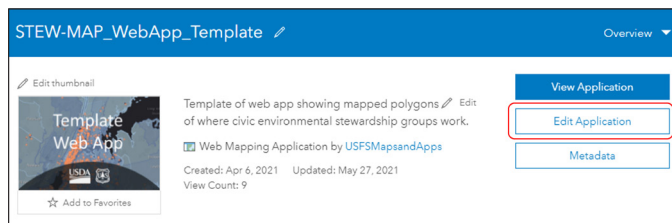
5.1.2 Create Web Application



Note

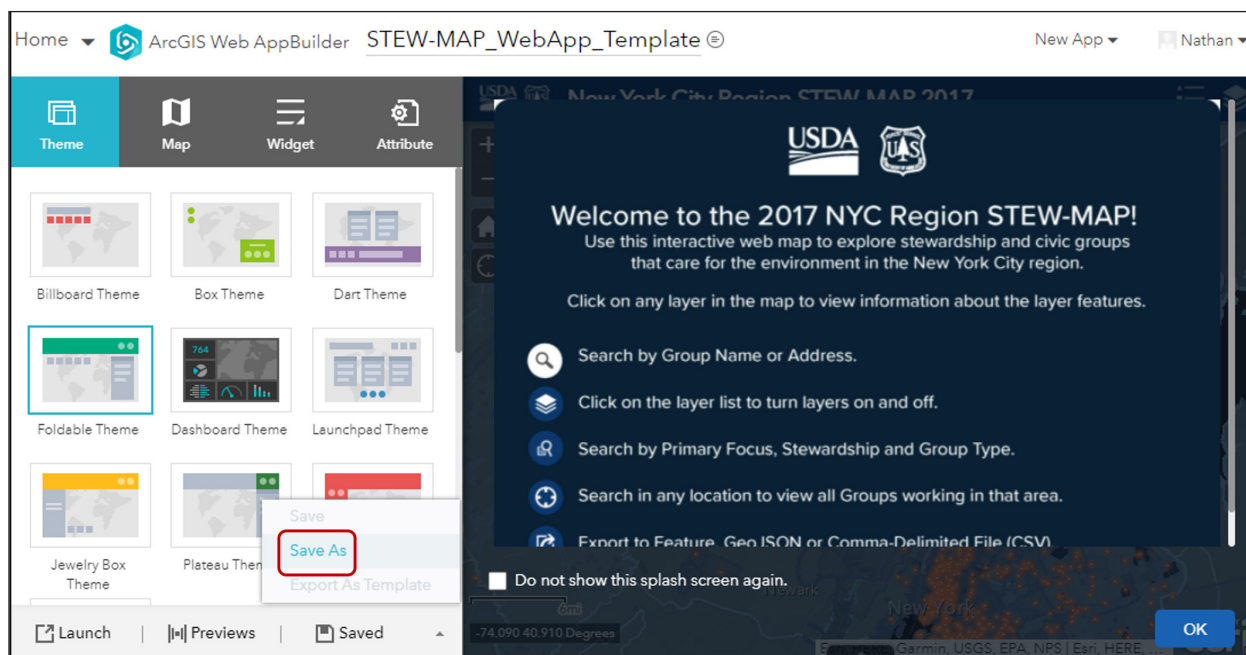
Web App Builder will no longer be supported by ESRI in late 2025, and the developer edition was retired in February 2024. Although this section discusses using Web App Builder, we suggest using Experience Builder instead. [Experience Builder](#) has also been used to create a tabbed version of a StoryMap that can also visualize STEW-MAP data in multiple ways. Here is an example: [NYC STEW-MAP StoryMap \(built in Experience Builder\)](#). The next version of this guide will include specifics on creating visualizations using Experience Builder.

Open the Web App template in the [STEW-MAP Gallery](#) by clicking on the blue Information icon on the bottom right side of the STEW-MAP Template_WebApp icon in the gallery. This will take you to the Item Details page where you can select Edit Application to open the application.



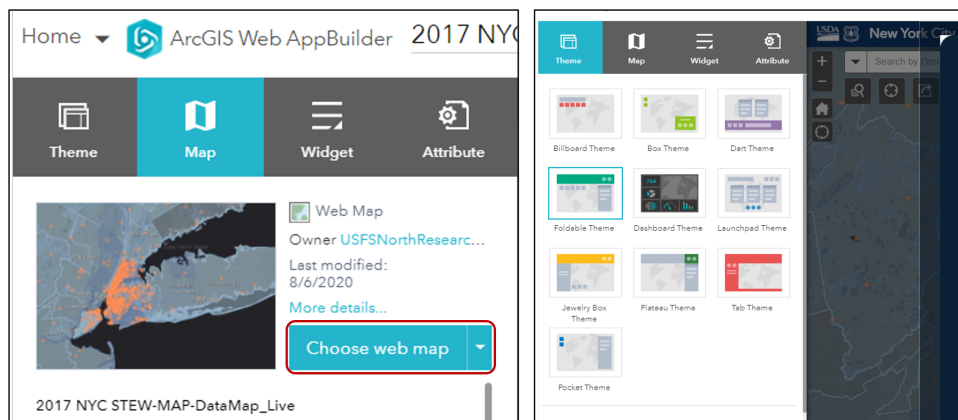
STEW-MAP Web App template in ArcGIS Online: **Edit Application.**

At the bottom of the web application configuration page, right-click on the **Saved** tab at the bottom and select **Save As** to make a copy of the web application in your AGOL workspace with a new title.



STEW-MAP Web App Template in ArcGIS Online: **Save As.**

Change the web map display to your new project area web map. To do this, go to the Map tab at the top of the configuration window and select the new web map created in [Section 5.1.1](#).



STEW-MAP Web App template in ArcGIS Online: **Web Map widget, Choose web map.**

In the **Widget** tab, update the splash screen with a new splash screen image. The splash screen is an editable PDF that can be downloaded from the gallery and must be edited to change the project name and date before being uploaded back to AGOL as a new image file. Update the widgets in the template to reference your new data layer and adjust the query parameters using updated fields from the latest survey. In the **Attribute** tab, update the title and the link for the data download.


Quick Link

See [Appendix D.2](#) for how to update the web application widgets and queries.

5.2 Create External Operations Dashboard

ArcGIS Dashboard enables users to convey information by presenting location-based analytics using intuitive and interactive data visualizations on a single screen. The STEW-MAP Dashboard gives a quick overview of statistics about the data, such as how many volunteer organizations completed the survey, the number of full-time and part-time staff, the number of volunteers, and collective membership of all organizations. The dashboard also contains charts that show organizations by primary focus, primary activity, stewarded area, funding type, and network collaboration via an embedded link chart from ArcGIS Insights. The dashboard can be created using the same web map that underlies the STEW-MAP web application, created in [Section 5.1.1](#).

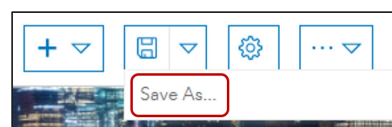
5.2.1 Create Dashboard from Template

Open the Template_Dashboard in the [STEW-MAP Gallery](#) and select **Edit Dashboard**.



STEW-MAP Web Dashboard template in ArcGIS Online: **Edit Dashboard**.

Make a copy of the dashboard in your workspace (My Content) by choosing the **Save As** option on the **Save** tab.

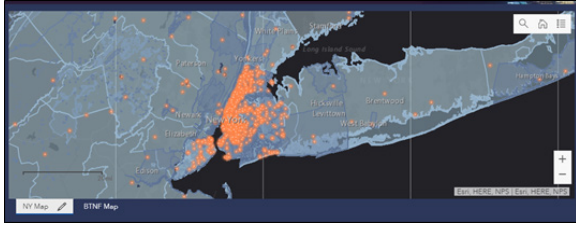


STEW-MAP Web Dashboard template in ArcGIS Online: **Save As**.

Update the template map by adding your project map to the dashboard. This step will place your map as its own item next to the template map; you can then remove the template map.

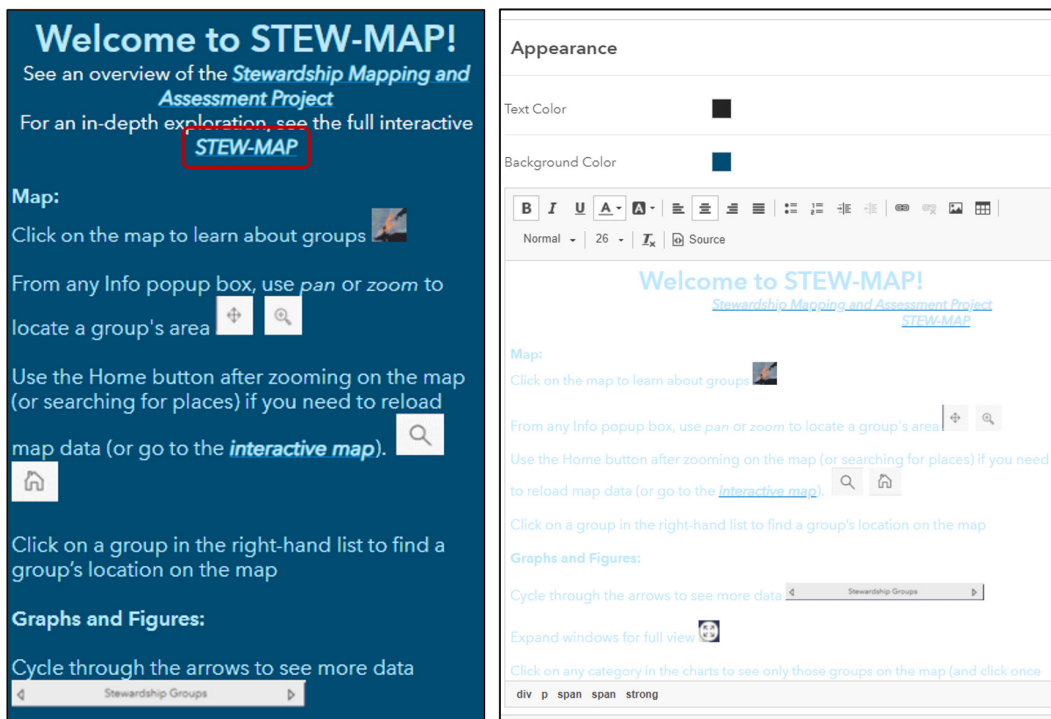

Note

Before you delete the template map, be sure to take screenshots of how the other dashboard widgets are set up. You will need this information when reconfiguring the widgets using the new layer.



STEW-MAP Web Dashboard template in ArcGIS Online showing maps side by side on two tabs before removing template map.

On the welcome/help text screen, update the interactive STEW-MAP link to your current web app by going to the blue tab at the top left corner and selecting **Configure**. You may also update the small map thumbnail on the welcome screen if you choose. Update the remainder of the dashboard widgets one by one.



STEW-MAP Web Dashboard template in ArcGIS Online: **welcome/help text screen**.

5.2.2 Configure the Widgets

Some widgets need to be reconfigured in the dashboard. The default widgets are based on the NYC STEW-MAP survey questions. If your survey posed different questions than those asked in the NYC STEW-MAP survey, you need to change the following widgets to reflect the information gathered in your survey.

Quick Link

See [Appendix D.3](#) for how to configure all the dashboard widgets.

- **Bar and pie chart widgets**
 - Primary stewardship activity
 - Primary focus
 - Stewarded areas
 - Organization type
 - Stewardship groups by type of funding (pie chart)
- **Indicator widgets**
 - Number of stewardship groups
 - Number of members
 - Number of volunteers
 - Number of full-time staff
 - Number of part-time staff
- **List widget**
- **Rich text widget with embedded link chart:** See [Appendix D.5](#) for how to add the link chart to the dashboard.

5.3 Create Link Chart in ArcGIS Insights

[ArcGIS Insights](#) is a data analytics tool that offers spatial and nonspatial analysis capabilities. Link charts are used in Insights to show the magnitude and direction of relationships between two or more variables. They identify relationships between organizations that are not easy to see from the raw data. A link chart is used in the STEW-MAP Dashboard to answer questions such as the following:

- How are organizations related?
- In which direction does the information flow?
- Which organizations have the largest influence and reach?

The link chart in the STEW-MAP Dashboard uses nodes that represent organizations and shows the connectedness and relationships among organizations. The following steps may be used to create a link chart and its preceding worksheet. See [Appendix D.4](#) for detailed instructions on each step.

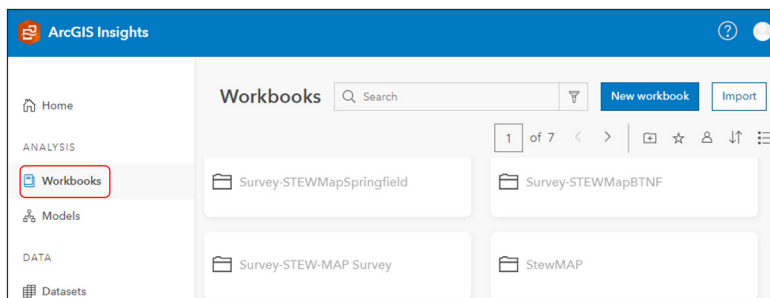
Go to [ArcGIS Insights](#) to create a new workbook. If you do not have access to Insights with your account, contact your RSA AGOL Administrator to set up access to Insights.

Select the **Workbooks** tab, and then select **New workbook**.



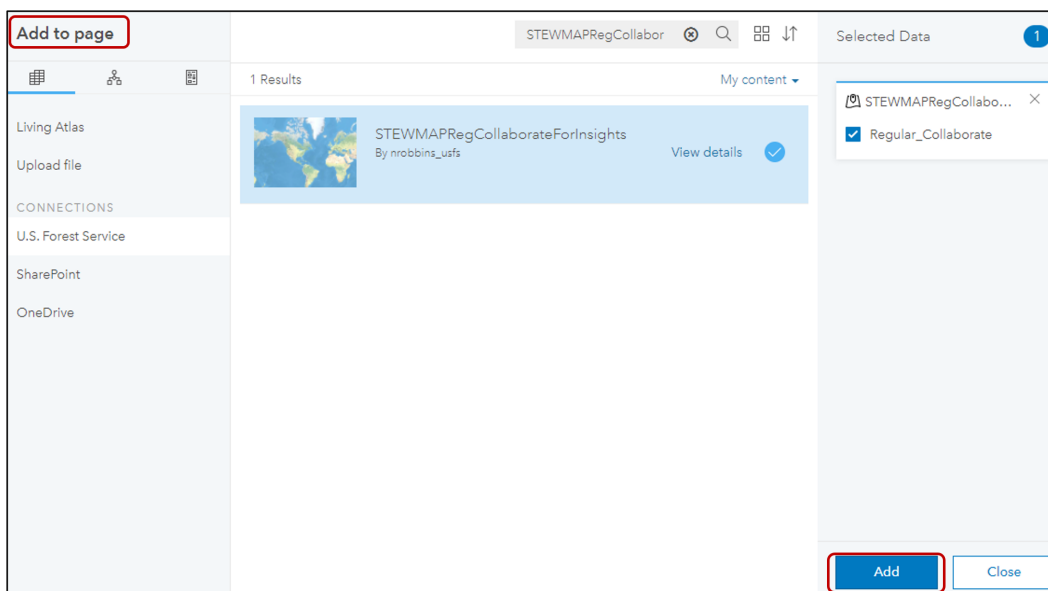
Note

Although link charts are not required for your survey, they provide a dynamic and powerful means to visualize and enhance the interpretation of the data you collect.



STEW-MAP ArcGIS Insights Workbooks: **New workbook.**

A new workbook is created, and the **Add to page** window displays where you can add data to your new workbook. Navigate to your AGOL Contents folder where the STEW-MAP data is located.



STEW-MAP ArcGIS Insights: **Add to page.**

Use the **Add to page** window to add the table. Check that the table has the fields shown below:

Σ	PopID_Sender
	GroupName_Sender
Σ	PopID_Receiver
	GroupName_Receiver_Std

Fields in the Insights table.

Add the previously cleaned office locations [points layer](#) from your survey. The PopID field will be used to create the relationship with the table in the Insights workbook.

Save your new workbook with an appropriate file name.

- In the Insights workbook, create a new relationship between the table and points feature layer. Details are found in [Appendix D.4.3](#).
- Create a link chart to show collaborations and interconnectedness between organizations. Details are found in [Appendix D.4.4](#).

5.4 Deploy ArcGIS Online Maps and Apps

To share the AGOL maps and applications with the public or your organization, you need to follow the proper Forest Service content governance and review the requirements for external publication. Please refer to the [AGOL Governance Example \(internal to Forest Service\)](#).

Refer to [USFS – ArcGIS Online – Web GIS Implementation SharePoint \(internal to Forest Service\)](#) for a full list of additional resources and guidance for creating and sharing AGOL content. On the right side of this site, you will see a list of useful **USFS ArcGIS Online Guidance** documentation (users may have to scroll down the page to find this heading).



The screenshot shows a SharePoint page titled "USFS ArcGIS Online Guidance". At the top, there are navigation icons for New, Upload, Sync, Share, and More. Below this is a list of documents, each with a thumbnail icon, a title, a status indicator (three dots), a date, and an author.

