STEW-MAP Implementation Guide 2.0

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Welcome to your STEW-MAP Implementation guide!

This step-by step guide will be your resource for how to get STEW-MAP started in your city. This provides a more in-depth resource than the three page "Implementation Steps" document.

1. DISCUSS SCOPE AND BUILD YOUR TEAM

STEW-MAP can be implemented at a wide range of budgets and scales. STEW-MAP requires a program coordinator working full-time at critical points that include the start-up phase and the data analysis phase. It is helpful if the program coordinator is familiar with the study site area in terms of community groups and key environmental concerns. The second estimated cost is for geospatial and network data collection, analysis, and mapping. If your group has staff capacity 'in-house,' this can reduce some of the cost. Finally, it is important to budget for science consultations, design support for visualizing the data, and for communication tools and applications. These costs are flexible and dependent upon your group's existing resources and capacity.

Discuss your parameters and put together your team accordingly, bearing in mind these 3 roles:

Program coordinator: The program coordinator oversees the entire implementation of the project from building the database, to implementing the survey (including directly supervising the analyst team), to data analysis, to generating results, to sharing results with stakeholders. They should be a team player, and a strong communicator - both written and oral. The key is to have someone consistent and capable, who is on board for the duration of the project.

Data analysts: These can be existing technicians, scientific staff, university cooperators, graduate or advanced undergraduate student workers, or temporary hires. They will be responsible for following the direction of the coordinator and the guidance in the geospatial and network guides to oversee: data collection, GIS mapping, social network cleaning, and data analysis and mapping

Science communication specialist - Depending on your product needs, you may also want to hire or work with designers and communications specialists to help develop products including written reports, slide decks, and maps.

2. COMPILE YOUR LIST OF GROUPS TO SURVEY

Identifying stakeholders
The first step in building your sampling frame is for the program coordinator to identify key stakeholders. Who are your partners on this project? Who are the potential data users? You can set up one-on-one meetings or phone calls with these organizations or even host a larger "kick-off" to give an overview of STEW-MAP, explain why you are taking on this project, and gain input and feedback on the project scope. You can even consider assembling a more formal advisory board that includes data providers and other local experts.

Some tips:
- Think of umbrella organizations, either government agencies or 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 public health, education, youth, social services, etc.

- Ensure that the entire geographic area you are looking to capture is represented

Once they are on board and excited to participate in STEW-MAP, the next step is to ask them to be "data providers" by providing a list of civic stewardship groups they work with, along with relevant contact information. In exchange, you can offer that they are listed as partners either on your webpage, on the survey itself, and/or on any publications. Many groups will already have a contact list for their partners or members, so this shouldn't be a lot of work for them. However, you may receive some concern from some groups that are hesitant to share their partners' contact information. In those cases, you can reassure them that the contact information will only be used to send a voluntary survey, and that these groups are under no obligation to participate. You can also offer to write-up a data sharing agreement stating these terms.

Developing your population
Once your contact lists start rolling in, you'll need a method to store and organize your data. Create an excel spreadsheet with one row per group and the following headers, as well as any other relevant information you'd like:
- Name of Contact (s) - may be more than 1 person
    - Contact 1 is who people think is best to contact
    - Contact 2 is another person in same group - an alternative person to contact
    - Contact 3
    - Contact 4
- Name of Group
- Address
- Email
- Telephone number
- Twitter account
- FB account

You can also jumpstart your population by downloading publicly accessible lists of NGOs, like the non-profit records from 990 tax forms. Note that depending on the public list available to you, you may miss some contact information, like email or social media.   As the lists come in and get added to your master population spreadsheet, you'll need to clean up any duplicate groups and consolidate them so that there is only one line per group.

In order to clean your dataset, you'll first need to assign a unique ID to each group. This will make it easy to track responses as they come in. To remove duplicates, first go through the group name to see if you have any two groups with the same name. Keep in mind that the name might be spelled differently--one version might have a number written out, and another might have a numeral, or one version could be capitalized. Identify all of the groups that you think are the same, and consolidate them so that they are only on one line, with one unique ID. Then, use the same process to go through contact information and address to identify any groups that might have different names but are in fact the same. Keep in mind that sometimes groups change names, so you may need to do some outside research to figure out which groups to keep.

3. SEND OUT THE SURVEY

Now that your population is complete, you are one step closer to launching STEW-MAP. Start with the OMB-approved version of the STEW-MAP survey, located in the General Technical Report Appendix.

Finalize all the questions on the survey with your team and make sure to save a final version of the survey as a word doc. If you have put together an advisory board or small group of trusted stakeholders, you can ask them to weigh in on the questions and share feedback. Determine whether you will be sending the survey by mail, electronically, or some combination of both. Our recommendation is to use a simple and inexpensive survey software to manage your survey invitations and responses. You can use Survey Monkey, Qualtrics, or even a google form.

Now that you've picked your method, you are only a few steps away from sending your survey!

- Enter your survey into the survey software
- Identify a few trusted groups to pre-test your survey and offer feedback
- Write your STEW-MAP invitation email with a link to the survey to send to all of the groups on your list
- Make sure the cover letter or email body explains the purpose of the survey

Now you are ready to hit send!

4. CONDUCT SURVEY OUTREACH

There are a number of ways to increase your buy-in from groups and encourage them to respond. It is important to construct a cover-letter to the survey that outlines why a group should want to participate in STEW-MAP. Here are some examples:

- Stress the importance of being made visible on the public map by using language like "Don't let your group's hard work go unrecognized!"
- Emphasize the possible benefits of being part of STEW-MAP, like connecting with potential partners and funders
- Offer an incentive for participation, such as a gift card drawing or public recognition on social media

In order 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. To increase your response rate, you can work on follow up through a number of channels:

- **Reminder emails**: Depending on the timeline of your survey, you may want to send anywhere between 1-3 reminder emails that re-state the purpose and the deadline of the survey and link back to the survey itself.
- **Phone calls**: If you have phone numbers associated with the groups that are in your population, making follow-up phone calls is a good way to encourage participation in the survey. By reaching a representative from each group, you can ensure that you have correct contact information for them, and that you are available to answer any questions they have about the survey and the project.
- **Social Media**: If you have an active twitter, instagram, or facebook account for your organization, make sure to use it to promote STEW-MAP! You can even make a seperate account just for your city's STEW-MAP. Make sure to tag groups that are in your sampling frame, and encourage them to post on their own pages once they complete the survey! Be sure to use the hashtag #STEWMAP

- **Partner organizations' listservs, newsletters, websites, etc.**: Reach back out to your data providers and other key stakeholders and ask them to include a blurb about STEW-MAP on any forms of communication they use. This will help spread the word about STEW-MAP so that recipients are more likely to recognize the survey when they see it.
- **Tabling**: To spread the word in person, ask your data provider and partner organizations to host you at any relevant conferences and events. You can hand out one pagers and postcards, answer any questions about the project, or facilitate an activity that gets people excited about the stewardship work they participate in. One successful example is a "stewardship story mapping activity" that can easily be replicated for a variety of geographies. To get started, print a map of your city or the relevant geography. Ask passersby to share a "stewardship story," a time where they did something to take care of the natural environment, by writing or drawing the experience on a post-it note. Then, help them locate ad place the post-it on the map in the area corresponding to the action. If the map crowds, you can have participants stick their stories to the outside of the map and draw a line to corresponding place where the event took place. If you laminate the map in use, you can re-use it by using dry-erase markers and wiping it clean between uses.

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

- Options for reminders:
  - 2 email reminders (1 week after 1st send, then 2 weeks after 1st send)
  - 2 phone calls
    - On phone calls, offer the following:
      - 1) fill out the survey over the phone - over the phone is the best option
        - Enter it right into surveymonkey - so don't have to merge paper data with online data
      - 2) offer to stop by and fill it out in person
  - Record all of these in a tracking spreadsheet, building off of the list of groups.
- Be systematic in your follow-up - everyone that hasn't already replied receives the same amount of reminders, in the same way, at roughly the same time.

5. CLEAN AND ANALYZE DATA

Now that your responses are in, you will need to go through a data cleaning process before you can begin to analyze and report your results. First, download your responses into a single spreadsheet and make sure all responses are accounted for, including any responses you collected by phone or in person. You should have just one response from every group you surveyed; if you have duplicates, keep the first complete response. Check the responses for any obvious errors (such as a letter entered into a numeric response) and discuss how you will handle these with your team. You may consider doing a round of follow-up emails to collect any missing data from groups who skipped questions.

Once your data are cleaned, you can run descriptive statistics on org characteristics to help understand your results. For open ended questions, such as mission statement, you may want to code responses into different categories to see any trends. For a guide to cleaning the turf and network data, refer to the mapping and network cookbooks.

6. SHARE RESULTS

Once your data have been cleaned and analyzed, you can write up your results. Consider sharing results in a white paper, a one-pager, a presentation slide deck, a webpage, and other methods that you use to disseminate information. You can represent the data through charts and tables, graphs, photos, maps, and case studies.

At minimum, make sure to share your responses with your advisory board, data providers, and respondents. Consider meeting with respondents and other practitioners to understand their interests and needs, and help them access answers and trend from the data.

HOW TO MAP YOUR STEW:

A multi-approach guide to creating and incorporating the geographic components of your STEW-MAP survey

February 2018 version

Krista Heinlen and Michelle Johnson

Congratulations! You've launched your stewardship survey, and that's a major accomplishment. Now you're ready to start thinking about what to do with all that awesome data, and this guide is here to help. Specifically, you've reached the MAPping part of your STEW-MAP project, and in order to look at the spatial relationship among stewardship organizations, their descriptions of where they do their work – their Turf – will need to be drawn on the map (this is separate from the address they give as their office location).

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HANDLING YOUR SURVEY DATA AND PREPARING IT FOR MAPPING

Depending on what kind of survey distribution you've chosen – e.g., an online survey software, paper surveys – your data should be in some form of spreadsheet file, with columns representing each question or information input, and rows for each respondent answer. For the list of organizations you sent the survey to, it is best to ensure each organization receives a unique ID number. In all cases, it will be highly important that the respondent's unique ID number (drawing from your initial list of organizations receiving the survey), organization name, and their drawn Turf, be properly connected. (Turf refers to the area of activity the organization described as working in when responding to the survey.) In other words, you won't need to use all of your survey response data columns in order to work on your Turfs, but the key to reuniting the spatial Turf information to an organization's set of responses is making sure that each ID number (often PopID) is assigned to the right Turf area.

- ProTip: If you are using an online survey and the survey software has the option to load a panel (mailing list) of contacts, make sure to include a PopID when you load the organization information. That way, PopID will be associated with all responses. Otherwise (i.e. if you are using Maptionnaire, mail versions, or survey software that doesn't allow you to include the PopID from the beginning), this will need to be done manually later. *(More on what this might look like in Section A).*

2 Types of TURF Data:

In some cases, such as with Maptionnaire survey software, organizations will have drawn their own version of this Turf area online as a polygon shapefile which can then be downloaded and checked for accuracy. In most cases, there will be a written description from respondents which will need to be drawn as a shapefile for a Geographic Information System, or GIS. Different applications can be used to do this – ArcGIS, Google MyMaps, and QGIS are some examples. This guide will focus on the ArcGIS platform, but the approach can be tailored to other software.

→Choose Your Own Adventure:

- To Draw Turf Areas Using Written Descriptions, see Section B (starts on page x)
- To Download Organization's Drawn Turfs , see Section D (starts on page x)
- To Check Organization's Drawn Turfs for Accuracy, see Section E (starts on page x)

2 Types of Data Management:

The size of your survey sample and the duration of your response period may determine how you approach working with your data: you may be able to download and work on completed responses while the survey is ongoing, or you may wait until your survey is closed, and then work with the completed survey data all at once.

→Choose Your Own Adventure:

- To Work On Data From A Completed Survey (All At Once), see Section B (starts on page x)
- To Work On Data From an Ongoing Survey (and Integrate New Data With Completed Data), see Section C (starts on page x)

Recording Your TURF Methodology in the Survey Data Table:

Regardless of which type of Data Management and Turf Creation method you choose, you will need to add some information to the data set that indicates how you are building each respondent's geographic area. Things you'll want to record include what kind of location the Turf encompasses (city, region, county, etc.), what type of data the Turf is derived from (user-drawn or created by you), who is the person creating or editing the Turf, the date of editing, and other comments, such as your confidence level in or any issues with the final shapefile. *(See Table 1 in Section A)* This guide will offer examples of how to add and populate these fields while you are building the Turf polygons. Once your shapefile work is completed, these fields will become part of the information included for each respondent to your survey.