Thumbnail	Title	Status	Date	Author
Folder icon	Implementation Plan Supplementals	...	October 11, 2016	Aiello, Eric -FS
Folder icon	Public Publisher Training	...	September 4, 2020	Rich, Michael -FS
Folder icon	Quick Guides - How To's	...	January 10, 2017	Aiello, Eric -FS
Folder icon	RSA Examples	...	July 24, 2015	Aiello, Eric -FS
Folder icon	Thumbnail Creation	...	June 1, 2016	Aiello, Eric -FS
Document icon	AGOL Content Sharing Workflows	...	February 10, 2020	Rich, Michael -FS
Document icon	ArcGIS Online - Improving Accessibility	...	July 11, 2019	Aiello, Eric -FS
Document icon	ArcGIS Online Administrators User Guide	...	Monday at 7:34 PM	Rich, Michael -FS
Document icon	ArcGIS Online Content Creation Guidance	...	June 24, 2020	Rich, Michael -FS
Document icon	ArcGIS Online Implementation Guide	...	September 22, 2020	Rich, Michael -FS
Document icon	ArcGIS Online Media Best Practices	...	March 24, 2020	Rich, Michael -FS

Forest Service ArcGIS Online Guidance documents on Web GIS SharePoint.

Work with the [RSA AGOL Administrator](#) for your location to follow the proper protocols for transferring content, appropriate branding, and sharing with the public. Forest Service RSAs are responsible for implementing their own governance processes.

To share the web map with the public, consider creating an e-newsletter, webinar, or other outreach to share the final product with respondents and other potential users. In the past, these user groups have included planners, government agencies, and of course, stewards themselves.

6 Tutorials and Resources

Numerous resources are available through the Forest Service and the ESRI training website to help you become more familiar with the technology involved with the processes described in this guide.

6.1 Forest Service Resources

- **Forest Service SharePoint**—[USFS – ArcGIS Online – Web GIS Implementation SharePoint](#) (includes documentation on AGOL).
- **Courses and training**—Several of the courses available on the [Forest Service Training SharePoint](#) page are applicable to this STEW-MAP workflow and could be beneficial to users to increase skills in desktop and online GIS. Refer to the [Geospatial Technology and Applications Center website](#) (internal to Forest Service) for more information and more links to training and user support.

[Introduction to Web GIS Using ArcGIS Online](#)

[Intermediate Web GIS Using ArcGIS Online](#)

[Survey123 Form Creation—An Introduction](#)

[ArcGIS Online Dashboard App Awareness Talk](#)

[ArcGIS Pro—Editing](#)

[ArcGIS Pro for ArcMap Users](#)

6.2 ESRI Resources

Following are several of the guides and tutorials that are available on the [ESRI training page](#) or [YouTube](#). They are applicable to this STEW-MAP workflow and could be beneficial to users to increase skills in desktop and online GIS.

How to Create Survey123 Surveys and Limit Access (useful for Section 3)

- **Guides**—[Survey123 XLSForm Essentials](#), [Limiting Access to Survey123 Results](#)
- **Tutorials**—[Get Started with ArcGIS Survey123](#), [ArcGIS Survey123 Product Overview and XLS Form Tutorial Videos](#)

How to Edit Data in ArcGIS Pro (useful for Section 4)

- **Guides**—[ArcGIS Pro Basics](#), [Create Polygon Feature](#)
- **Tutorials**—[ArcGIS Pro Quick Start Tutorial](#), [Editing in ArcGIS Pro](#)

How to Create and Use ArcGIS Online Notebooks (useful for Section 5)

- **Guides**—[ArcGIS Online Notebooks](#), [Get Started Creating Notebooks](#)

How to Create an ArcGIS Online Web Map and Web Application (useful for Section 5)

- **Guides**—[Choose a Basemap](#), [Get Started Creating Apps](#)
- **Tutorial**—[An Introduction to Web Appbuilder for ArcGIS](#)

How to Publish Hosted Feature Layers to ArcGIS Online (useful for Section 5)

- **Guide**—[Publish Hosted Feature Layers](#)

How to Create an Operations Dashboard (useful for Section 5)

- **Guide**—[ArcGIS Dashboard Resources](#)
- **Tutorial**—[Operations Dashboard: An Introduction](#)

How to Embed a Network Graph in Operations Dashboard (useful for Section 5)

- **Guides**—[Insights Cards in Operations Dashboard](#), [Share Report](#), [Share Your Work](#)

How to Create an Insights Workbook (useful for Section 5)

- **Guide**—[Introduction to ArcGIS Insights](#)
- **Tutorials**—[ArcGIS Insights Fundamentals](#), [Insights for ArcGIS: An Introduction](#), [Insights for ArcGIS: Data Visualization, Analysis, and Science](#)

Appendix A: Advanced Configuration of Survey123 Form

A standardized Survey123 survey template is available in the STEW-MAP AGOL Gallery. It is provided as a starting point with the standard OMB approved STEW-MAP survey questions included. However, you may want to adjust this template based on your local needs. We recommend that changes and adjustments should be as minimal as possible to ensure standardization.

As you consider changes—whether minor or significant—be advised that some html and web development experience is recommended because the html formatting tags can be tricky to navigate. Read through the documentation and watch videos on editing XLS forms (See [Section 6.2](#)) to become familiar with the different columns and standard naming conventions.

The **type**, **name**, and **label** columns on the **survey** worksheet of the [XLS Form](#) are required and must be present for it to correctly function in Survey123. work. The **choices** worksheet on the [XLS Form](#) has three mandatory columns: **list name**, **name**, and **label**.

Each worksheet also has a set of optional columns that allow additional control over the behavior of each question in the XLS form. Optional columns can be left blank, but the mandatory columns must have a value for each row. When authoring or editing text in the XLS form, the syntax must be precise. For example, if you write “Choices” with an upper-case letter, or “choice” in the singular form instead of **choices**, the XLS form will not work.



Quick Link

See [Section 6.2](#) for guides and tutorials on Survey123 form essentials and more advanced topics.



Note

Note: Open Survey123 Connect and select **XLS form** to open the imported form and make edits directly in Excel. When you click **Save**, the form will be updated in Survey123 Connect so you can immediately review changes as you make them.

A.1 Change Standard Text

Some text in the **labels** column will need to be updated to specific text for your location. Those requiring updates should be easy to identify.

A.1.1 Update Survey Worksheet

Navigate to the **survey** worksheet. Locate and modify text in the label column that needs to be modified for your location. For example, you would want to replace any text relevant to the “Bridger Teton National Forest” (shown in the following screen shot) found in the template with text related to your survey region.

Row 1: **Intro** label. Note that the row numbers here correspond to the template. Row numbers may change as you customize the XLS form.

1	type	name	label
2	begin group	Intro	Welcome to the Bridger Teton National Forest STEW-MAP survey!

Intro label in XLS form template.

Row 12: Update **BTNF contact list** information and **mailto** email address in the **Note** field.

12	note	If you are a member of a group with multiple programs, please answer for your entire organization. If you are a respondent from a national organization, please answer for your local chapter. If you answered no, you do not need to complete the rest of the survey. Thank you for your time! If you answered no, but would like to be put on the BTNF contact list, please email with the subject line "contact list" (sm.fs.r4_b-t_info@usda.gov)
----	------	---

Update contact list and email to options in **Note** field within XLS form.

Row 30: Update the **multiple Primary Focus List**.

30	select_multiple Primary_Focus_List	FuncStew	Does your group do any of the following in the Bridger-Teton National Forest? Please select all that apply.
----	------------------------------------	----------	--

Update the **multiple Primary Focus List** field.

Row 37: Update all the items in the **Where Your Group Works** list.

37	begin group	Where_Begin	Section 3: Where Your Group Works
38	text	BoundText	Please describe in detail the physical/geographic boundaries of where your group has done stewardship work on or around the Bridger Teton National Forest. Be as specific as possible, and you can list multiple locations.* For example: - Kemmerer Ranger District; - Snow King Mountain Resort; - Wyoming and Salt Ranges, including Greys River, Kemmerer, Big Piney ranger districts; - Greater Yellowstone Ecosystem * If you have multiple programs in different sites or at different scales, please list each with corresponding programs (e.g. our education programs are citywide; we operate a compost facility at 1234 Main Street.)

Update all items in the **Where Your Group Works** field.

Row 59: **Percentage Stew (PctStew) list** field. Update both the name field (PctBTNF) and the text in the label (right) column.

59	select_one PctStew_List	PctBTNF	Of these activities, what percentage of your group's stewardship effort has been directed toward the BTNF during the past year? <h6>Please select one. </h>
----	-------------------------	---------	--

Percentage STEW list field: Update both the name field and text in the right-hand column.

Row 134: Update contact list information and email addresses in this note.

134	note	<p style="font-weight: normal">To finish, please click SUBMIT below! This concludes the STEW-MAP survey. Thank you for your participation. To learn more about STEW-MAP, visit: www.nrs.fs.fed.us/stewmap Once the survey is complete, we will email you with the results. If you have any questions, feel free to contact us at sm.fs.r4_b-t_info@usda.gov and include "STEW-MAP request" in the subject line.</p>
-----	------	--

Contact list information and email address update.

A.1.2 Update Settings Worksheet

Row 2: Update the survey name in the **Settings** worksheet.

1	form_title	form_id
2	Bridger Teton National Forest STEW-MAP survey	can_form

Update the survey name in the **Settings** worksheet of XLS form.

A.1.3 Update Choices and Survey Worksheets

Refer to [Appendix A.2](#) for how to add groups to the **choice** tab. Populate the existing Ntw_Org_List rows (and additional, if needed) with your unique [PopID](#) (name column) and label for the respondent groups and partner groups that were included in your initial STEW-MAP sampling frame (the list you will use to distribute your survey). To add all groups in the sampling frame may require inserting rows in each worksheet. Notice that the **list_name** column needs to be **Ntw_Org_List** for all rows with PopID (name column) and group names (label column). This list should be used in two locations: (1) as **choices** lists for both the organization name and network collaborators questions, and (2) in the **survey** worksheet to make post processing and cleanup easier. This step creates a linkage between PopIDs and organization names selected as part of survey responses.

list_name	name	label
Ntw_Org_List	001	AMPL Advocates for Multi-Use of Public Lands
Ntw_Org_List	002	Anaconda Trail Society
Ntw_Org_List	003	Backcountry Horsemen
Ntw_Org_List	004	Big Agnes
Ntw_Org_List	005	Bureau of Land Management
Ntw_Org_List	006	Central Wyoming College

Organization list (**list_name**) for all survey groups in XLS form.

type	name	label
select_one Ntw_Org_List	OrgName	What is your group/organization name?

What is your organization name question in XLS form.

type	name	label
select_one Ntw_Org_List or_other	Ntw_Org	Collaborator name

Collaborator name question in XLS form.

A.2 Add or Modify Choice Lists

XLS forms support three types of questions: **select_one** (select one answer), **select_multiple** (multiple answers allowed), and **rank** (order a list of choices). The **choices** worksheet contains the list of possible choice questions for your survey. On the survey worksheet, the **type** column contains the type of question followed in the next column by the name of the choice list in the **choices** worksheet.

select_one list_name	Multiple choice question in which only one answer can be selected. Replace <code>list_name</code> with the name of your choice list. Field type can be changed; however, the choice name is always treated as a string in the field app when used in expressions.	esriFieldTypeString
select_multiple list_name	Multiple choice question in which multiple answers can be selected. Replace <code>list_name</code> with the name of your choice list. Field type cannot be changed and the choice name is always treated as a string in the field app when used in expressions.	esriFieldTypeString

Select one and select multiple list name field types in XLS form.

For example, row 55 contains a **select one** choice question using the list titled **Focus_List** from the **choices** worksheet.

55	select_one Focus_List	PrimFocus	If you had to choose just one activity, what would you say is your group's primary focus? Please select one.
----	-----------------------	-----------	---

Primary focus choice; **select one Focus_List**.

1	list_name	name	label
136	Focus_List	OF_Animal	Animal/ wildlife related
137	Focus_List	OF_Arts	Arts, culture, creative practices
138	Focus_List	OF_CC	Climate change adaptation
139	Focus_List	OF_CommImp	Community improvement and capacity building
140	Focus_List	OF_CultureX	Cultural exchanges
141	Focus_List	OF_Culture	Cultural/ place-based knowledge, values, and practices
142	Focus_List	OF_Drought	Drought management
143	Focus_List	OF_EconDev	Economic development
144	Focus_List	OF_Educ	Education
145	Focus_List	OF_ER	Emergency management and disaster response
146	Focus_List	OF_Employ	Employment, job related
147	Focus_List	OF_EngyEff	Energy efficiency

Primary focus list choice names and labels.

You can also add an **other** option for the user to select when a preferred answer choice is not listed. To do this in the XLS form, follow the **select_one** or **select_multiple** and list name by **or_other**.

54	select_multiple Focus_List or_other	OrgFocus	What does your group work on? Please choose all that apply.
----	-------------------------------------	----------	--

Select multiple Focus List, OrgFocus, other option.

To add a new choice list, scroll to the bottom of the **choices** worksheet and type in the name of the list in the **list_name** column, repeating the same text on each row. In the **name** column, input a value that will be stored in the database. In the **label** column, create a label that will show up in the drop-down list as users respond to the survey. Add a new row for each group on the list.

list_name	name	label
Ntw_Org_List	0001	89.1 KHOL
Ntw_Org_List	0002	Advocates for Multiple Use of Public Lands

Add a new choice list in the **choices** worksheet of the XLS form.

To change a survey question from regular text free form to a single or multiple-choice list, go to the **survey** worksheet and change the **type** field from text to **select_one list_name** or **select_multiple list_name**. This will change your form question from requiring manual text entry to providing a list of items from which to choose. As discussed in [Section 3.8](#), you should create a [Master List](#) early and prior to sending out your survey. This Master List can be created prior to the survey form being finalized by combining lists of standardized names and unique IDs for respondent groups and partner groups that were included in the initial STEW-MAP sampling frame (the list you will use to distribute your survey). After the data are collected, the sampling frame will remain static, but the Master List will be updated to include partners named by survey respondents.

In the XLS form, your network group collaborator name survey question (row 72) uses the NTW_org_List, which is based on your Master List; this simplifies cleanup and post processing because users are forced to pick an organization from the drop-down list and therefore do not submit responses with different spellings for the same organization. The XLS form will not have a list of organizations along with unique ID in the **choices** tab; you need to create this list in the **choices** worksheet of the form following the procedure described in the preceding paragraph to match your Master List.

type	name	label
select_one Ntw_Org_List	Ntw_Org	Collaborator name

Network collaborator name survey question.

To change options for an existing list, simply modify the name and label fields so the list matches your requirements as outlined in the data dictionary. To add additional options to the list, add new rows to the XLS form spreadsheet, and type in the **list_name**, **name**, and **label** values in the appropriate columns. By default, the choices in the survey form appear in the order provided in the **choices** worksheet. You can instead randomize the order in which the choices appear by entering **randomize=true** in the **parameters** column (column AE), which is one of the optional fields in the survey worksheet and appears on the right-hand side of the sheet.

list_name	name	label
Site_List	PS_None	None of the above
Site_List	PS_Park	Park

Site list survey question in the **choices** worksheet.

type	name	label
select_one Site_List or_other	PrimST	If you had to choose just one site type, what would you say is your group's primary site type? Please select one

Select one site list or other in the **choices** worksheet.

A.3 Add Questions and Groups of Questions

The XLS form is divided into several groups or sections of questions, by general topic. Each group of questions appears on a new page of the published survey. The beginning of a group contains the text **begin group** in the **type** field. The end of the group contains the text **end group** in the **type** field. To add a new question to an existing group, simply add a new row in the XLS form spreadsheet where you want to add the question and type in a **field type**, **name**, and **label**. Modify any of the optional fields as needed. You can make the question required by selecting **yes** in the optional **required** column (column G) drop-down menu. You can modify the appearance of a question by selecting an option from the **appearance** column (column I) field drop-down. As you make changes and add new questions, you can save and review the appearance by viewing in Survey123 Connect.

To add a new group of questions, insert new rows anywhere in the XLS form spreadsheet and add **begin group** and **end group** in the **type** column. (Copy/paste from an existing group may be useful if you have similar questions in the new section.) Any new groups (or sections) added to the spreadsheet will add a new page to the survey.

type	name	label
begin group	Where_Begin	Section 3: Where Your Group Works

Add new questions and groups of questions with **begin group** in the **type** column.

type	name	label
end group	Where_end	

End the list of new questions or groups of questions with **end group** in the **type** column.

Ensure that there are no duplicate values in the **name** column. Otherwise, the XLS form will not work correctly, and you will get an error in Survey123 Connect when you save the spreadsheet.

**Error converting XLSForm**

There are more than one survey elements named 'survey_finished' (case-insensitive) in the section named 'STEW_MAP_Survey'.

☒ OK

Error message indicating duplicate values in the **name** columns.

Section 5 (row 69) of the XLS form is a network repeat type of question, meaning that survey respondents can select add [+] at the bottom of the form to add additional network collaborators.

Section 5: Networking

Please tell us which other groups you partner with and what kind of relationship you have with these groups. These groups may be government agencies, offices of elected officials, community-based groups, nonprofits, private companies, faith-based organizations, etc.

Please add all groups with which you work.
Select the "+" near the bottom of this page.

Collaborator name

Big Agnes



Networking repeat type of question, **collaborator name**, and add **[+]** button.