Before Getting Started:

Chances are good that you already have a STEW-MAP folder on your computer. How you organize your project is ultimately up to you, but within your STEW-MAP folder, you'll benefit by creating a folder called Maps, or GIS, or Turfs, or whatever makes sense to you. This will make it immensely easier to save your shapefiles and Turf-related downloads together for easy management. If you want to take it a step further, you can create individual folders in the Maps folder to separate data and GIS files, since the GIS files can end up having several parts. Again - just easier.

- ProTip: Don't use any spaces in the folder name – ArcGIS and other GIS software packages gets finicky about these, and you'll be accessing the folder every time you save a Turf file. Underscores "_" are fine.

SECTION A: Working With Survey Responses and Data

If you have conducted your STEW-MAP survey via an online or software platform, you can follow their specific instructions for downloading the responses and gathering the data into a spreadsheet that you can edit. If the options available are limited to exporting a .csv or .txt file, know that both of these file formats can be opened in a program like Excel and saved as an .xls file if desired.

Once you have an editable spreadsheet, there are a few columns you'll add that will be related to the work that will be done for each organization's Turf. Depending on how the software has uniquely

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More About What This Might Look Like:

Let's say in your original survey mailing/distribution list, your first three organizations look like this, where 1, 2, 3, etc. is your PopID:

1. Department of Parks and Urban Forestry
2. The Pinchot Institute
3. Cedar Park Community Association

If your online survey allows you to load a panel, the survey results that you download once the survey has been completed will keep the numbers 1, 2, 3, etc. attached to the organization's responses. If your survey does not allow you to do this, sometimes the downloaded responses will have their own unique number system for your organizations, like this:

4679. Department of Parks and Urban Forestry
4680. The Pinchot Institute
4681. Cedar Park Community Association

What you are doing in this process is making sure that you've included the original 1, 2, 3, etc. PopID values to your organization's responses and their Turfs. This is the piece of continuity that will make all the magic happen! Instructions for when to do this start in Section A.

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identified each organization (usually with some sort of ID number connected to their responses), there may be a field called Respondent ID, or UserKey, or something similar. In addition to this column, add a PopID column, which you can fill with the PopID from your initial list of groups that received the survey.

The following table defines and describes the other columns to add:

NAME	FIELD TYPE	FIELD INFORMATION
PopID	Number	● Unique ID number (PopID) if not already included in downloaded survey responses
Location	Text	● City, Region, or Both
Source	Text	● Digitization by editor to create the data ● Digitization via download from Maptionnaire
Editor	Text	● Your name or initials
EditComm	Text	● Editor comments, observations, or issues with Turf digitization
RevDate	Date	● Date of Turf creation/revision
Completed	Text	● Yes or No
Confidence	Text	● High, Medium, or Low
TurfType	Text	● Entire Turf or Multiple Sites that make up Turf

Table 1

Save your spreadsheet with these new columns; you will be able to populate the fields (add the new data for each entry) as you are creating each Turf. If you are already familiar with how to use the Add Field operation within ArcGIS, there are instructions in the next section on how to add these fields there if you'd prefer.

SECTION B: Drawing Turfs From Written Descriptions (If you are doing this in batches from an ongoing survey, see Section D first)

Drawing Turfs Using ArcGIS:

ArcGIS has an extensive set of Editing Tools that allow you to create a new shapefile and draw (or trace) a polygon based on the description you have for a Turf. You can do this using a background map that shows you features like streets, which is helpful when a description says something like, "6th Street to 13th Street, from Broad Street to Washington Ave.", to describe the Turf's four bounding streets. Other descriptions may reference other related boundaries, such as Zip Codes, Parks, or School Catchment zones. If they do, and if you have access to these in existing shapefiles, you can trace them to create Turf areas using the same editing process.

There are two ways that you can implement these tools: the first is by creating a simple Shapefile, which will essentially be an empty canvas for your drawn polygons, where you will use your survey data

spreadsheet to reference the Turf descriptions and then draw them in an open ArcMap, updating the related fields, or attributes, as you create each polygon.

The second is to create a geodatabase that will contain both your shapefile (in this case called a Feature Class) and your data table, allowing you to pre-load some of the attribute fields and access the descriptions from within the shapefile itself. The latter method will require a bit more attention during set-up, and is recommended for people who are fairly comfortable working with Arc file management. Ultimately, however, your final dataset will be converted to shapefiles in order to be uploaded into an ArcGIS Online map, which have fieldname length limits of 10 characters.

- ProTip: ArcGIS has an extensive help menu and an active forum. If you know what ArcGIS tool or feature you want to use, but don't understand what it does, the help menu can explain in detail what the tool does, with step-by-step examples. Also, if you ever receive an error message, the help menu can explain the error message further, to help you resolve the issue. Finally, the ArcGIS forum (https://community.esri.com/community/help-and-feedback) is useful for problem-solving issues you may encounter as you work on your project.

The first thing you can do is make your spreadsheet easier to work with. You don't need all of the spreadsheet data to create the Turfs; by copying and pasting the columns you need into a new CSV file, you'll have a smaller file to manage in ArcGIS and one that readily allows you to add new data, as well as easily recombine it to the larger dataset.

Open your spreadsheet in Excel and select the columns for PopID, Organization Name, Street Address, City, ZipCode, and the Description given for the boundaries of the area where they do their work. Be sure to also include the new fields you added in Section A, which you will edit as you create each Turf. Copy these and paste them into a new blank spreadsheet. Save the sheet as a .csv file, which you can open in Excel, or that you will be able to open in Arc when you are ready.