To create this type of network repeat question, you will need a **begin repeat** and **end repeat** in the type column within the **begin group** and **end group** rows, as shown in the following screenshot.

type	name	label	appearance
begin group	Network_Begin	Section 5: Networking	field-list
<i>begin repeat</i>		Please tell us which other groups you partner with and what kind of relationship you have with these groups. These groups may be government agencies, offices of elected officials, community-based groups, nonprofits, private companies, faith-based organizations, etc.	field-list
	Network		
<i>note</i>		Please add all groups with which you work. Select the + near the bottom of this page.	
select_one Ntw_Org_List	Ntw_Org	Collaborator name	
select_multiple Ntw_Type_List	Ntw_Type	Please indicate the nature of your work together. Select all that apply.	
<i>end repeat</i>			
end group	Network_end		

Begin repeat and **end repeat** in the **type** column.

A.4 Modify Optional Fields

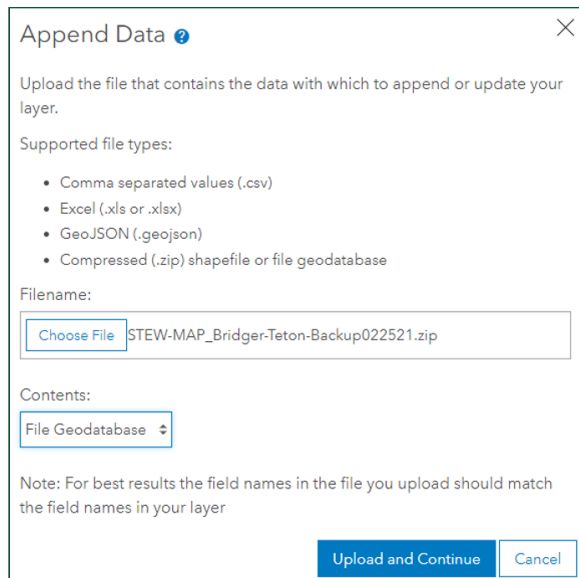
There are optional fields in the XLS form that can be used to further refine and enhance questions. The following fields are used to indicate which questions are required, how to control survey appearance, and how to skip or show additional questions based on answers in previous responses.

- **Required** (column G)—Forces a survey question to be answered or else the survey cannot be submitted. To make a field required, simply change the value of the required column to **yes**. This is useful for questions like group/organization name, name, and email.
- **Appearance** (column I)—Changes the appearance of a question, such as changing a multiple-choice question from multiline to minimal (drop-down box).
- **Default** (column J)—Provides a default answer for a question that can then be changed by the user.
- **Relevant** (column L)—Provides a way to skip or show additional questions based on previous answers. To set this property, place a formula in the relevant field for a question you want to have shown if a specific option is selected. For example, to require a respondent to specify the type of tribal government if they choose that option in the primary land ownership question, input a value of **\$(PriLandOwn) = Tribal Government** in the **Relevant** column for the **PriLandTri** question. If a respondent picks Tribal Government from the PriLandOwn list, a new question appears and asks the type of tribal government.

Appendix B: Update and Append Survey Data from Backup

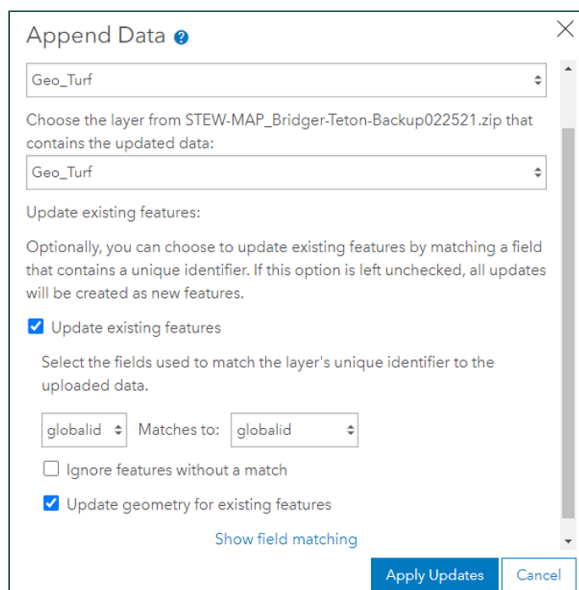
If you make a mistake and accidentally delete data during the ArcGIS Pro turf-editing process, or the AGOL erroneous feature-deletion process, in a web map, you can use a backup file to fix these accidents.

Go to **Item Details** for your live [hosted feature layer](#) for public data collection and click **Update Data** and **Append Data**. In the popup, choose your backup zip file and change **Contents** option to **File Geodatabase**. Select **Upload and Continue**.

The 'Append Data' dialog box is shown. It has a title bar with a close button. The main text says 'Upload the file that contains the data with which to append or update your layer.' Below this, it lists 'Supported file types:' with a bulleted list: 'Comma separated values (.csv)', 'Excel (.xls or .xlsx)', 'GeoJSON (.geojson)', and 'Compressed (.zip) shapefile or file geodatabase'. There is a 'Filename:' label followed by a text input field containing 'STEW-MAP_Bridger-Teton-Backup022521.zip' and a 'Choose File' button. Below that is a 'Contents:' label followed by a dropdown menu set to 'File Geodatabase'. A note at the bottom says 'Note: For best results the field names in the file you upload should match the field names in your layer'. At the bottom right are 'Upload and Continue' and 'Cancel' buttons.

Append Data dialog. **Choose File** and then select **Upload and Continue**.

Select **Geo_Turf** layer from both drop-down menus, check the **Update existing features** box, change **Matches to** to **globalid**, and check the **Update geometry for existing features** box. Select **Apply Updates**. If you accidentally delete a point feature, repeat this process but this time select **can_form** or whatever the point layer is called, as the layer.

The 'Append Data' dialog box is shown. It has a title bar with a close button. The first dropdown menu is set to 'Geo_Turf'. Below it, the text says 'Choose the layer from STEW-MAP_Bridger-Teton-Backup022521.zip that contains the updated data:' followed by another dropdown menu set to 'Geo_Turf'. Below this is the 'Update existing features:' section. It contains a paragraph: 'Optionally, you can choose to update existing features by matching a field that contains a unique identifier. If this option is left unchecked, all updates will be created as new features.' There is a checked checkbox for 'Update existing features'. Below this is the text 'Select the fields used to match the layer's unique identifier to the uploaded data.' followed by two dropdown menus, both set to 'globalid', with 'Matches to:' between them. There is an unchecked checkbox for 'Ignore features without a match' and a checked checkbox for 'Update geometry for existing features'. At the bottom right are 'Apply Updates' and 'Cancel' buttons. A link 'Show field matching' is also present.

Append Data dialog. Choose **Geo_Turf** and select **Apply Updates**.

Appendix C: Advanced Network Cleaning Steps

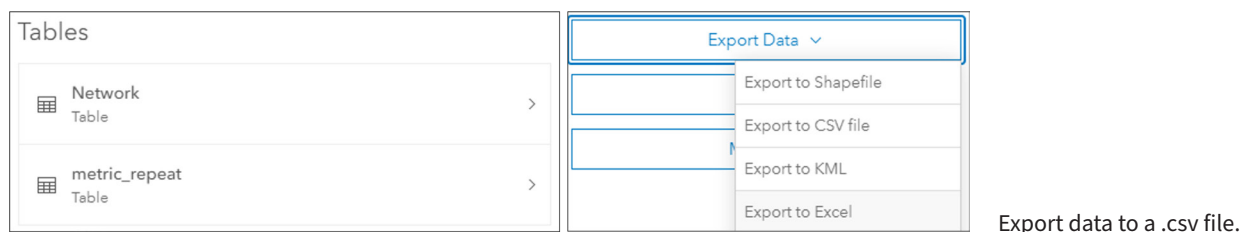
Network questions on the STEW-MAP survey can be formatted to generate network tables that show collaborator (group) names and the nature of the groups' work together. There is a one-to-many relationship between each responding group and the group's network collaborators named in the survey, meaning that each respondent can have many network collaborators. This section details steps to export, clean, standardize, and configure your survey network tables. The process results in a complete set of tables (or [edgelist](#)s) for each collaboration type, which in turn can be used to create custom ArcGIS Insights visualizations embedded in an ArcGIS Online Operations Dashboard. Refer to [Appendix D](#) for more information on configuring the ArcGIS Online products.

These steps create a networks dataset in an Excel workbook called **Networks.xlsx**.

C.1 Export Survey Data from AGOL

Download the survey data to a file that can be opened and edited in various software products, including Microsoft Excel. (This section addresses how to do these steps in Excel, but since the data are exported as a .csv file, any software that imports CSV can be used.) Exporting the data file is a two-step process.

First, navigate to the Survey123 [hosted feature layer](#) in AGOL and select the **Network Table**, then select **Export Data** and **Export to CSV file**.



Export data to a .csv file.

Give the network table a title, tags, summary; specify which folder to save it; and select **Export**.

Second, find this newly downloaded CSV file in your AGOL content and select **Download** to save the file to your computer hard drive.

Also download to your computer your cleaned survey office locations layer (**Survey Results Points hosted feature layer**) as a new CSV file. You will need this file to join to your **Networks table**.

Open the **Network table** (CSV file) in Excel. Examine the data to become familiar with the data structure. Name the worksheet tab **Networks** and save as an Excel file titled **Networks.xlsx**.

A	B	C	D	E	F	G	H
ObjectID	GlobalID	Please Specify other.	Ntw_Other	Collaborator Name	Please indicate the nature of yo	ParentGlobalID	
3	2edbf492-76a7-4a4b-8ff7-00ef1ed6ba8f						527dece7-9774-48b6-8551-6ce016b67469
13	b4b42cec-d961-4b29-878b-096bc6280020	010			Regular_Collaborate	e66e4fd9-55d9-44c8-8b80-2cb023508b3a	
27	367864a6-db15-440e-8612-185642cda0bf	007			Regular_Collaborate	e66e4fd9-55d9-44c8-8b80-2cb023508b3a	
29	6eb91d0d-9ec0-4836-82c5-18c50006ac18			Teton Student Conservation Association	Regular_Collaborate	e66e4fd9-55d9-44c8-8b80-2cb023508b3a	
36	9995f621-6416-4461-8982-21a8d0c0ef3a	025			Regular_Collaborate	19491983-29ea-43ee-80b0-02e00b2712c4	
53	16854e77-40e5-43e4-8739-2f4245dbbbe4	011			Regular_Collaborate,Funding	19491983-29ea-43ee-80b0-02e00b2712c4	
55	51a2eb42-9fc0-4c0a-8652-30501b0c42c5	061			Regular_Collaborate,Funding,In	527dece7-9774-48b6-8551-6ce016b67469	

Networks worksheet.

Open the cleaned survey office location points CSV file in a new Excel spreadsheet. Select **ctrl+A** to select all data, then **copy** and **paste** the data into a new worksheet (tab) in the **Networks** Excel workbook. Rename the new worksheet **Office Locations**. Organize the columns so that the first three columns are **GlobalID**, **OrgName**, and **OrgName2**. The other columns are not needed and can be deleted.

A	B	C
GlobalID	OrgName	OrgName2
eae97ab4-dafa-4540-89ab-493ccf6461b0	001	AMPL Advocates for Multi-Use of Public Lands
e66e4fd9-55d9-44c8-8b80-2cb023508b3a	011	Continental Divide Trail Coalition
527dece7-9774-48b6-8551-6ce016b67469	015	Friends of Pathways
19491983-29ea-43ee-80b0-02e00b2712c4	016	Friends of the Bridger-Teton
79e7a7d6-72f8-4866-8336-d910540e174b	018	Grand Teton Association

Data pasted into the **Office Locations** worksheet (tab) of the **Networks** Excel file.

In the Networks Excel file, create a third worksheet titled Master List.

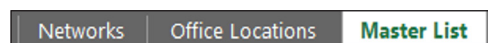
Keep the Networks workbook open. Locate and open your [Master List](#) of groups in a new Excel spreadsheet. This will be the full list of survey respondents that were created during general workflow [Section 2.2](#). (This should match the values in the name and label fields from your Survey123 form **choices** worksheet, Ntw_Org_List list_name.) This Master List has been created early in the process and prior to the survey form being finalized by combining lists of standardized names and unique IDs ([PopID](#)) for respondent groups and partner groups that were included in the initial STEW-MAP sampling frame (the list you used to distribute your survey). Refer to [Section 3.8](#) for information on what this list of groups is and how it is created. The first two column names should be PopID and GroupName. As the STEW-MAP team clean the network data, new named groups will be added to the Master List.

A	B
PopID	GroupName
001	AMPL Advocates for Multi-Use of Public Lands
002	Anaconda Trail Society
003	Backcountry Horsemen
004	Big Agnes
005	Bureau of Land Management

Master List from Step 2 of the general workflow.

Select and copy all data in these first two columns and paste the data into a Master List tab in the Networks workbook.

Your Networks Excel file should now have these three tabs (or worksheets): Networks, Office Locations, and Master List.



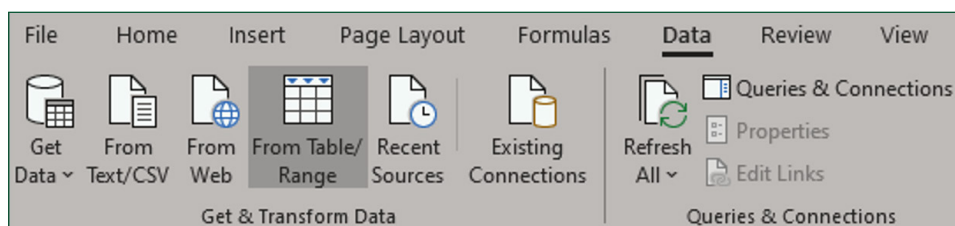
Master List tabs in **Networks** Excel file.

C.2 Convert Excel Tables to Connections Using Power Query

Now that your data are downloaded and formatted in Excel, you need to create queries to join the data using [Excel Power Query](#), which merges the data from these three tables in your Excel workbook. The first step is to convert the tables into connections using Power Query, described in this section. The next step is to merge them ([Section C.3](#)).

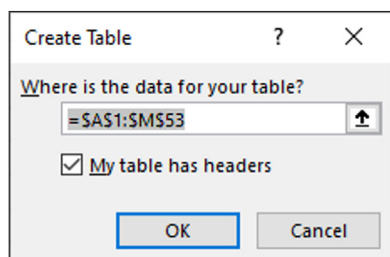
Here are the eight steps to save an Excel table as a connection in Power Query:

1. Select any cell in **Networks** worksheet.
2. Select the **Data** tab.
3. In the **Get & Transform Data** group of options, select **From Table/Range**.



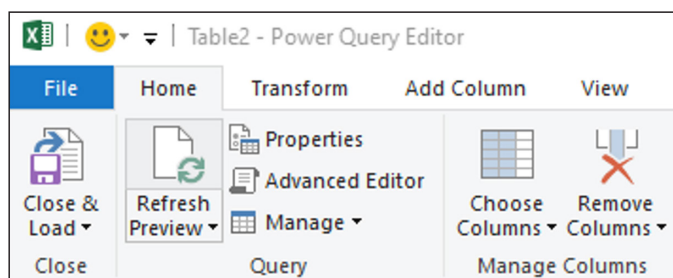
From Table/Range option in **Get & Transform Data** in worksheet **Data** tab.

4. In the **Create Table** popup, all cells in your worksheet should be highlighted in the window under **Where is the data for your table?** Leave the box checked for **My table has headers** and select **OK**.

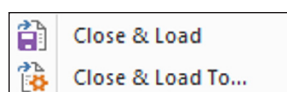


Create Table dialog; select cell range for your data.

5. The **Power Query Editor** will open. In the query setting **Properties**, change the file name to **Networks**.
6. In the Query Editor, select the **File** tab, then **Close & Load To...** from the **Close & Load** drop-down.

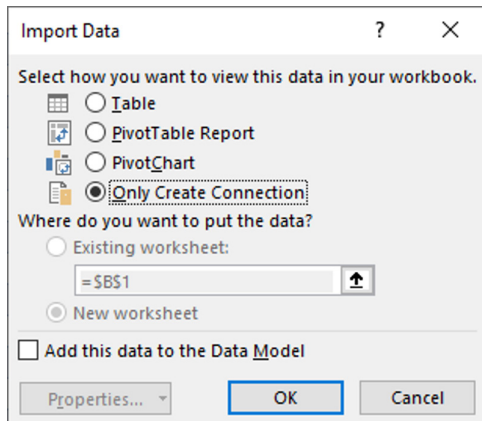


Create Table dialog; select cell range for your data.



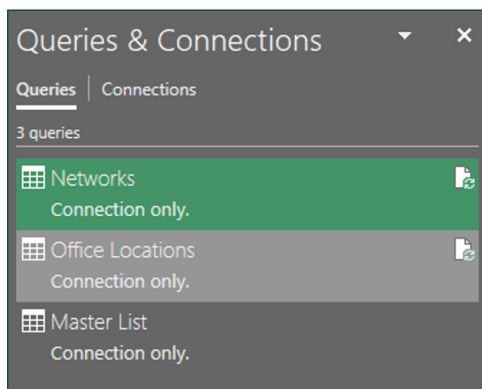
Power Query Editor setting properties.

7. In the **Import Data** dialog box, select **Only Create Connection**.



Import Data; select **Only Create Connection** option.

These steps create a connection with the title Networks. Next, repeat the steps using the Office Locations and Master List worksheets. When these steps are complete, you will have three tables of connections in your Excel workbook: Networks, Office Locations, and Master List.



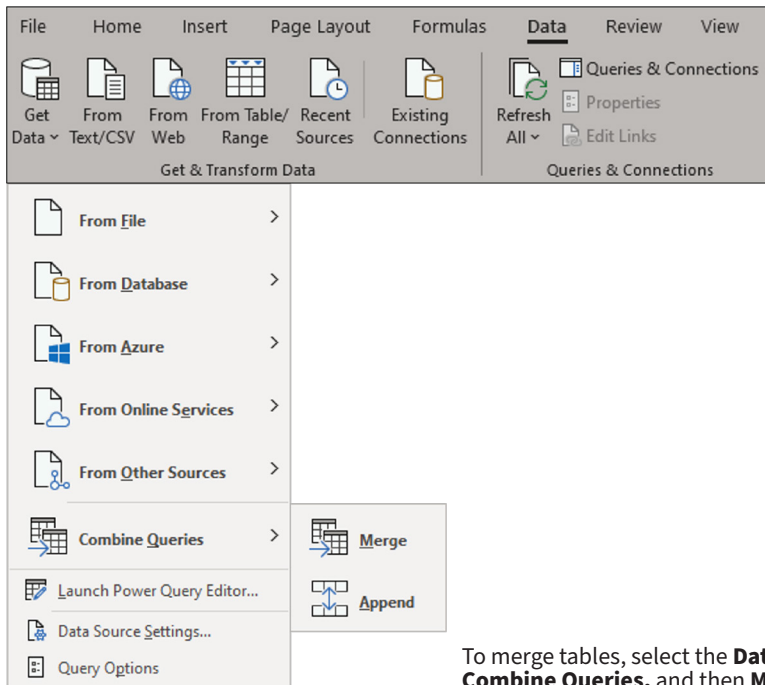
Queries & Connections setting properties.

C.3 Merge Networks and Office Locations

The ParentGlobalID column in the Networks table and the GlobalID column in the Office Locations table are the key fields in the one-to-many relationship. A one-to-many relationship means there are multiple children (network collaborators) per parent (office location). These two columns link the tables together and facilitate the join. Both columns are generated automatically by the Survey123 software and added to the [hosted feature layers](#).

Follow these steps to merge the **Networks** and **Office Locations** tables:

1. Select the **Data** tab on the banner at the top of the Excel screen.
2. In the **Get & Transform Data** group, select **Get Data**.
3. In the drop-down, select **Combine Queries**, then **Merge**.



To merge tables, select the **Data** tab, **Combine Queries**, and then **Merge**.

4. In the **Merge** dialog box, select **Networks** from the first drop-down.
5. Select **Office Locations** from the second drop-down.
6. In **Networks** preview, click on the **ParentGlobalID** column header to select the entire column.
7. In **Office Locations** preview, click on the **GlobalID** column header to select the entire column.
8. In the **Join Kind** drop-down, select **Left Outer (all from first, matching from second)**.

Merge

Select tables and matching columns to create a merged table.

Networks

ParentGlobalID	GroupName	CreationDate
527dece7-9774-48b6-8551-6ce016b67469		44252.8835
e66e4fd9-55d9-44c8-8b80-2cb023508b3a	City Wild	44252.8835
e66e4fd9-55d9-44c8-8b80-2cb023508b3a	Chama Valley Outdoor Club	44252.8835
e66e4fd9-55d9-44c8-8b80-2cb023508b3a	Student Conservation Association	44252.8835

Office Locations

GlobalID	OrgName	OrgName2
eae97ab4-dafa-4540-89ab-493ccf6461b0	1	AMPL Advocates for Multi-Use of Public Lands
e66e4fd9-55d9-44c8-8b80-2cb023508b3a	11	Continental Divide Trail Coalition
527dece7-9774-48b6-8551-6ce016b67469	15	Friends of Pathways
19491983-29ea-43ee-80b0-02e00b2712c4	16	Friends of the Bridger-Teton
79e7a7d6-72f8-4866-8336-d910540e174b	18	Grand Teton Association

Join Kind

Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

Fuzzy matching options

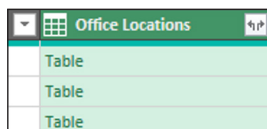
✓ The selection matches 52 of 52 rows from the first table.

OK Cancel

Merge options in the **Networks** spreadsheet query merge.

9. Select **OK**.

These steps will open the **Power Query Editor** and show data from the **Networks** table with one additional column from the **Office Locations** table.

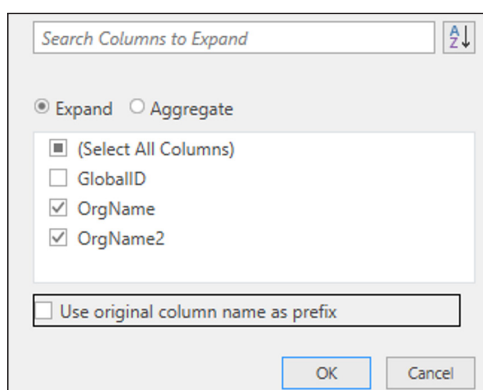


Office Locations	
	Table
	Table
	Table

Additional **Office Locations** field in **Networks** table query editor.

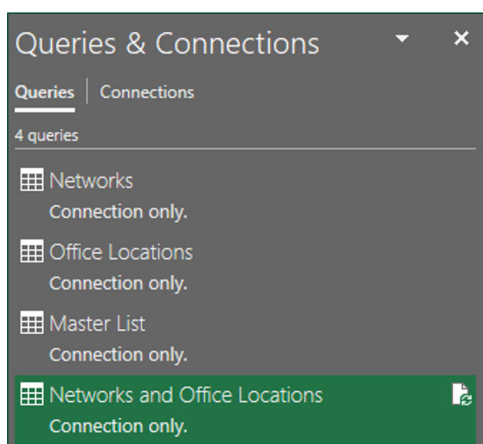
Follow these steps to merge the tables within the Power Query Editor:

1. In the additional column, **Office Locations**, select the double-pointed arrow on the right side of the header (see preceding screenshot).
2. On the options box that opens, uncheck **GlobalID** (because this column is not needed in the final table). **Use original column name as prefix**.



Power Query Editor column options.

3. Select **OK**.
4. Save this merged table as a connection by selecting the **File** tab.
5. Select **Close and Load to** option.
6. In the **Import Data** dialog box, select **Only Create Connection**.
7. Select **OK**. Rename this new connection **Networks and Office Locations**.



Queries & Connections: **Networks and Office Locations** query.

Use the same process to merge the [Master List](#) table with the newly created Networks and Office Locations table:

1. Select the **Data** tab.
2. In the **Get & Transform Data** group, select **Get Data**.
3. In the drop-down, select **Combine Queries**.
4. Select **Merge** to open the dialog box.
5. In the **Merge** dialog box, select **Networks and Office Locations** from the first drop-down.
6. Select [Master List](#) from the second drop-down.
7. In the **Networks and Office Locations** preview, click on the column **Please add all groups with which you work**.
8. In the **Master List** preview, click on the **PopID** column.
9. In the **Join Kind** drop-down, select **Left Outer (all from first, matching from second)**.

Merge

Select tables and matching columns to create a merged table.

Networks and Office Locations

ObjectID	GlobalID	Please add all groups with which you work. Select the "+ Specify other
3	2edbf492-76a7-4a4b-8ff7-00ef1ed6ba8f	null
13	b4b42cec-d961-4b29-878b-096bc6280020	10
27	367864a6-db15-440e-8612-185642cda0bf	7
29	6eb91d0d-9ec0-4836-82c5-18c50006ac18	null

Master List

PopID	GroupName
1	AMPL Advocates for Multi-Use of Public Lands
2	Anaconda Trail Society
3	Backcountry Horsemen
4	Big Agnes
5	Bureau of Land Management

Join Kind

Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

> Fuzzy matching options

✓ The selection matches 45 of 52 rows from the first table.

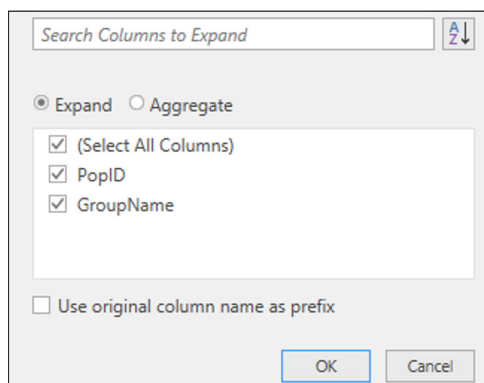
OK Cancel

Networks and **Office Locations** table merge options.

10. Select **OK**.

Follow these steps to merge the tables within the Power Query Editor:

1. In the additional column, **Office Locations**, select the double-pointed arrow on the top right of the header.
2. From the **Options** dialog box that opens, check the **Select All Columns**.
3. Uncheck **Use original column name as prefix**.



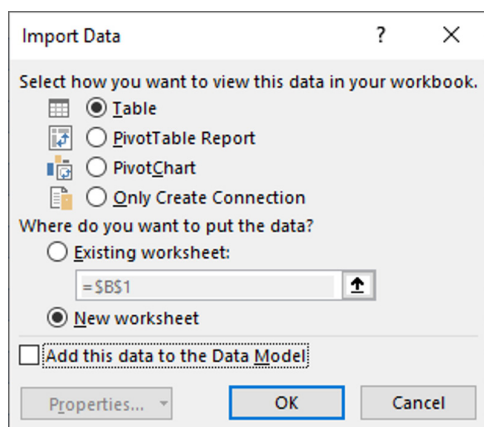
Search Columns to Expand options.

4. Select **OK**.

These steps will result in a table that has all three tables merged (Networks table with two columns for Office Locations and two columns for Master List).

Follow these steps to load this table into Excel:

1. Select the **File** tab.
2. Select **Close and Load to**.
3. In the **Import Data** dialog, select **Table** and **New worksheet**.



Import Data to new worksheet.

4. Select **OK**.

This results in a merged table in a new worksheet in the **Network** table.

C.4 Prepare Table for Visualization

To finish cleaning the **Network** table to prepare it for visualization, follow these steps:

1. Rename the new worksheet **Networks Cleaned**.

2. Delete the following columns, which are no longer needed:

ObjectID	ParentGlobalID
GlobalID	CreationDate
Please add all groups with which you work	Creator
Specify other	EditDate
Ntw_Other	Editor

3. Rename the columns as follows:

Old Name	New Name
OrgName	PopID_Sender
OrgName2	GroupName_Sender
PopID	PopID_Receiver
GroupName	GroupName_Receiver
Collaborator Name	GroupName_Other
Please indicate the nature of your work together	Collaborate_Type

4. Reorder the columns are in the following order: PopID_Sender, GroupName_Sender, PopID_Receiver, GroupName_Receiver, GroupName_Other, Collaborate_Type.

PopID_Sender	GroupName_Sender	PopID_Receiver	GroupName_Receiver	GroupName_Other	Collaborate_Type
--------------	------------------	----------------	--------------------	-----------------	------------------

Renamed and reordered column headings in the **Network** table.

5. Insert six new columns between the columns **GroupName_Other** and **Collaborate_Type**. Name the new columns as follows:

GroupName_Receiver_Std	Information
Regular_Collaborate	Collaborate
Funding	Status

GroupName_Receiver_Std	Regular_Collaborate	Funding	Information	Collaborate	Status
------------------------	---------------------	---------	-------------	-------------	--------

New columns and headings in the **Network** table.



Note

The **Collaborate_Type** fields added above should match whatever collaboration types you have defined in your Survey123 form (e.g., Funding, Information, Collaborate).

C.5 Standardize Collaborator Names and Update Status

The **GroupName_Receiver** column should already be standardized because you used a choice list to force respondents to pick a collaborator from the drop-down list of groups in your survey. However, respondents will also have the option to type in the name of a collaborator that does not exist in the drop-down. **You will likely need to verify these added collaborators are not already in the [Master List](#), standardize the names if they are not in the Master List, and add a [PopID](#) for each new collaborator.** There may also be some entries where responders did not pick a collaborator group or collaborator type. These rows will have the **PopID_Sender** and **GroupName_Sender** completed, but other fields may be blank.



Note

It is critically important to standardize the group names for any additional collaborators added by survey respondents during the survey and ensure they do not already exist in your list of groups. Another critical step that is easily overlooked is to clean up entries where a collaborator group or collaborator type is not selected.

PopID_Sender	GroupName_Sender	PopID_Receiver	GroupName_Receiver	GroupName_Other	GroupName_Receiver_Std	Collaborate_Type
15	Friends of Pathways		80 Wyoming Untrapped			Regular_Collaborate,Funding,Information
15	Friends of Pathways					
11	Continental Divide Trail Coalition			Teton Student Conservation Association		Regular_Collaborate
1	AMPL Advocates for Multi-Use of Public Lands					
11	Continental Divide Trail Coalition					
16	Friends of the Bridger-Teton					
18	Grand Teton Association			Teton Chamber of Commerce		Information
18	Grand Teton Association					

Sample of the **Collaborator** table with fields left blank.

Removing rows is not recommended. Instead, add a value to the **Status** column for any rows that have incomplete information. Populate the status column with the value **Exclude** for any such rows to easily exclude them from your final formatted collaboration tables.

For rows where the respondent identified a collaborator but did not select a collaborator type, it may be inferred that they are a regular collaborator. Update the **Collaborate_Type** column with the following text: **Regular_Collaborate**.

PopID_Sender	GroupName_Sender	PopID_Receiver	GroupName_Receiver	GroupName_Other	GroupName_Receiver_Std	Collaborate_Type
16	Friends of the Bridger-Teton		13 Everlong Endurance			

In some cases, a collaborator is named but no **Type** is selected.

For rows where the respondent identified a collaborator that was not in the drop-down, verify it is not a duplicate and standardize the names in the **GroupName_Receiver_Std** column. Some suggestions for standardizing names include the following:

- Delete leading and trailing white spaces ([use Excel TRIM function](#)).
- Remove double white spaces ([use Excel TRIM function](#)).
- Change all names to either Title Case, lower case, or UPPER CASE for consistency ([use Excel PROPER, LOWER, or UPPER formulas](#)).
- Examine for special characters ([use Excel PROPER, LOWER, or UPPER formulas](#)).
- Examine for Arabic numerals that might match to text (e.g., 6th could match to “sixth”) ([use Excel Arabic function](#)).

You will likely need several passes through the data to fully standardize names. Copy all the data in **GroupName_Receiver** to **GroupName_Receiver_Std** column so all final standardized names are in one column. Add any groups not on the Master List to it and create a standardized name and [PopID](#). To confirm the group's existence and correct name, you can use online searches; if a group has a website and/or social media accounts, add those in an additional column (e.g., a website column).

For entries that cannot be found or fact-checked after a web search or other outreach, add a **Notes** column and document categories of potential issues (e.g., individual, can't locate group, not enough information). Groups are defined as two or more people; if just a single person is named, that receiver would be excluded from the **Networks** list. Additionally, there may not be enough information from the response to clearly identify a group. Registered nonprofits will be searchable through the Internal Revenue Service and nonprofit databases; informal community groups may not be.

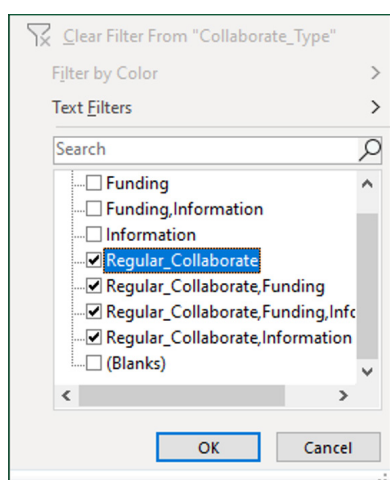
You may want to exclude these rows from the final dataset by adding **Exclude** to the **Status** column. You may want to populate rows you want to include in the final list with **Include** in the **Status** column. You may also want to add additional categories for **General** or divide this status column further into **Civic** or **Government**.

For groups named in the network (receivers) that are not already part of the [sampling frame](#) that serves as the initial Master List, assign [PopIDs](#) in the **PopID_Receiver** column in the **Networks** worksheet. Add the PopID and group name to the Master List.

C.6 Format Tables

Format the table and prepare it to be uploaded to ArcGIS Online as a hosted table so it can be joined with the survey **Office Locations** ([nodelist](#)) to create a network collaboration ArcGIS Insights visualization by following these steps:

1. Select the filter option for the **Collaborate_Type** column and select all the rows that contain **Regular_Collaborate** exists.



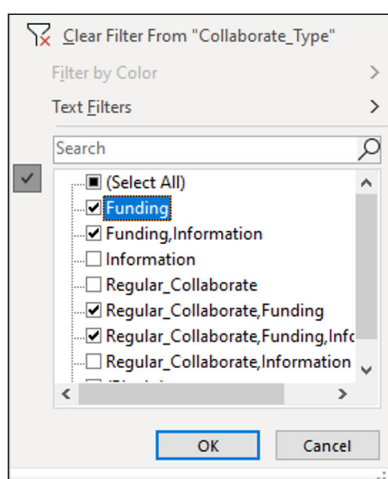
Regular_Collaborate filter request.

- Highlight all rows in the **Regular_Collaborate** column and type the number **1**. Then select **ctrl+enter** on your keyboard. This will populate all rows that had **Regular_Collaborate** selected on the survey form with a **1**.

Collaborate_Type	Regular_Collaborate
Regular_Collaborate	1
Regular_Collaborate,Funding,Information	1
Regular_Collaborate	1
Regular_Collaborate,Information	1
Regular_Collaborate	1

Input the number **1** for all collaborators in **Regular Collaborate** field.

- Click the filter option for the **Collaborate_Type** column and select all the rows that contain **Funding**.



Clear filter from **Collaborate_Type**.