**I.   Drawing Turfs Using a Shapefile**

ArcGIS provides a handful of options for drawing new shapes in the program or on your map, and in order to create a saveable, editable file for your turf polygons, the first step will be to set up an empty Shapefile. This can be done in ArcCatalog, which you can open on its own or in your map. If you haven't already, go ahead and open ArcMap, which will set you up with a blank map document.

a.   Open ArcCatalog within ArcMap

In ArcMap, click on the icon along the top toolbar that looks like a mini yellow file cabinet. This will open the ArcCatalog window on the right of your screen. In order to browse to your STEW-MAP folders, you may first need to tell ArcGIS to *Connect To Folder* and navigate to your STEW-MAP folder location. If Arc has never accessed a folder in the past, it will need you to show it the file you want to use. Once you've connected to a folder, it will continue to be available (i.e. you don't have to do this every time).
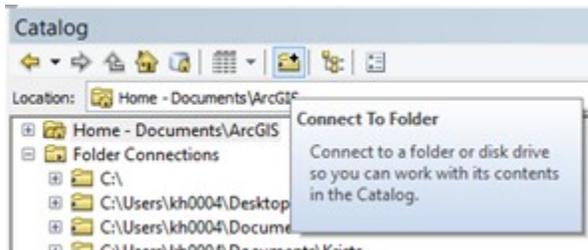
Within your STEWMap folder, it will help to create a separate folder for your GIS work. You can do this in your regular Windows Explorer, or in ArcCatalog by right-clicking on your STEWMap folder and selecting *New-->Folder*. Give it a name such as GIS, Turfs, or whatever makes the most sense to you. Once you have this folder, right-click on it, and select *New-->Shapefile*. This will pop open a window asking you to set up a name, type and coordinate system for your file:
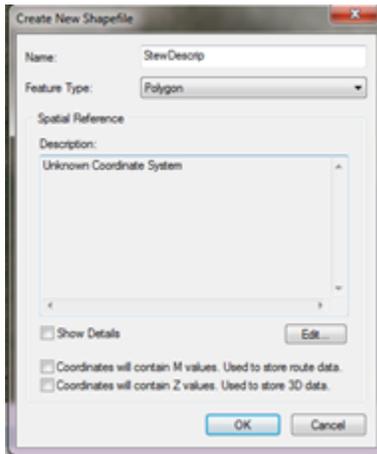
Give the shapefile a name that makes sense to you, like DrawnTurfs, or STEWTurfs, etc. You will be able to revisit this shapefile and edit it as many times as you need, so it doesn't need to be specific to the date or set of organizations you are working on in this session. For Type, choose Polygon, then click Edit (under the Description box) to set the Projection (use your local State Plane projection, unless you will be tracing your polygons from other shapefiles that are in a different projection (e.g., ZipCodes that have NAD 83 coordinates). If that is the case, match the projection setting of your Shapefile to that coordinate system.

Selecting Edit will open the Spatial Reference Properties Box. To choose your State Plane Coordinates, navigate to the folder called *Projected Coordinate Systems-->State Plane-->NAD 1983 (US Feet)*, and select your state and region (usually North or South). If you need to set the projection to match that of an existing shapefile you are using, go up to the search box and click on the drop-down menu next to the sphere icon that (when you hover on it) says *Add Coordinate System*. From the menu, select Import, and navigate to the shapefile you want to match.

Click OK in the Spatial Reference Properties box, and again in the Create New Shapefile box. You should now be able to see your new shapefile in the ArcCatalog window. You can click and drag this file to place it in your Table of Contents window, or you can click on the *Add Data* icon (the yellow diamond with the plus sign), navigate to the file that contains it, and select it from there. Remember - your new shapefile doesn't have any turfs in it yet, so you won't see anything on your map.

...Just a few more things before you can start to draw the Turf areas:

c.   Add Attribute Fields To Your Shapefile

At the very least, you will need to add one Attribute, or column, to the shapefile's data table. This will be for including the PopID (or name for the organization's original unique identifier). It's also a good idea to

**What are Projections, and Why do they Matter?**

Projection is GIS-speak for the transformation that occurs when you take something that exists on a (round) globe and try to represent it on a flat surface, like your computer screen. There are a bajillion different ways that this process can be tweaked for accuracy.

The important part for the Turf process is that projections are also a way to make sure that shapefiles can align and talk to each other properly. In other words, you would want any shapes that you draw to be able to match the underlying reference information (streets, park locations, county boundaries, etc.) with as much accuracy and consistency as possible. STEW-MAP is considering these Turf areas for their various spatial connections and correlations, and this is the way that you can ensure that the "spatial" components are all on the same page.

For more detailed insights, you can always check out Projections in the ArcGIS Help information.

create a column for the name of the organization as a nice safeguard. Because your shapefile is blank, the table will also be empty of data, but you will soon be remedying that.

To set up your new fields, right click directly on the name of your new shapefile; from the options, select *Open Attribute Table*. The table should appear with default headers that read FID, Shape, and ID. From the Table menu options, select *Add Field*:
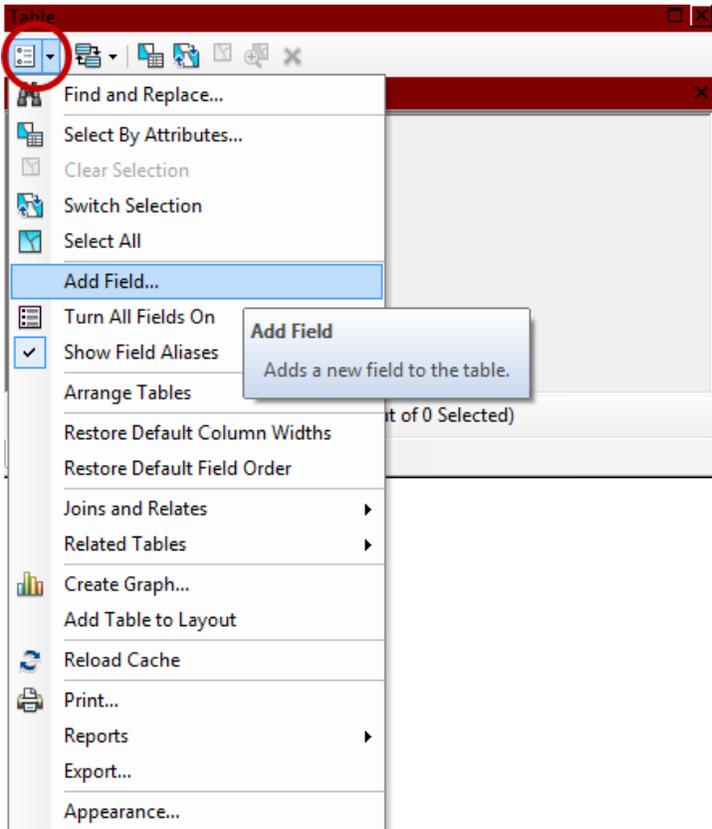