- Highlight all rows in the **Funding** column and enter the number **1**, and then select **ctrl+enter** on your keyboard. This will populate all rows that had **Funding** selected on the survey form with a **1**.
- Repeat these steps for **Information** and **Collaborate** (or whatever collaboration types you have in the survey).
- Select a column (for instance, **Funding**) for which you want to create a new table, and filter to only show where there is a **1**.



Filter options: Do not show (select) Blanks.

- Filter the **Status** column to show only **Include** or whatever you want to show based on the categories you have added to this column.
- Click on any of the column header names and select all data in the sheet with **ctrl+A** on the keyboard. Right-click and select **Copy**.
- Create a new worksheet in the Excel workbook and paste the data you just copied.

10. You may now delete the following columns in this new worksheet:

Group_Name_Receiver	Funding
GroupName_Other	Information
Collaborate_Type	Collaborate
Regular_Collaborate	Status

You should have the following columns remaining:

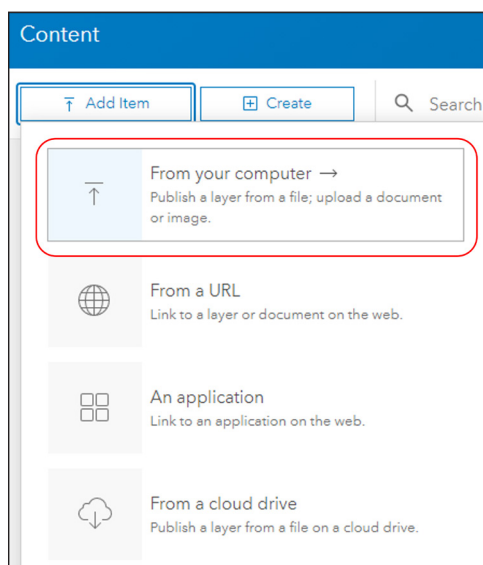
PopID_Sender	PopID_Receiver
GroupName_Sender	GroupName_Receiver_Std

11. Rename this worksheet **Regular_Collaborate** or whatever collaboration type you had filtered for.

12. Repeat these steps for **Funding**, **Information**, **Collaborate** to create a separate worksheet for each.

C.7 Upload Tables into ArcGIS Online

Upload the properly formatted tables created in [Appendix C.6](#) into AGOL and share them with the proper groups so they can be added to an **Insights** workbook using the following steps:



Upload tables into ArcGIS Online from your computer.

1. In your AGOL Content folder, select **Add Item** and **From your computer**.
2. Choose the Excel workbook with formatted networks ([Appendix C.6](#)).
3. Enter a title, tags, and select **Publish this file as a hosted layer**.
4. Select the worksheet from the workbook you want to publish in the **Publish this sheet** drop-down. It should be named **Regular_Collaborate** unless you gave it another name ([Appendix C.6](#)).

5. Select **Add Item**.

Add an item from your computer

File:
Choose File STEW-MAP Networks.xlsx

Title:
STEWMAPRegCollaborateForInsights

Categories:
+ Assign Category

Tags:
STEW MAP Networks
Add tags

☒ Publish this file as a hosted layer.

Publish this sheet: Regular_Collaborate

Locate features by:
☐ Coordinates ☐ Addresses or Places ☒ None, add as table

Review the field names.

Field Name
PopID_Sender
GroupName_Sender
PopID_Receiver

Time Zone: (UTC) Coordinated Universal Time

Add Item Cancel

Add item to AGOL from computer and publish as a hosted layer.

6. A new hosted table is created. You are directed to its item details where you can update descriptions and share with the GTAC STEW-MAP Collaboration group or other groups as required. This hosted table will be used in the **Insights Network Visualization**. See [Appendix D.4](#) for more information on how to configure it and [Appendix D.5](#) for information on how to embed this graphic in your dashboard.

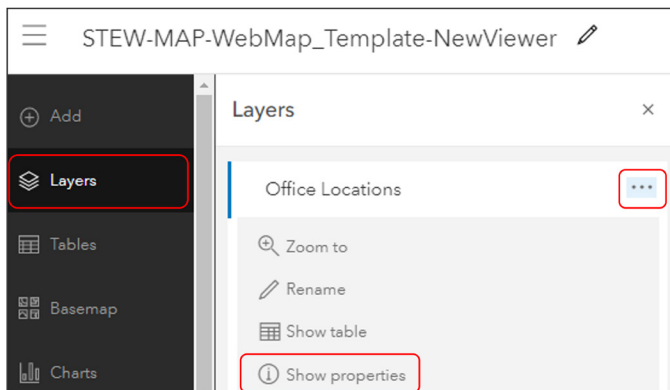
Appendix D: Configure ArcGIS Online Products

Once you have decided how you want to present your map, you can configure its appearance by controlling the graphic elements displayed.

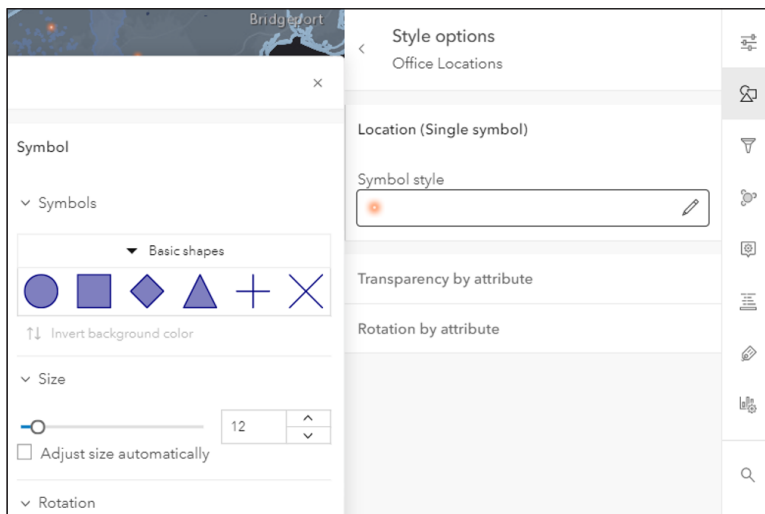
D.1 Update Layer Symbolology² and Configure Popups in the Web Map

The layer symbolology in the [web map](#) can be updated using styling per these [instructions for Map Viewer Classic](#) and these [instructions for Map Viewer](#).

In the AGOL Classic Map Viewer, select **Layers** in the gray sidebar to see the list of layers in the web map. Click on the ellipsis (three dots) to the right of the layer in which you want to edit symbology and select **Show properties**.



Office Locations layers options.



Choose a sunburst symbol for **Office Locations**.

²Symbology is the use of symbols to represent the features and attributes of a [map layer](#). For example, black circles might symbolize cities.

The configuration of the popups in the web application is done using [Arcade Expressions](#) software. Detailed instructions for editing popups are available from Esri for [Map Viewer Classic](#) and the new [Map Viewer](#) and on Youtube for [using Arcade Expressions in popups](#). An example of the [Arcade Expressions](#) used to configure this portion of the popups is below:

Pop-up in App	Arcade Expression
(3 of 54) Organization Type: 501(c)(3) (or has applied) 0 Staff 100 Members 70 Volunteers Budget: \$25000 Stewardship Land Ownership: County government Time Spent on Stewardship: 80-100%	Organization Type: {OrgTypeTxt} {expression/expr63} Staff {Members} Members {Volunteers} Volunteers Budget: {expression/expr64} Stewardship Land Ownership: {PriLandOwn} Time Spent on Stewardship: {PctStewTxt}

Pop-up in App and Arcade Expression for **Organization Type**.

The **Office Locations** popup currently uses 64 Arcade Expressions. Each expression is automatically numbered and should be given a name that is meaningful to you (i.e., a name that will help you identify the contents of the expression when creating the popup). Examine how the popup expressions for the **Primary Stewardship Activity** and **Other Stewardship Activities** are set up. The organization's primary stewardship activity **{PrimStewFn}** is listed first. Other stewardship activities are listed in a bulleted list below the primary stewardship activity and filtered by the presence or absence of a value for each of the **Other Stewardship Activities** categories. In the example below, the primary stewardship activity is **Monitor** and the other stewardship activity is **Educate** (expression 60).

Pop-up in App	Arcade Expression
Primary Stewardship Activity: <i>MONITOR</i> Other Stewardship Activities: • Monitor • Educate Group Mission: Queens County Bird Club is dedicated to the study and appreciation of birds. Club activities include: MEETINGS - monthly. Includes a lecture and/or presentation about birds, wildlife in general, and natural areas. All are welcome. Admission is fr	Primary Stewardship Activity: {PrimStewFn} Other Stewardship Activities: {expression/expr55}{expression/expr56}{expression/expr57}{expression/expr58}{expression/expr59}{expression/expr60}{expression/expr61}{expression/expr62} Group Mission: {Mission}

Pop-up in App and Arcade Expression for **Primary Stewardship Activity**.

The following table shows Arcade expression code examples for popup boxes.

Arcade Expression Name and Number	Arcade Expression Code
Activity - Conserve {expression/expr55}	<pre>if (\$feature.Conserve == 0){ return Null; } else { return "• Conserve" + TextFormatting.NewLine };</pre>
Activity - Manage {expression/expr56}	<pre>if (\$feature.Manage == 0){ return Null; } else { return "• Manage" + TextFormatting.NewLine };</pre>
Activity - Transform {expression/expr57}	<pre>if (\$feature.Transform_ == 0){ return Null; } else { return "• Transform" + TextFormatting.NewLine };</pre>
Activity - Monitor {expression/expr58}	<pre>if (\$feature.Monitor == 0){ return Null; } else { return "• Monitor" + TextFormatting.NewLine };</pre>
Activity - Advocate {expression/expr59}	<pre>if (\$feature.Advocate == 0){ return Null; } else { return "• Advocate" + TextFormatting.NewLine };</pre>
Activity - Educate {expression/expr60}	<pre>if (\$feature.Educate == 0){ return Null; } else { return "• Educate" + TextFormatting.NewLine };</pre>
Activity - Participate {expression/expr61}	<pre>if (\$feature.Particip == 0){ return Null; } else { return "• Participate" + TextFormatting.NewLine };</pre>

Access the code for each Arcade Expression in the template map and paste the code into their [points layer](#) and turfs layer popups. The Arcade Expressions may be customized to show different information based on what was collected in your survey. The complete popup text is as follows:

```
{OrgName}  
{OrgStreet1}  
{OrgCity}, {OrgState} {OrgZip}  
Contact:{OrgEmail} (Note that {OrgEmail} is set as a hyperlink)  
Website:{OrgWebSite} (Note that {OrgWebSite} is set as a hyperlink)  
Phone: {OrgPhone}  
Primary Stewardship Activity:{PrimStewFn}  
Other Stewardship Activities:  
{expression/expr55}{expression/expr56}{expression/expr57}{expression/expr58}{expression/expr59}  
{expression/expr60}{expression/expr61}{expression/expr62}  
Group Mission: {Mission}  
  
Primary Group Focus: {PrimFocus}  
Other Group Foci:  
{expression/expr1}{expression/expr2}{expression/expr3}{expression/expr4}{expression/expr5}  
{expression/expr6}{expression/expr7}{expression/expr8}{expression/expr9}{expression/expr10}  
{expression/expr11}{expression/expr12}{expression/expr13}{expression/expr14}{expression/expr15}  
{expression/expr16}{expression/expr17}  
  
Primary Stewarded Space: {PrimST}  
Other Stewarded Spaces:  
{expression/expr18}{expression/expr19}{expression/expr20}{expression/expr21}{expression/expr22}  
{expression/expr23}{expression/expr24}{expression/expr25}{expression/expr26}{expression/expr27}  
{expression/expr28}{expression/expr29}{expression/expr30}{expression/expr31}{expression/expr32}  
  
Organization Type: {OrgTypeTxt}  
{expression/expr63} Staff  
{Members} Members  
{Volunteers} Volunteers  
Budget: {expression/expr64}  
Stewardship Land Ownership: {PriLandOwn}  
Time Spent on Stewardship: {PctStewTxt}  
  
Property Ownership:  
{expression/expr33}{expression/expr34}  
{expression/expr35}{expression/expr36}  
  
Services Provided:  
{expression/expr37}{expression/expr38}{expression/expr39}{expression/expr40}{expression/expr41}  
{expression/expr42}  
  
Information Sharing:  
{expression/expr43}{expression/expr44}{expression/expr45}{expression/expr46}{expression/expr47}  
{expression/expr48}{expression/expr49}{expression/expr50}{expression/expr51}{expression/expr52}  
{expression/expr53}
```

D.2 Configure the Web App Queries

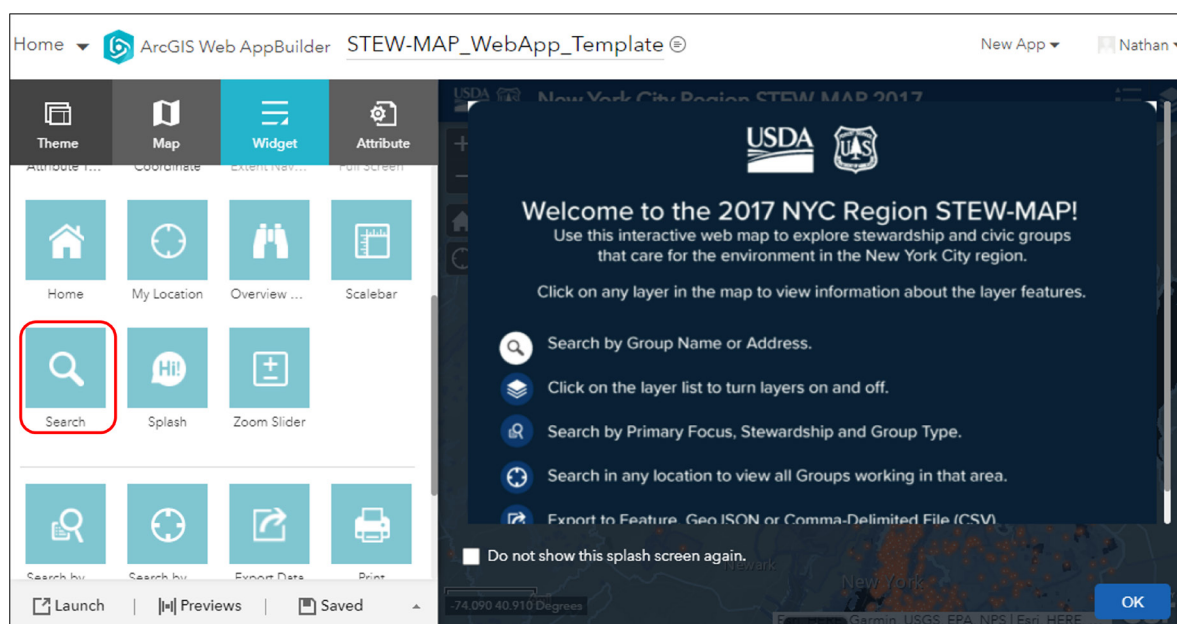
D.2.1 Bar Widget

The search bar in the upper left corner of the map allows users to search by organization name in the turfs database or an ESRI-created geocoding service using street name or place of interest. In the **Search** widget, users can enter the name of the organization they're searching for or a single word in the name (e.g., "green" in Green Park Gardeners NY). The widget opens a list of all the turfs with the word "green" in the name. Users can select the relevant turf name to zoom.

The geocoding service can be customized to restrict the search to just the geographic extent of the current map. For the New York City data (shown in the following screenshot), the client has chosen not to restrict the search area based on the current map extent because there are turfs outside of the map extent that users may want to access in their searches. Future iterations of the application using other jurisdictions' data may be modified to restrict the search to only within the map extent.

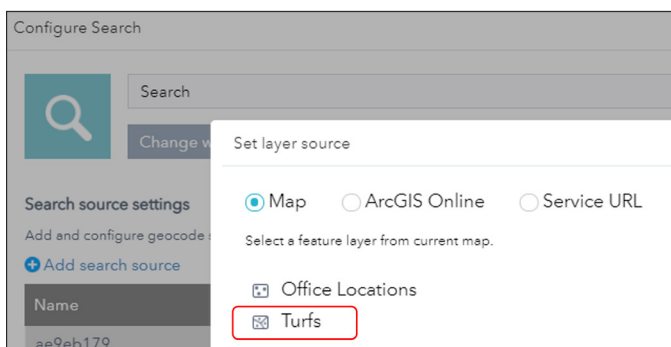
Update the **Search** query by adjusting the search parameters to your search area using the following steps:

1. Select the **Search** widget under the Widget tab.



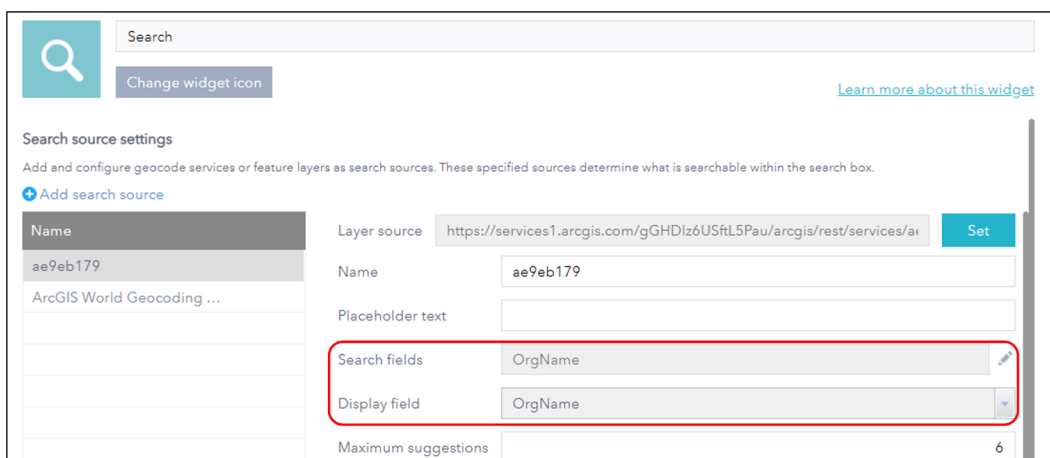
Web App Builder **Search** widget.