This will pull up the Field window, where you can name your field (PopID), set it to Type = Long Integer, and leave the default for Precision. Follow the same steps for entering a field that will hold the organization's name, but change the Type to Text, and set the Length to 255 if desired (255 is the maximum number of characters allowed; you probably won't need this for the name, but may be useful for other fields). If you opted not to create the rest of your new fields in your spreadsheet (i.e., the fields for your name as the editor, any comments on the Turf boundary, the date of your revisions, etc., as described in the table in Section A), you will need to do this step now.

- ● ProTip: the option to add these fields in your spreadsheet or your shapefile is up to you. For the former, you will ultimately need to set up your work flow to allow you to toggle back and forth between your shapefile and your spreadsheet in order to fill in these fields as you create new Turf polygons. For the latter, you will need to enter these attributes in the shapefile table within ArcGIS as you are editing the Turfs. ***Regardless, you will need to input the correct PopID for each Turf polygon as you create it in your Arc map.***

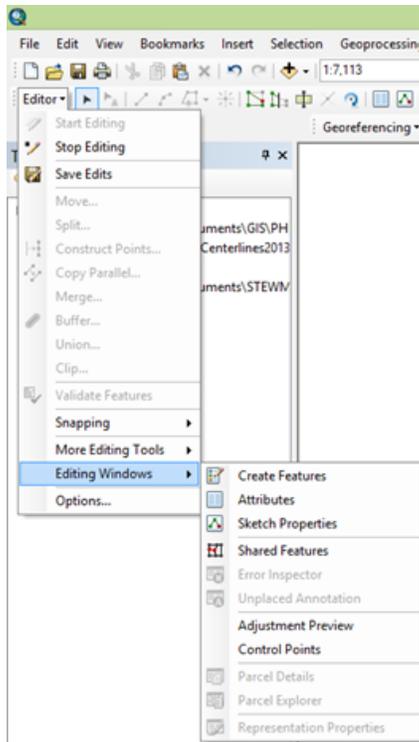d.   Add other data files to provide references for the Turfs you will draw.

This can include other boundary shapefiles that you have from your region (counties, ZIP codes, parks). One of the easiest to use is a background or basemap that you can add right from Arc, which will show you streets and several area landmarks, Google-style. You can access it by *File-->Add Data-->Add Basemap*, or by clicking the drop down menu on the *Add Data* icon and choosing from the available basemaps. The Streets basemap is an excellent option, and there may be times when you find the Imagery helpful as well:
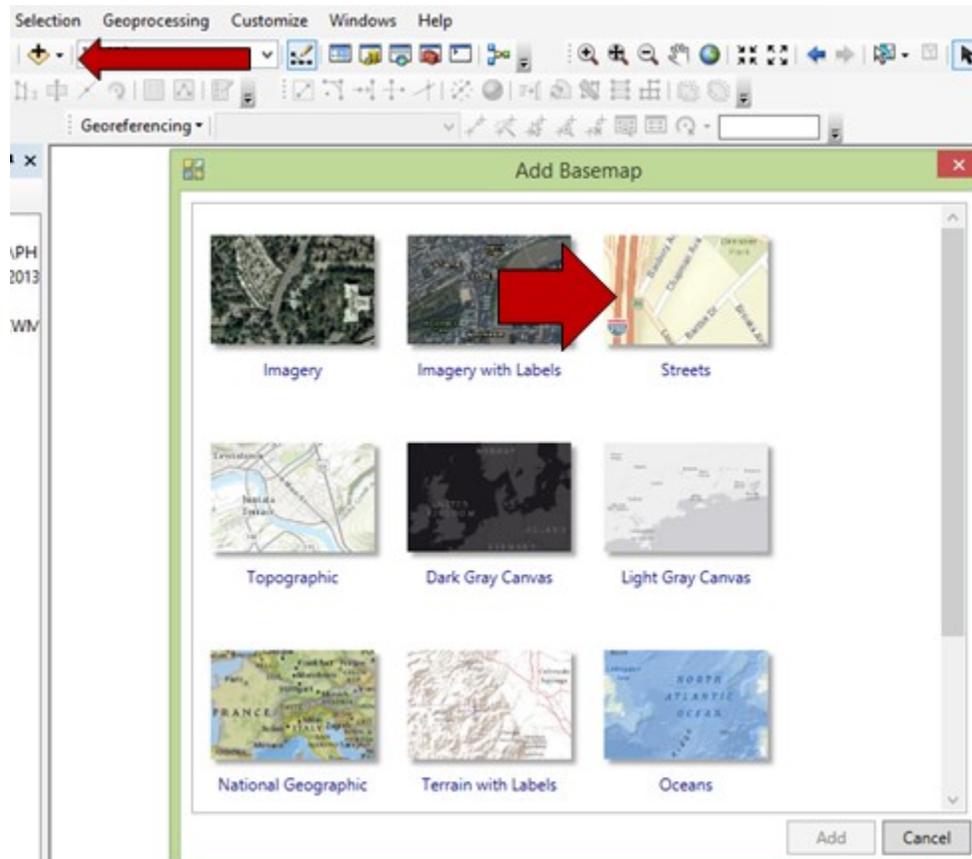

- ● ProTip: running these basemaps in the background (especially the Imagery) can slow down the time it takes you to make adjustments to your map, since it will be trying to redraw these large files the whole time you are working on your shapefiles. This is totally normal - it's not anything buggy on your system. Remember that by un-checking the box next to these World maps in your Table of Contents, you can turn them off for a while when you don't need them.

e.   Edit your new shapefile to draw your Turfs.

In order to draw the boundaries of an organization's Turf, you will need to formally Edit your shapefile. Start by opening the Editor Toolbar from the Customize options and selecting *Toolbars-->Editor*. This will pop open the editing tools.

- ProTip: before starting to edit for the first time, if you are unfamiliar with the Editor toolbar, use the ArcGIS help menu and/or tutorials to orient yourself to how editing works in general.

Under the Editor drop down menu, select *Start Editing*.

Arc may ask you to identify the file you wish to edit, in which case you'll choose your shapefile. Once you've told Arc to Start Editing, it will open the Create Features window on the left of your screen:

- ProTip: if you do not see the Create Features window, go back to the Editor toolbar and from the drop down menu select *Editing Windows-->Create Features*:

Click once on the name of your shapefile (to select it); a variety of Construction Tools will appear below. You'll most likely want to choose the Polygon tool, but you can use any of the options that will best draw your area. Click once on your tool to choose it:
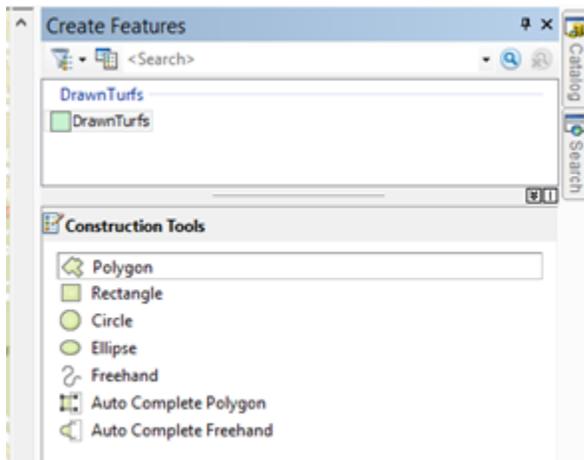

Your cursor will now appear as a crosshair symbol.

Go to your spreadsheet and locate the Description for the first Turf, and find the parameters for the boundary described on your map. If you aren't sure where the area being described is located (if the description is for a school catchment boundary, for example), the quickest way to get your bearings is to search for it in Google Maps (Pro tip: honest - we do this all the time!).

Line your cursor up with the area of focus on your map, and click in order to start drawing. As you move your cursor it will draw a line until you click again, which will set what is called the next "vertex". Each

time you click, you create a new vertex, and these are the spots where you can change direction/turn a corner on order to complete the outline of your Turf. In the image below, each green or red square is a vertex:
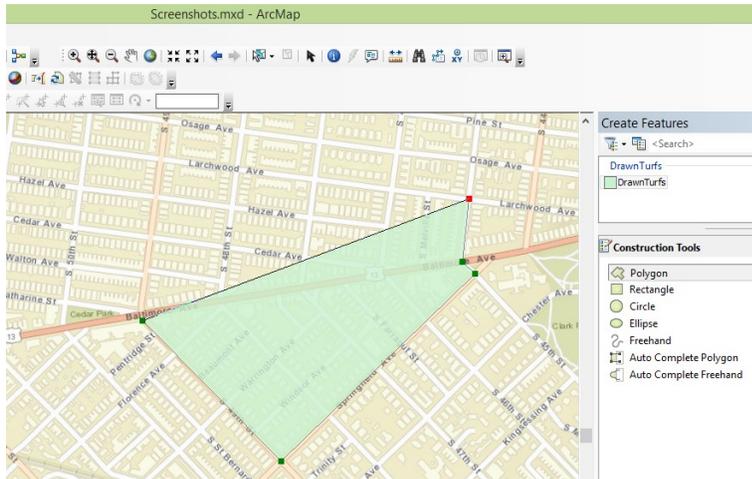

If you place a vertex in the wrong spot, don't panic; you can right-click on your map and choose *Delete Vertex.* Once you have completed all of the parts of a boundary, double click on the first vertex to complete the polygon. It will now have an "x" in the middle, and the polygon boundary will appear highlighted in blue.

- ProTip: Under the Editor drop down menu, there is an option to Save Edits; you'll want to remember to do this frequently so that you don't lose any of your drawn Turfs

Once you have completed a Turf, there are two ways you can fill in the needed attributes:

1. Right click on the name of your shapefile and select *Open Attribute Table*. The table will open with the item you have just drawn highlighted in blue. You can click right into each cell and fill in the associated organization data from your spreadsheet.

2. From the drop down menu on the Editor Toolbar, select *Editing Windows--> Attributes*. This will open an Attributes box over the Create Features box on the right side of your map. The fields for the Turf you have just created will appear in the box, and you can click right into each cell and fill in the associated organization data from your spreadsheet.
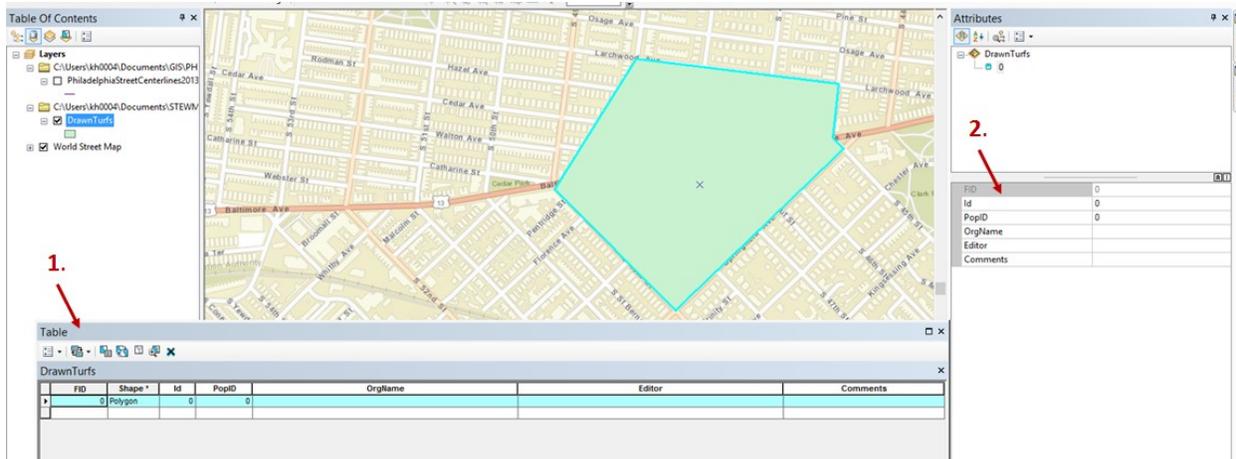
Check it out - YOU JUST DREW YOUR FIRST TURF!! You rock. A few more quick things:

If you chose to add most of the new data columns to your spreadsheet instead of your shapefile, now is the time to go back and fill those in. Make sure you are editing data for the same PopID that you just gave to the new Turf polygon. Go ahead and save your edits in the spreadsheet, and then again in the map. You can never do this too often!