2. Select the **Turfs** data layer on the left side of the screen and update the URL for the turfs layer to your project area URL:
 - a. Select **Add search source**, select **Feature Layer**, and select **Map** to see a list of data layers in the map.
 - b. Select the layer you want to search (typically the **Turfs** layer), and select it.



Select **Turfs** as layer source in **Configure Search**.

3. Update the search field and display field by clicking on both fields and selecting **OrgName** from the list of field values.



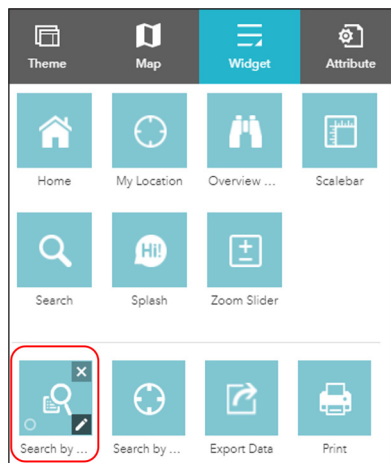
Search and **Display** fields in **Search** widget.

D.2.2 Search by Primary Focus, Stewardship, and Organization Type Widget

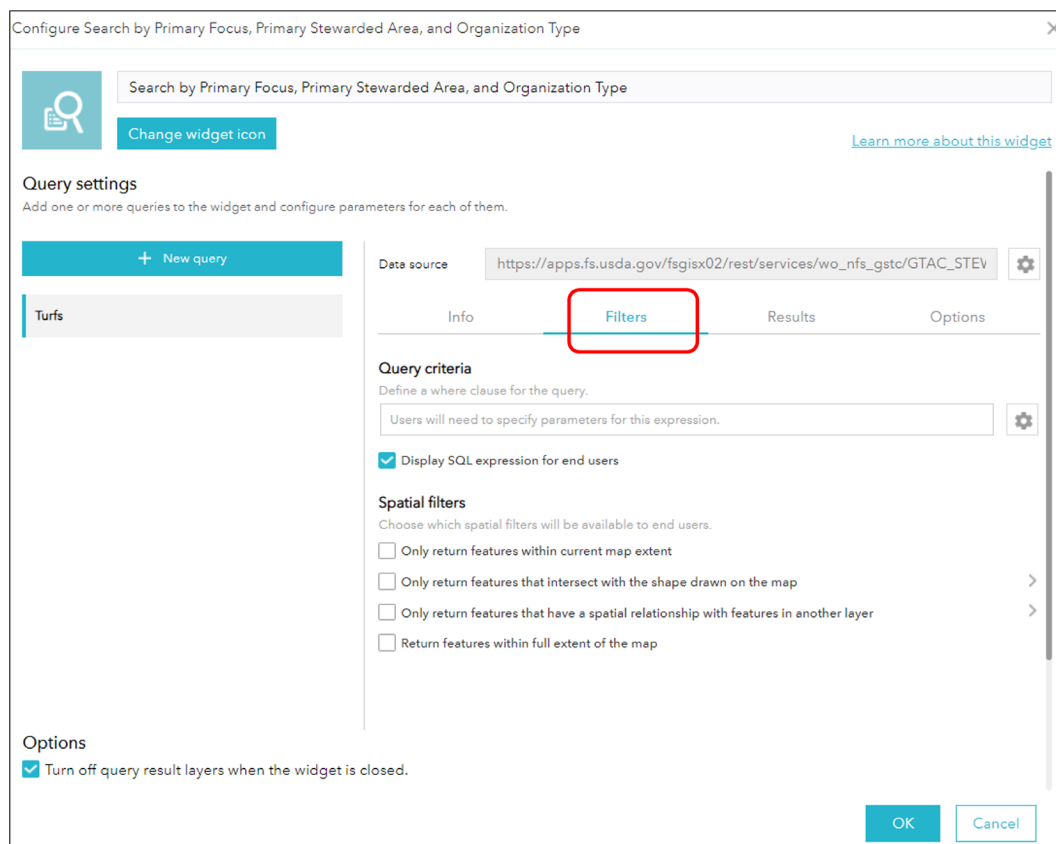
Users can filter the **Turfs** data by primary focus, stewardship focus, or organization type using a single filter category or a combination of categories from the list below. The application provides a drop-down list of values to choose from in each category, which include the following:

- **Primary Focus**—Database field used is PrimFocus
- **Steward Space**—Database field used is PrimST
- **Organization Type**—Database field used is OrgType

Update the search by **Primary Focus**, **Primary Steward Area**, or **Organization Type** by selecting the edit pencil  in the bottom right corner of the **Search by query** icon.



Search by query widget in Web App builder.



Filters options in **Configure Search**.

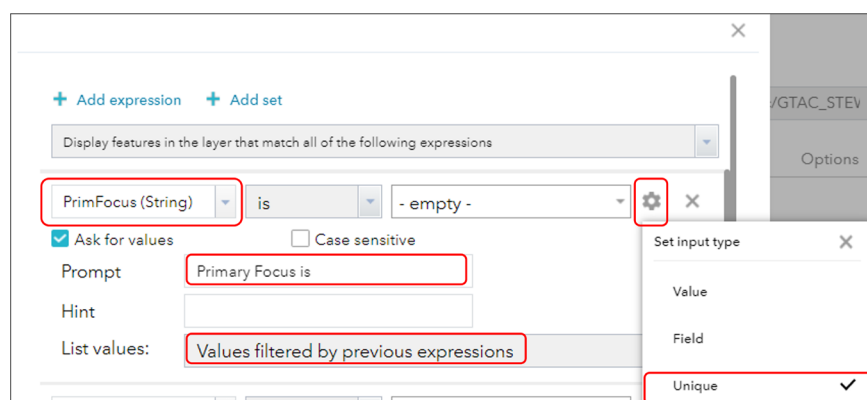
Update the data layer to your current **Turf layer** by clicking on the button to the right of the **Data Source** dialog box. This will remove any preset query definitions based on the old Turf layers.

Reconfigure the queries for the following by selecting **Filter** then clicking on the gear button  to the right of the **Query Criteria** dialog box.

To update the query for the **Primary Focus (PrimFocus)** field:

1. Select the correct field to use for the **Primary Focus** query from the drop-down values.
2. To the right of the field selection drop-down, click on the icon to set input type and choose **Unique** for the input type.
3. Select **Ask for Values** option.
4. Change the text that users will see in the query widget to **Primary Focus is**.
5. In the **List Values** option, select **Values filtered by previous expressions**.

Repeat the process above to reconfigure the queries for the **Primary Stewardship (PrimST)** field and the **Organization Type (OrgType)** field.



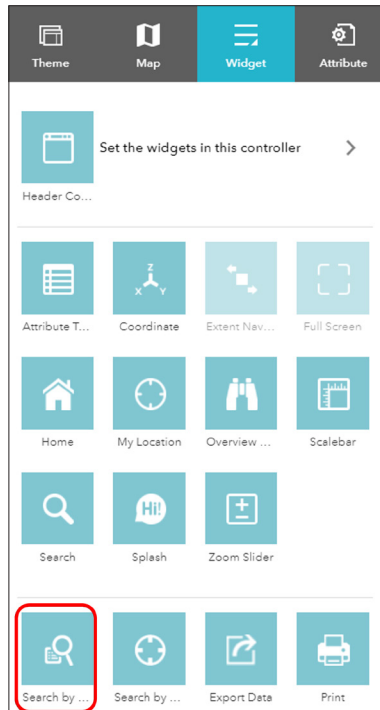
Primary Focus search query configuration showing the gear button and **Unique** input type.

D.2.3 Search by Widget

The **Search by** tool allows users to search for Turfs or Organization points using the following methods:

- **Select Office Locations in Area of Interest**—Users have the option to define their area of interest by drawing a polygon, point, or line on the map and choosing a buffer distance if they desire. Users then have the option to select all organizations that intersect the area of interest.
- **Select Turfs in Area of Interest**—Users have the option to define their area of interest by drawing a polygon, point, or line on the map and choosing a buffer distance if they desire. Users then have the option to select all turfs that intersect the area of interest.
- Update the **Search by Area** query for office locations by selecting the edit pencil in the bottom right corner of the query icon. Update data source and toggle through the rest of the tabs, selecting the options as shown in the following screenshots:
 1. Update the data source.
 2. Select **Turn off query results when widget is closed** at the bottom of the page.
 3. On the **Filters** tab, select **Only return features that intersect with the shape drawn on the map**.
 4. On the **Results** tab, select the default options.
 5. On the **Options** tab, select the appropriate options for your project.

Repeat the steps above for the turfs. See the following screenshots for which options to select for each tab. The **Turf Search by Area** query is similar.



Update the **Search by Area** query.

Configure Search by Area

Search by Area

[Change widget icon](#) [Learn more about this widget](#)

Query settings
Add one or more queries to the widget and configure parameters for each of them.

[+ New query](#)

Select Office Locations in Area of Interest

Select Turfs in Area of Interest

Data source https://apps.fs.usda.gov/fsgisx02/rest/services/wo_nfs_gstc/GTAC_STEV [Settings](#)

[Info](#) [Filters](#) [Results](#) [Options](#)

Turf **Search by Area** query configuration.

Options

☒ Turn off query result layers when the widget is closed.

Turn off query result layers option.

[Info](#) [Filters](#) [Results](#) [Options](#)

Query criteria
Define a where clause for the query.

[Settings](#)

☒ Display SQL expression for end users

Spatial filters
Choose which spatial filters will be available to end users.

☐ Only return features within current map extent

☒ Only return features that intersect with the shape drawn on the map [Default](#) [>](#)

☐ Only return features that have a spatial relationship with features in another layer [>](#)

☐ Return features within full extent of the map

Filter options: **Display SQL expressions for end users.**

Results tab: **Use layer's popup configuration.**

Options for search query in Web App Builder.

D.2.4 Print Widget and Export Data Widget

The **Print** widget allows users to print the current map area. The **Export Data** widget allows users to download portions of the data in .csv format, feature layer, or geoJSON format. For both widgets, update the data source to the datasets in your project (Turf and/or Office Locations) and toggle through the rest of the tabs, selecting the options as shown in the following screenshots.

Configure data source in **Export Data** widget.

Options: **Turn off query result layers when the widget is closed.**

Info **Filters** Results Options

Query criteria
Define a where clause for the query.

No expression defined. All records will be returned. [gear icon]

☐ Display SQL expression for end users

Spatial filters
Choose which spatial filters will be available to end users.

☐ Only return features within current map extent

☐ Only return features that intersect with the shape drawn on the map >

☒ Return features within full extent of the map >

Default

On **Filters** tab, select **Return features within full extent of the map**.

Info Filters **Results** Options

Content

☒ Use layer's pop-up configuration in the web map

☐ Configure custom content

Sort result items:

[text box] [edit icon]

Symbol

☐ Use symbols defined by the layer

☒ Use custom symbol [dropdown menu]

☐ Allow to change symbols at runtime

On **Results** tab, select **Use layer's popup configuration in the web map** and **Use custom symbol**.

Info Filters Results **Options**

☒ Allow to export results

☐ Expand the results list by default

☐ Show option to configure custom **Result layer name**

Specify how the query task creates layers

☒ Overwrite the layer every time the query is executed

☐ Create a new layer every time the query is executed

On **Options** tab, select **Allow to export results** and **Overwrite the layer**.

Configure Print

Print [button]

Change widget icon [button] [Learn more about this widget](#)

*Service URL [text box]

Default title [text box]

Default author [text box]

Default copyright [text box]

☒ Editable

Default format [dropdown menu]

Default layout [dropdown menu]

Configure Print options: choose defaults **PDF** and **MAP_ONLY**.

D.3 Configure the Operations Dashboard

You can change how the Operations Dashboard appears to users. Before you start updating the tabs for each widget, take screenshots of the existing dashboard widget configurations and use the screenshots to guide your reconfiguration of the tabs in each widget.

D.3.1 Bar and Pie Chart Widgets

Pie charts and bar charts are useful for illustrating differences and similarities among the responders to the survey. The dashboard displays five stacked chart widgets (four bar charts and one pie chart). The bar chart widgets are Primary stewardship activity, Primary focus, Stewarded areas, and Organization type. The pie chart widget is Stewardship groups by type of funding.

Before creating the bar charts, decide how you will deal with inconsistencies in the data that could affect how the data are displayed. Consider the following:

- How to handle **no response** data and whether it should be filtered out of graphs.
- How to handle **none of the above** and **none specified** data.
- How to handle multiple variations of a single value.



Note

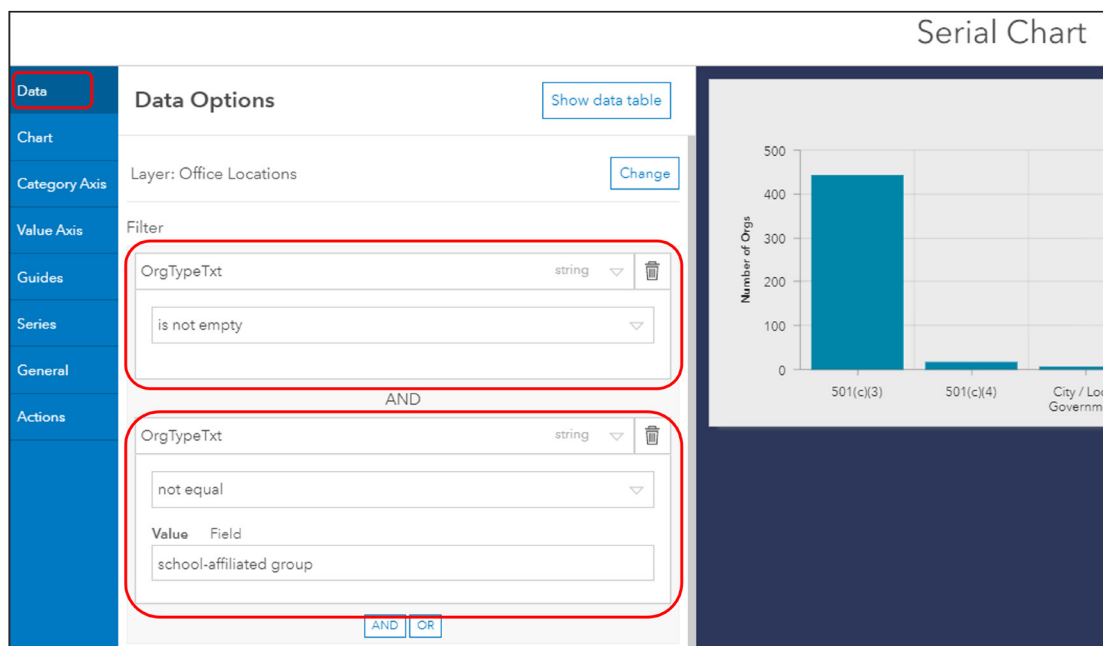
In the bar chart configuration, you have the option to sort the axis data by name (alphabetical order) or by count (number of records). In December of 2020, ESRI identified a software bug that prohibited sorting by count. This issue has since been resolved for the current version of ArcGIS Online (accessible by your browser).

To update the chart widgets, follow these steps:

1. On the **Data** tab (left side of screen), update data source to your current data layer. (This should be done for all widgets or the widget will reference the wrong data. To do this, go to the top left corner of each widget and select **Configure**, which will take you into the widget configuration window with several tabs on the left side of the window.) Back on the **Data** tab, select **Change** on the right side and select **Office Locations** as the **Points Layer**.

On the **Data** tab, select **Change** and **Office Locations** (points layer).

2. Select the correct field to use and add filters where those are used. Refer to the screenshots for each widget.



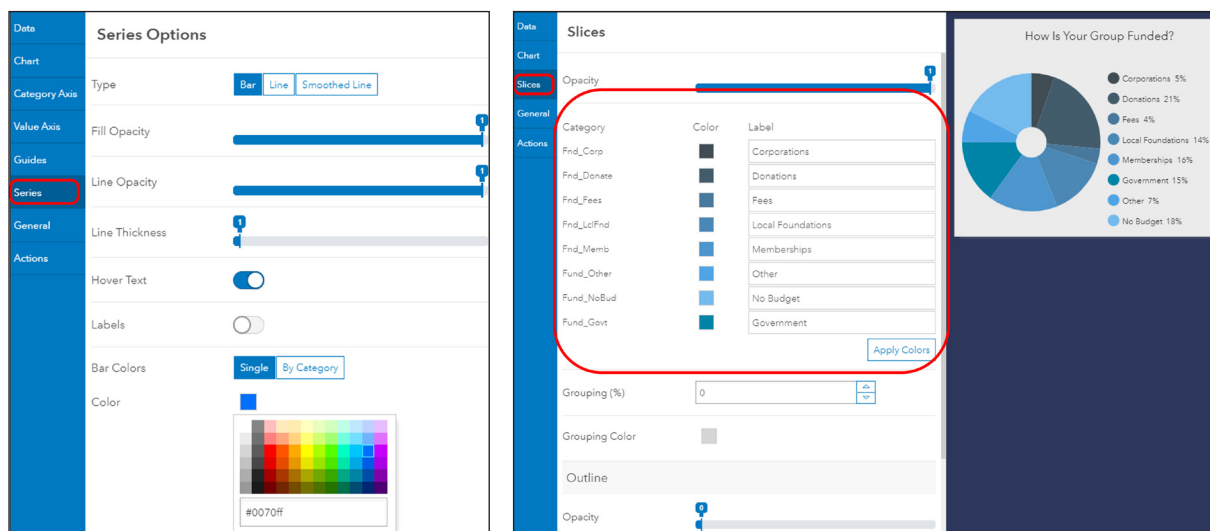
On the **Data** tab, **Serial Chart** organization type text (**OrgTypeTxt**) data options.

3. On the **Category Axis** tab (left side of screen), update the category labels.

The screenshot shows the 'Category Axis' configuration interface. The 'Category Axis' tab is selected on the left sidebar. The 'Labels' section is highlighted with a red box. It contains a table with two columns: 'Category' and 'Label'. The categories listed are 'City/local government', 'Community Board', 'Public-private partnership', 'Private firm, for-profit business', 'Religious congregation (church, synagogue, mosque, etc.), but not a 501(c)(3)', 'School-affiliated group', 'Other', 'Group without 501(c)(3) or 501(c)(4) status (for example, a community garden group or block club)', and '501(c)(3) (or has applied)'. The corresponding labels are 'City / Local Government', 'Community Board', 'Public - Private Partnership', 'Private Firm', 'Religious (not 501(c)(3))', 'School - Affiliated Group', 'Other', 'Non - 501(c)(3) or 501(c)(4)', and '501(c)(3)'. Each row has a trash icon to its right.

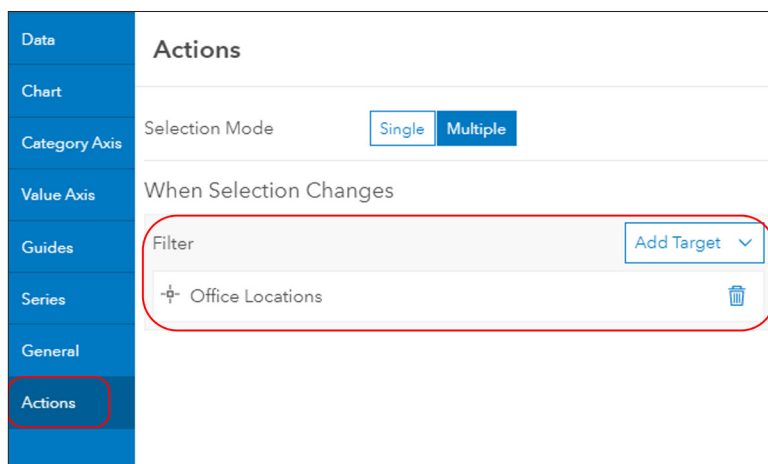
Category Axis options for **Serial Chart**.

- On the **Series** tab, update the bar color to **#0084a8** for the bar charts.



Series options for bar and pie charts.

- For the pie chart, copy the HEX values from the template version of the chart and update each segment.
- On the **Actions** tab, create an action to filter the map by the graph selection. For example, in the Stewardship Activity bar graph, the map is filtered by the current selection in the chart. You would set the chart action to filter by Office Locations.



In the **Actions** tab, filter map by Graph Selection.

Complete the customization for the rest of the bar chart and pie chart widgets in the dashboard by following the workflow described above. Note that you may need to add workarounds for instances where there are anomalies in the data. For example, records with no data were excluded by adding a filter of **is not empty**.

In the **Organization Type** bar chart, the NYC data illustrated in the following screenshot contained two different spellings in the **OrgTypeText** field for a school-affiliated group, one “camel” case (where words

have no spaces in between, e.g., WhereWordsHaveNoSpaces) and one all lowercase. We normalized the data manually by excluding the second value for that category. We did the same in the **Primary Activity** bar chart to exclude multiple spellings of the **Conserve** category.

Filter

OrgTypeTxt string is not empty

AND

OrgTypeTxt string not equal

Value Field school-affiliated group

Org Type Text filter option values.

Category Axis

Visibility ☒

Size (px) Default

Placement Default Staggered Rotated Wrapped

Category	Label
City/local government	City/Local Government
Community Board	Community Board
school-affiliated group	School-Affiliated Group
Public-private partnership	Public-Private Partnership
Private firm, for-profit business	Private Firm, For-Profit Business
Religious congregation (church, synagogue, mosque, etc.), but not a 501(c)(3)	Religious Congregation, Non-501(c)(3)
School-affiliated group	School-Affiliated Group
Other	Other
Group without 501(c)(3) or 501(c)(4) status (for example, a community garden group or block club)	Non-501(c)(3) or 501(c)(4)
501(c)(3) (or has applied)	501(c)(3)
501(c)(4) (or has applied)	501(c)(4)
Null	Null
Blank	Blank

+ Override Load Categories

D.3.2 Indicator Widgets

There are five stacked indicator widgets: Number of stewardship groups, Number of members, Number of volunteers, Number of full-time staff, and number of part-time staff.

Follow these steps to update the indicator widgets:

1. Update the data layer in **Data Options**.
2. Under **Statistic**, select **Count for Stewardship Groups** and **Sum** for the other indicators.
3. Select the field to use for the indicator.
4. Enter the number of stewardship groups in the **Count** field.
5. Enter the number of members, field used: **Sum of Members**.
6. Enter the number of volunteers, field used: **Sum of Volunteers**.
7. Enter the number of full-time staff, field used: **Sum of FTStaff**.
8. Enter the number of part-time staff, field used: **Sum of PTStaff**.

9. Check that the middle text color is set to #1a4d84.
10. Select **Done** to complete the configuration.
11. Drag the widget to position it over the other Indicator widgets.



Example of indicator widget showing total group membership.

 A configuration panel titled 'Data Options' with a 'Show data table' button. It has three tabs: 'Data', 'Indicator', and 'General'. The 'General' tab is selected. It contains several settings: 'Value' (text input), 'Layer: Turfs' (dropdown with a 'Change' button), 'Filter' (text input with a '+ Filter' button), 'Value Type' (radio buttons for 'Statistic' and 'Feature', with 'Statistic' selected), 'Statistic' (dropdown menu showing 'Sum'), and 'Field' (dropdown menu showing 'Select a field', which is highlighted with a red rectangle). To the right of the panel is a preview of the indicator widget showing '718 Collective Part-Time'.

Select Field in Data Options.

D.3.3 List Widgets

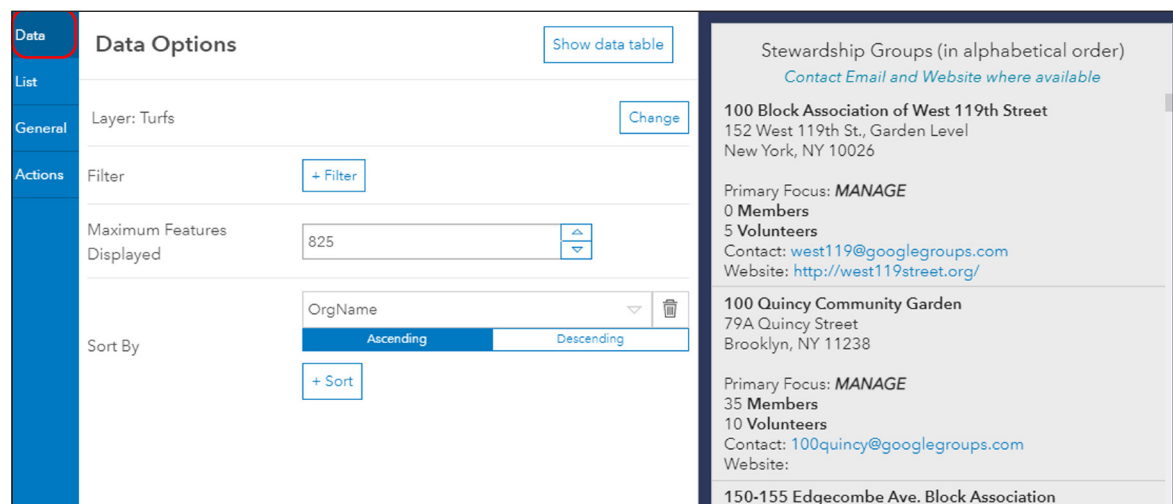
A list widget displays a list of stewardship groups that are currently being drawn on the map. The list displays 25 features at a time and is sorted by polytype, number of members, and organization name.

 A configuration panel titled 'Data Options' with a 'Show data table' button. It contains settings for 'Layer: Turfs' (dropdown with a 'Change' button), 'Filter' (text input with a '+ Filter' button), 'Maximum Features Displayed' (text input set to '25' with up/down arrow buttons), and 'Sort By' (three dropdown menus for 'polytype', 'Members', and 'OrgName', each with 'Ascending' and 'Descending' options and a trash icon, plus a '+ Sort' button).

Data Options for list of 25 stewardship groups, sorted.

After creating the widget, use the following [Arcade Expressions](#) to customize the list text:

{OrgName}	{Members} Members
{OrgStreet1}	{Volunteers} Volunteers
{OrgCity}, {OrgState} {OrgZip}	Contact: {OrgEmail}
Primary Focus: {PrimStewFn}	Website: {OrgWebSite}



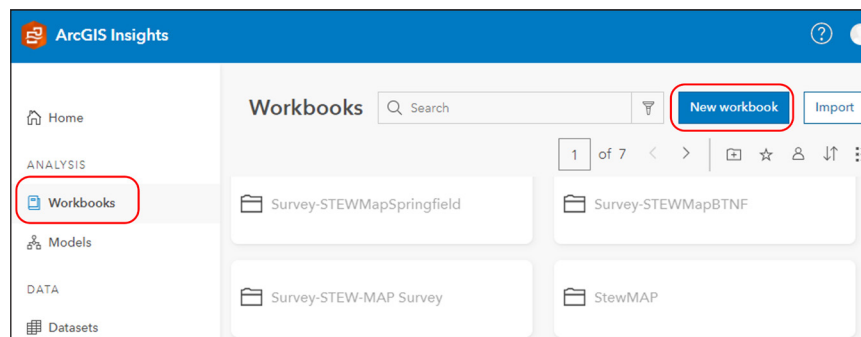
Data Options for list.

D.4 Configure the Insights Workbook

A link chart is created using ArcGIS Insights to show how organizations are connected. Use the steps below to create the link chart.

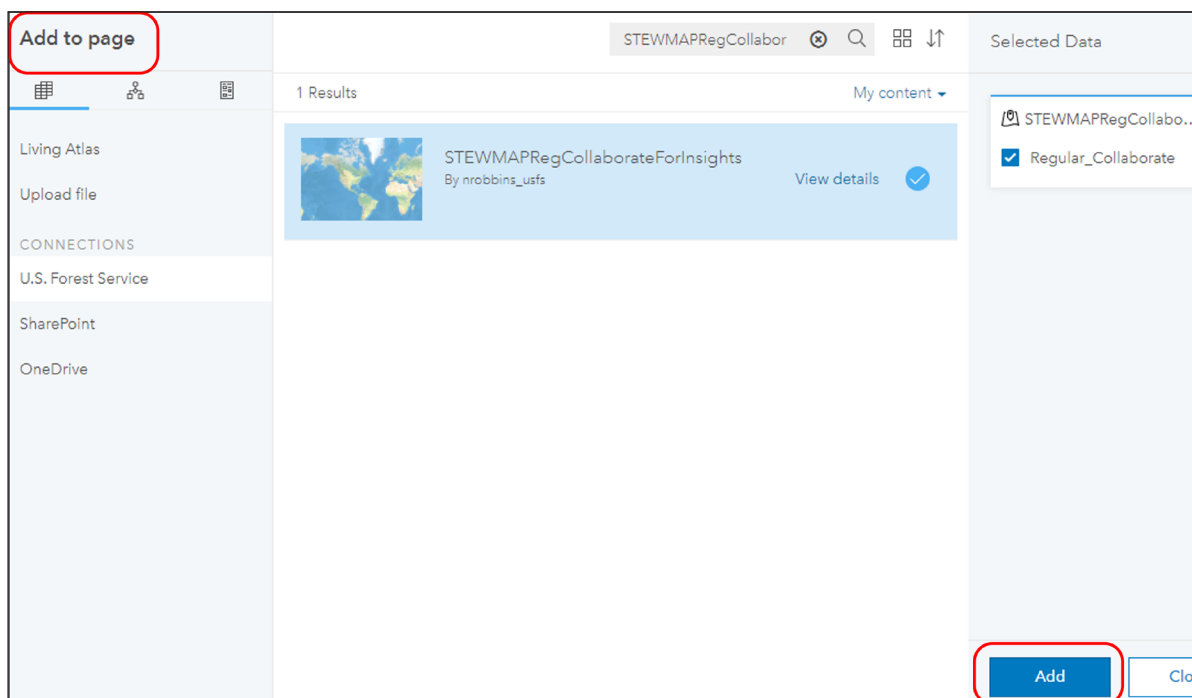
D.4.1 Set Up Workbook

1. Go to [ArcGIS Insights](#). If you do not have an Insights account, contact your AGOL administrator to set up access.
2. Select the **Workbooks** tab in the list on the left and then select **New workbook**.



ArcGIS Insights **New workbook**.

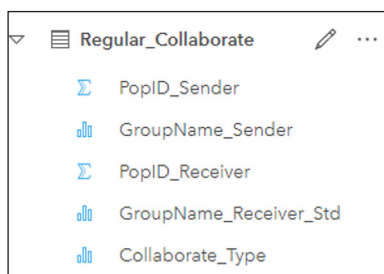
3. A new workbook is created and the **Add to page** window appears. Navigate to your **Working group** folder or your **Contents** folder where the STEW-MAP data are located. You may also search by text in the search box near the top of the page. Select the table you want to add.



Add to page window for ArcGIS Insights.

D.4.2 Add Networks Table

1. Select **Add** to add the Networks table created in the advanced network cleaning steps in [Appendix C](#) and loaded to AGOL in [Appendix C.7](#). This will add the table to your Insights Workbook that can be used for visualizations.

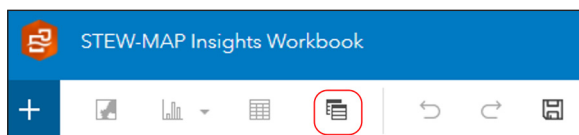


Regular_Collaborate fields.

2. Add the cleaned Office Locations points survey results feature layer from your survey to the Insights Workbook ([Section 5.3](#)).
3. Name and save your workbook.

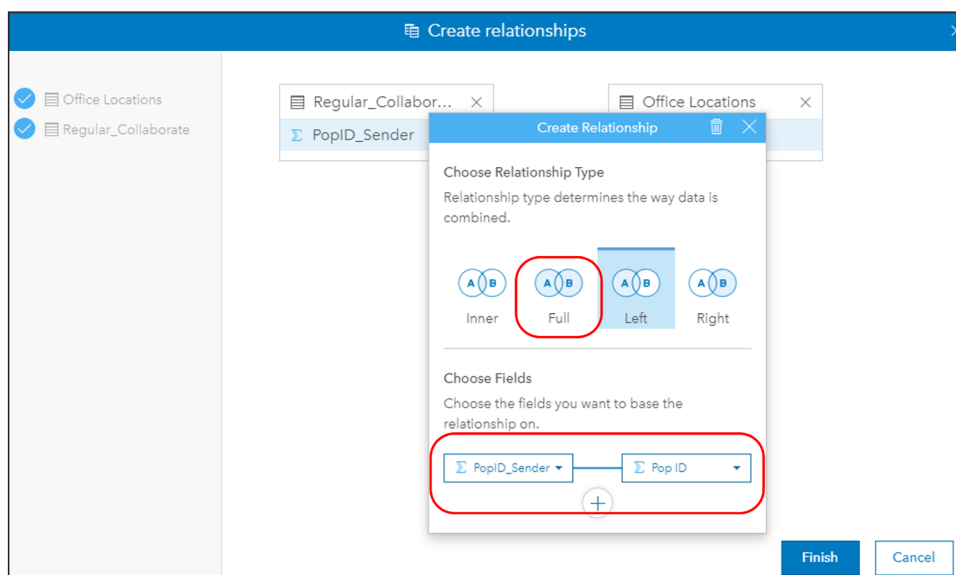
D.4.3 Create Relationships

1. Select **Create Relationship** on the main toolbar to create a new relationship between the Networks table and the Office Location points feature layer.



STEW-MAP Insights Workbook option to create new relationship between Networks table and Office Locations.