You are ready to move on to the next organization's Turf. To start drawing the next boundary, go back to the Create Features box on the right of your map and select Polygon under Construction Tools again. This will set your cursor back to crosshairs, and you can start placing vertices for the next polygon.

- ● ProTip: if the Attributes box is still the one you can see, peek down at the bottom of the box and you'll see a set of tabs; one will say Create Features. Just click on the tab to toggle back to that box.

f.   Tracing Turfs from existing shapefiles.

If you have loaded a shapefile to your map that contains the boundaries of things that you can use to draw your Turfs (such as parks, school catchment areas, ZIP codes, or similar features), you can use one of the Editing tools that allows you to trace these existing boundaries instead of drawing them freehand. You'll find the Trace tool on the Editor toolbar:
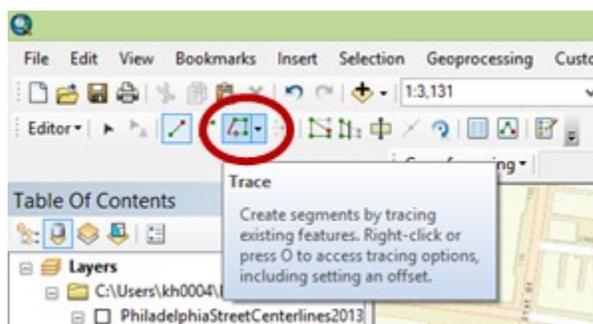
When you choose this tool, you can start to trace the existing shape by clicking on any of its edges and then moving your cursor around the perimeter. You'll notice that the name of the object being traced will appear, and the outline of your drawing will snap to the object and be outlined in purple:


Double-click when you come back around to your starting point to finish your drawing. The new Turf polygon will then be highlighted in blue - same as if you drew it free hand - and will appear directly on top of the shape you just traced. Follow the instructions under #1 (or #2) in part e. above to fill in the attributes, and you're all set. Don't forget to Save your edits!
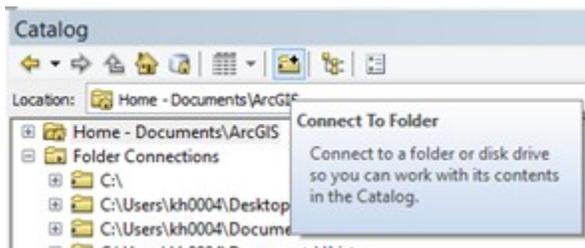
II.   Drawing Turfs Using a Geodatabase

To set up a Feature Class shapefile for your Turf, you'll want to create a New Geodatabase, which is like setting up a new folder to hold your Turf data. This can be done in ArcCatalog.

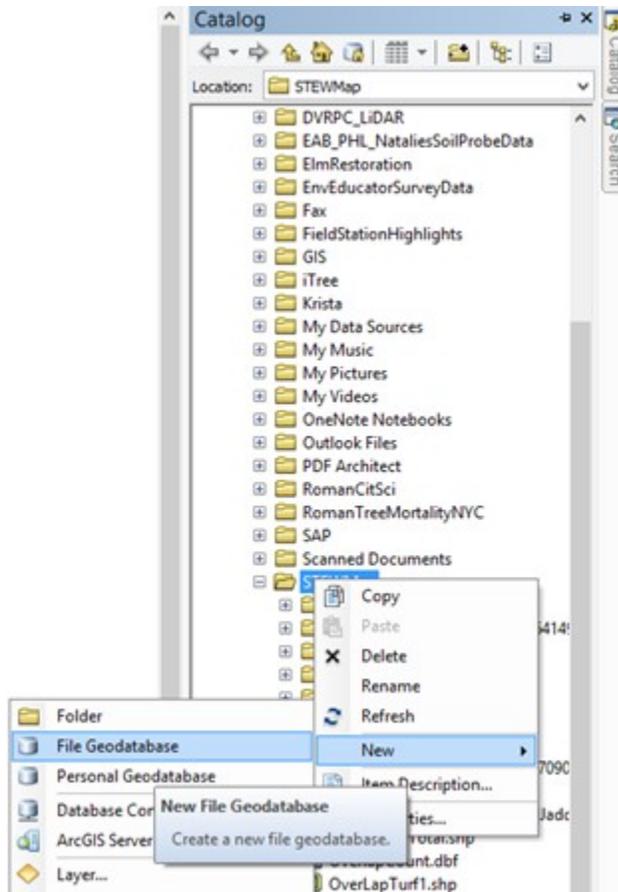a.   Open ArcCatalog within ArcMap
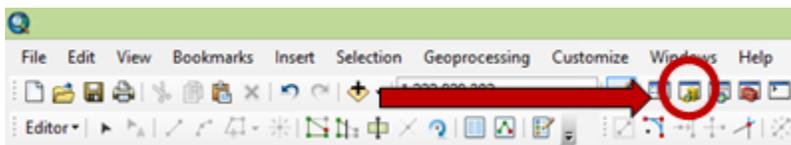
b.   Connect to your STEWMap folder *(See steps a. and b. on page 6)*

Right-click on the STEW-Map folder, and choose *New-->File Geodatabase*; you will be asked to name the GDB.


d.   Open your .csv file in ArcMap.

If you've saved your survey data spreadsheet as a .csv file, you can open it inside ArcGIS . The reason for doing this is that by setting up a geodatabase, you can load the information in your survey spreadsheet directly to your empty shapefile, transferring the PopID, organization name, and the description for each Turf directly to your file. You can convert this to a file for the .gdb by right-clicking on the table and choosing *Data→Export Data*, and then saving it as file type Table in the .gdb (you can give it the same name if desired).