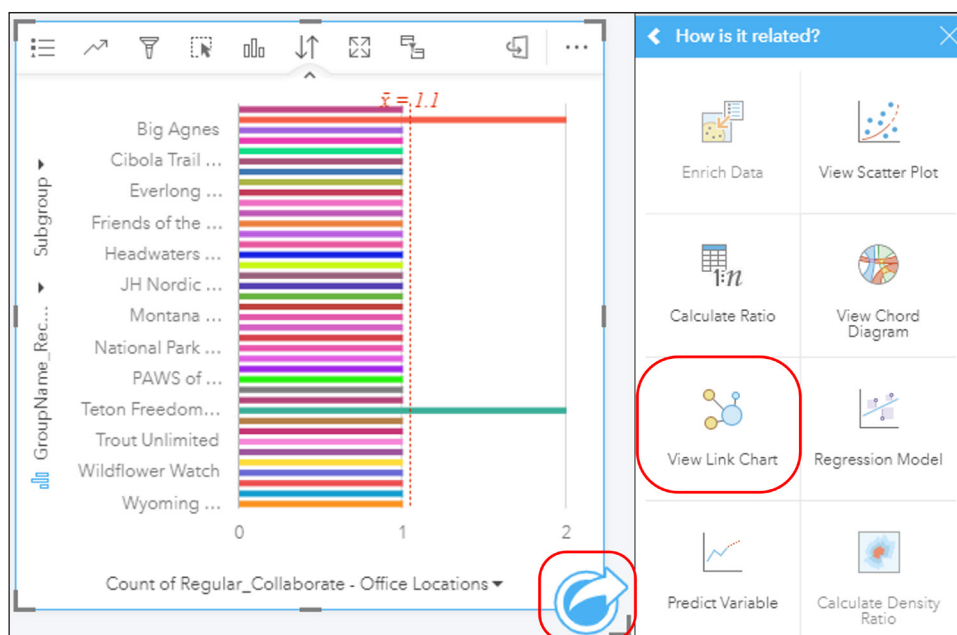
2. In the **Create Relationship** widget, choose the **Network** table and then the **Office Locations** points feature layer.
3. Select **Left** for **Relationship Type** to indicate the type of relationship you want to create.
4. Select the **PopID_Sender** field on left (table) and the **Pop ID** field on right (points layer) and select **Finish**.



Choosing relationship type and fields to create relationships in Insights Workbook.

5. A new item will appear in your **Local Content** tab; this is the relationship you just created.
6. Select this new relationship and drag it to the right to create a new bar chart card.
7. Update the y-axis field from **ObjectID** to **GroupName_Receiver_Std**.

8. Select **Action** on the lower right side of the card and select **How is it related?**

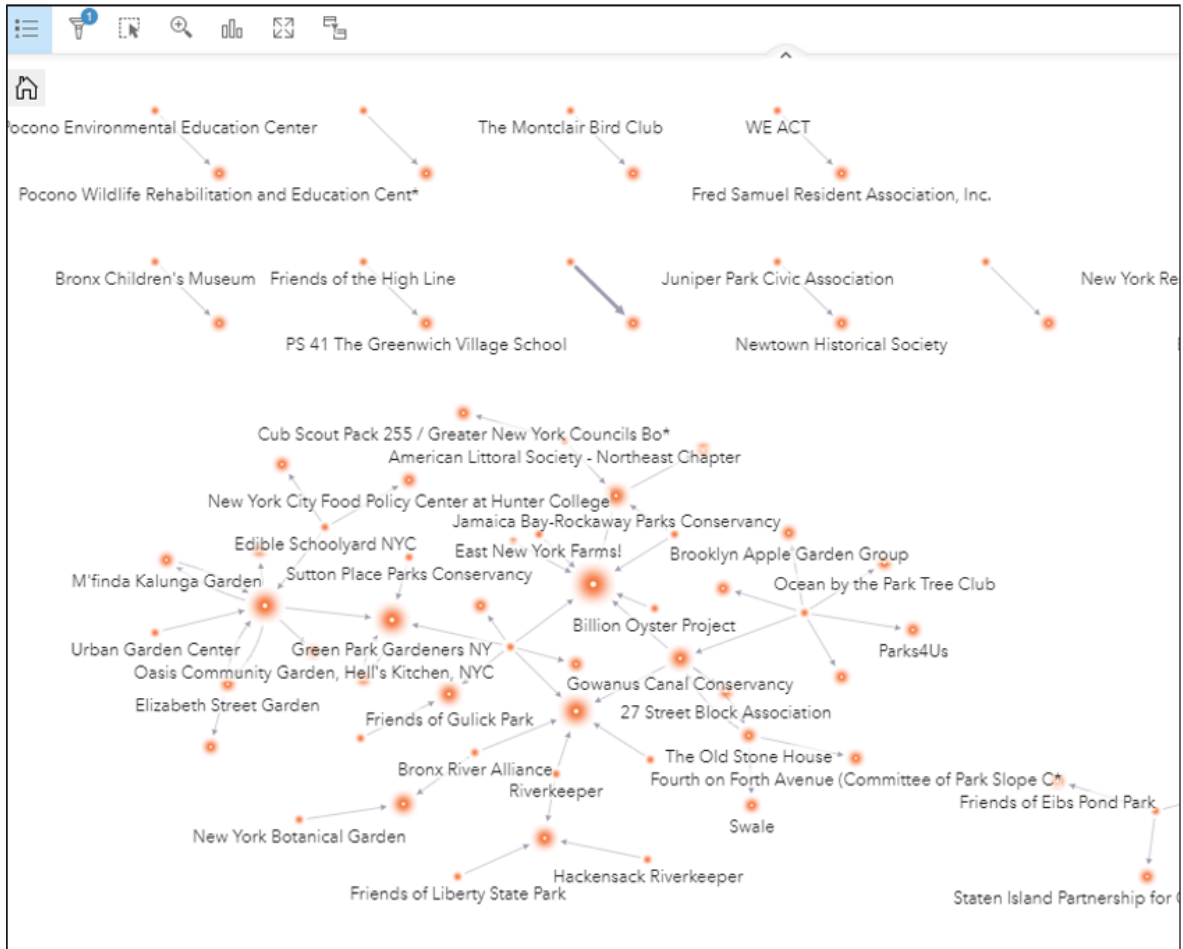


View Link Chart
option for Insights
Workbook.

D.4.4 Create Link Chart

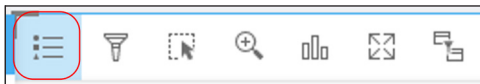
1. Select the **View Link Chart** option to create the link chart.
2. Apply the default values for **Choose a layer**, **Choose fields**, and **Style**. Change to **Betweenness** for **Size** nodes from the drop-down.
3. Select **Run** to create the link chart.

View Link Chart: option for **Size nodes using Betweenness**.



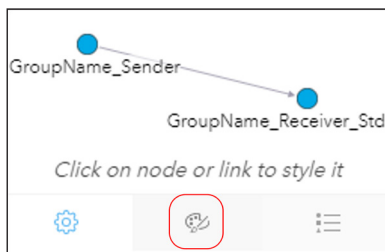
View networks link chart visually.

- To update the symbology of the points and lines, go to the **Layer** options menu on the main toolbar of the Link chart and select the **Points (nodes)** or **Lines (links)** visible at the top of the **Layer** menu to update the symbols.



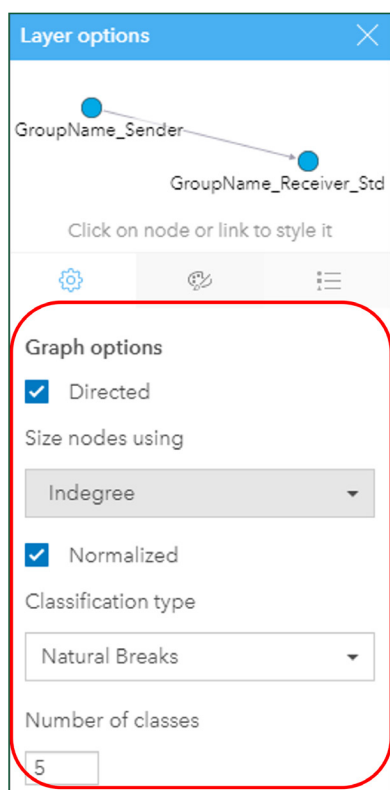
Update the symbols by selecting the **Points or Lines** option.

- Select the **Style** icon and change the color of the [node](#) or line.



Select the **Style** icon (paint palette) under **Click on node or link to style the** node in networks chart.

- Update the node symbology with hex value #00A9E6.
- Update the color of the network lines with hex value #A19CAE.
- Select **Settings** in the **Layer options** and check **Directed** under **Graph options**. You can experiment with size nodes using options as desired.
- Check the **Normalized** box and specify **Natural Breaks** under the **Classification type** drop-down.



Select **Graph options** for networks chart.

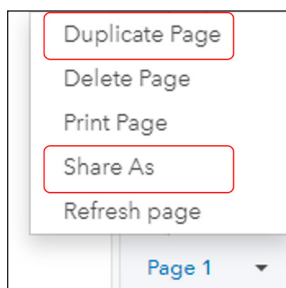
- Save your workbook.

D.5 Link Chart in the Dashboard: Rich Text Widget

The link chart from the Insights workbook is added to the STEW-MAP Operations Dashboard via an embedded iframe object in a rich text widget.

Add the link chart using the following steps:

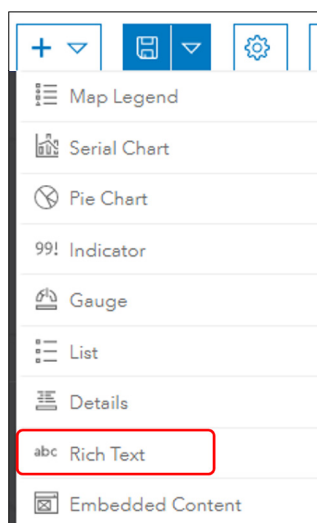
- Create the link chart in a workbook following the steps in [Appendix D.4](#).
- Make a copy of Page 1 and delete the map and bar chart cards from the second page so only the link chart remains.
- Update the tags and description and share the page with the collaboration group or any other groups as needed.



Duplicate Page and **Share As** options.chart.

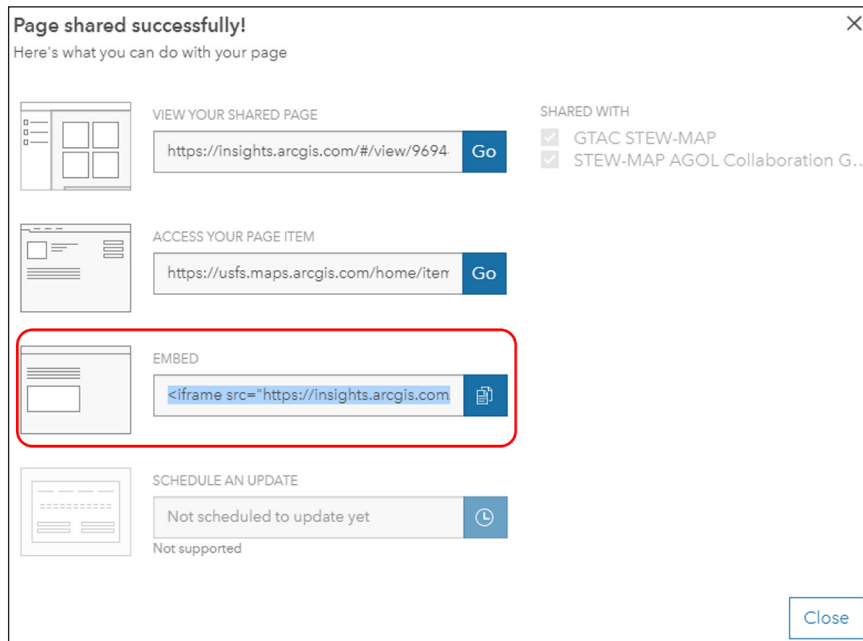
Share as STEW-MAP Insights Workbook options.

4. Open the **Operations** Dashboard created and configured in [Section D.3](#). Choose the option to create **Rich Text** widget.



Create **Rich Text** option with Insights.

- Copy and paste the code found in the **Embed** dialog box of the shared Insights link chart to create an **iframe** object in the **Rich Text** widget.



EMBED dialog box of the shared Insights link chart.

- The code should look like this:

```
<p><em>Expand Window For Full View ---&gt;</em></p>
```

```
<p><iframe frameborder="0" height="650" src=" https://insights.arcgis.com/#/  
embed/96944990951f4463901e27c5130adaf2" width="1150"></iframe></p>
```



Expand window for full view source code.

- Drag the widget to position it over the other chart widgets.
- Save the Dashboard.

Appendix E: Glossary

Arcade Expressions—Arcade is a portable, lightweight, and secure expression language used to create custom content in ArcGIS applications. Like other expression languages, it can perform mathematical calculations, format text, and evaluate logical statements. It also supports multi-statement expressions, variables, and flow control statements. Arcade is unique when compared to other expression and scripting languages because it includes [feature](#) and [geometry](#) data types.

ArcGIS Desktop—Foundational software for GIS professionals to create, analyze, manage, and share geographic information so decision-makers can make intelligent, informed decisions. Traditional ArcGIS Desktop applications include ArcMap, ArcCatalog, and ArcGlobe; these are used to create maps, perform spatial analysis, manage geographic data, and share your results. ArcGIS Pro, the newest addition to the ArcGIS Desktop product line, integrates your GIS workflows in a single application. [ESRI's help documentation](#) provides more information.

ArcGIS Notebooks—A versatile web-based interface for powerful geospatial data analysis. Notebooks are an efficient, modern environment that combine code, on-the-fly visualizations and maps, and data tools. In the Notebook editor, a user can write, document, and run Python code in one place. [ESRI's products overview provides more information](#).

Edgelist—A spreadsheet of edges between senders and receivers. In STEW-MAP, an edge is a collaborative connection, or tie, between two organizations.

Feature Class—A collection of common features in a geodatabase, each having the same spatial representation (e.g., points, lines, or polygons) and a common set of attribute columns (e.g., a line feature class for representing road centerline). [ESRI's help documentation](#) provides more information.

Feature Layer (hosted)—A web service where the GIS data are stored in ESRI's cloud servers and made available in ArcGIS Online by ESRI. Essentially, the user uploads content to ESRI's cloud servers, and it becomes available in AGOL. [ESRI's help documentation](#) provides more information.

Geodatabase—Collection of geographic datasets of various types held in a common file system folder, a Microsoft Access database, or a multiuser relational DMBS (such as Oracle™ or Microsoft SQL Server). The geodatabase is the native data structure for ArcGIS and the primary data format used for editing and data management. [ESRI's help documentation](#) provides more information.

Map Layer—See **Points Layer**.

Master List—Microsoft Excel spreadsheet with one row per group with column headers for contact information and any other relevant information, such as the contact person's social media handle or job title. This spreadsheet is used to store all your contacts and their information as they start rolling in. A spreadsheet of all groups across all networks, typically created by expanding the initial sampling frame of groups the survey was sent to. Compare to **sampling frame**.

Metric Repeat Table—Related ArcGIS Survey123 survey table that contains one record for each additional implementation and outcome added by the survey respondent. Think of [XLSForm](#) repeats like sub-forms: a form within a form that can also be completed multiple times. Repeats are a very powerful feature in Survey123 because they can be configured in many ways to support different business workflows.

Node—A node is an entity included in a network. In STEW-MAP, nodes are organizations and include senders and receivers.

Nodelist—A spreadsheet of nodes and associated attributes. In STEW-MAP, this includes survey results for groups that took the survey.

Points Layer (Map Layer)—In ArcGIS, layers are collections of geographic data. Layers reference a data source, and if the software interprets data as spatial, the data's properties and attributes specify how the layer draws on a map. Data gathered in a layer are represented with points, lines, shapes (polygons), or surfaces. You then use symbols, text, graphics, and images to visualize the data.

PopID—A unique identification number for a STEW-MAP group created manually when the survey list is built for a location. A unique ID number for each group is important for matching up responses from the survey.

Public Headless Account—A generic AGOL user account that is shared between multiple individual users, and used when an authoritative AGOL item needs to be shared with the public from an officially named account, not an individual user account.

Receiver—Organization named by sender as a collaborator.

Sampling Frame—Initial list of groups the survey was sent to. Compare to **Master List**.

Sender—Organization that names another organization as a collaborator.

Shapefile—A simple, nontopological format for storing the geometric location and attribute information of geographic features. Geographic features in a shapefile can be represented by points, lines, or polygons (areas). [ESRI's help documentation](#) provides more information.

Survey Feature Layer (Feature Service)—A web service where the GIS data are stored in ESRI's cloud servers and made available in ArcGIS Online by ESRI. Essentially, the user uploads content to ESRI's cloud servers, and it becomes available in AGOL. A survey feature layer stores the responses to the survey. For surveys created from an existing feature layer in Survey123 Connect, a new feature layer is not created. Survey123 references the existing feature layer from its source location. A survey may also have hosted feature layer views. For more information, see [FAQ: What are the form and results hosted feature layer views used for in ArcGIS Survey123?](#)

Web Application—A web-mapping application, or web app, is any content that is built with a web map as a base, using predefined templates, web app builder, or a customized application template. [ESRI's Configurable App page provides more information](#) about web apps and web app templates.

Web Map—An interactive display of geographic information that is available online and one of the most basic units of content in AGOL. Web maps contain a basemap, a set of data layers, and navigation tools to pan and zoom. [ESRI's help documentation provides more information](#).

Web Service—A system that facilitates the transfer of information between computers or internet-connected devices. It is the way you connect to data in ArcGIS Online. In the world of GIS, a web service is a mechanism by which client applications access a GIS resource via the internet. The resource is located on a server and the web service makes the data available when requested by applications that can interpret it.

XLSForm—A standard created to help simplify the authoring of forms and used by Survey123. Authoring is done in a human readable format using a spreadsheet. The [XLSForm.org](https://xlsform.org) website is the definitive source on XLSForms.

XLS Form—Refers to a form created in a Microsoft Excel spreadsheet using the XLSForm standard. This spreadsheet contains the major elements needed for a survey.



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