In order to have an editable file that you can set up and use to draw your polygon Turfs, you'll start by creating an empty one. This can be done in ArcCatalog. Right-click on your .gdb and select *New-->Feature Class*:
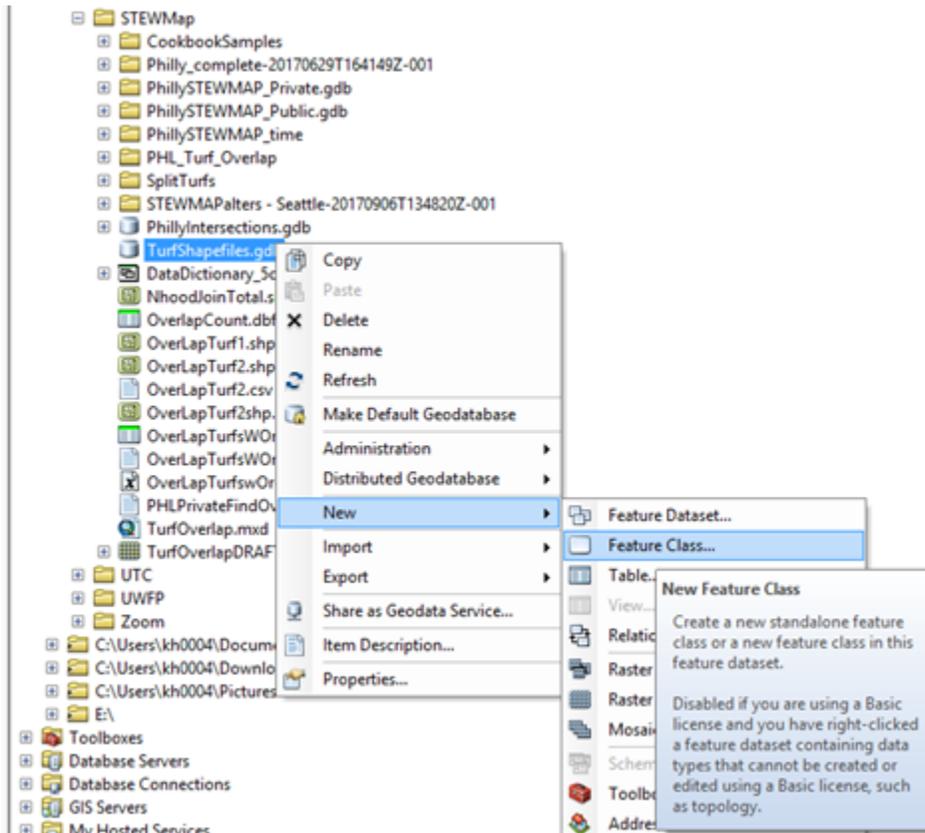

You will then see a New Feature Class pop-up window where you can format the file. For Type, choose Polygon Features, then click Next to set the Projection (use your local State Plane projection, unless you will be tracing your polygons from other shapefiles that are in a different projection (e.g., ZipCodes that are have NAD 83 coordinates). If that is the case, match the projection setting of your Feature Class to that coordinate system:
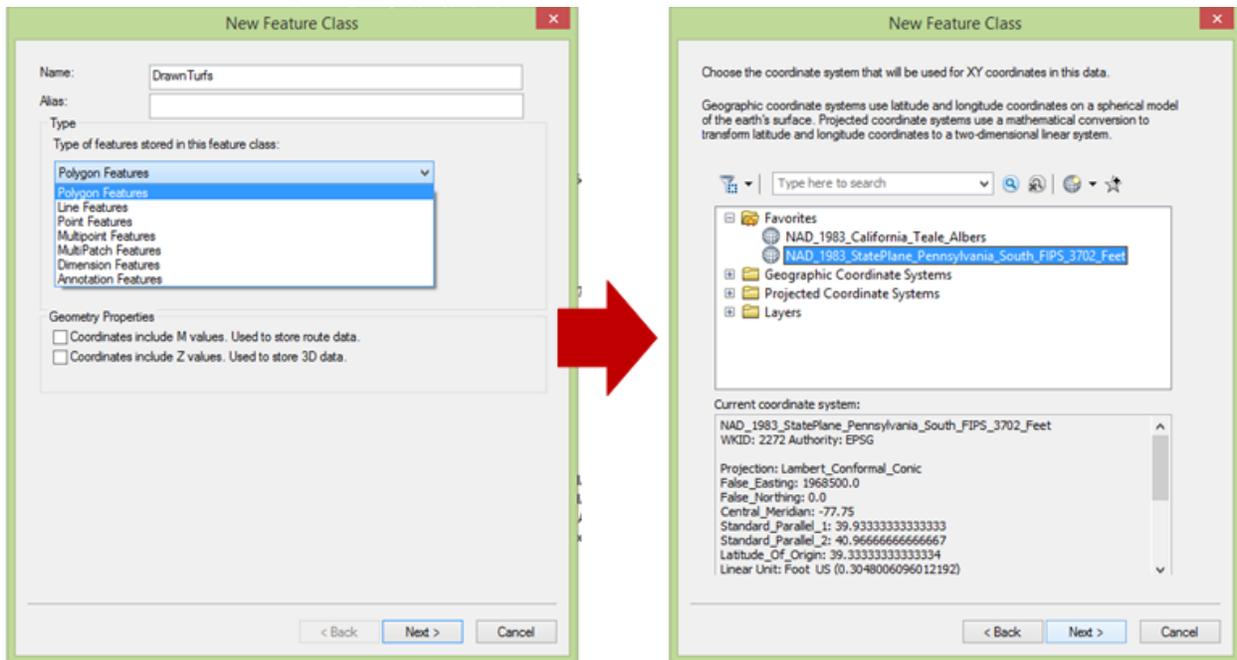
When you click Next, you will be given options for setting up the Field Configuration. In this step, you can tell the new feature class to adopt the fields, or columns, and headers from your survey data table containing your area descriptions. The advantage of copying these to your feature class is to ensure that the field names are identical, which will be important when you attach your survey data to the file. It will also allow you to access the description information from within the Feature Class.

In the Field Configuration window, choose the option to *Import* under the Field Properties area, and browse to the survey data table you exported to the .gdb. Once you select the table, the fields from the table will show up under the Field Names at the top of the window:
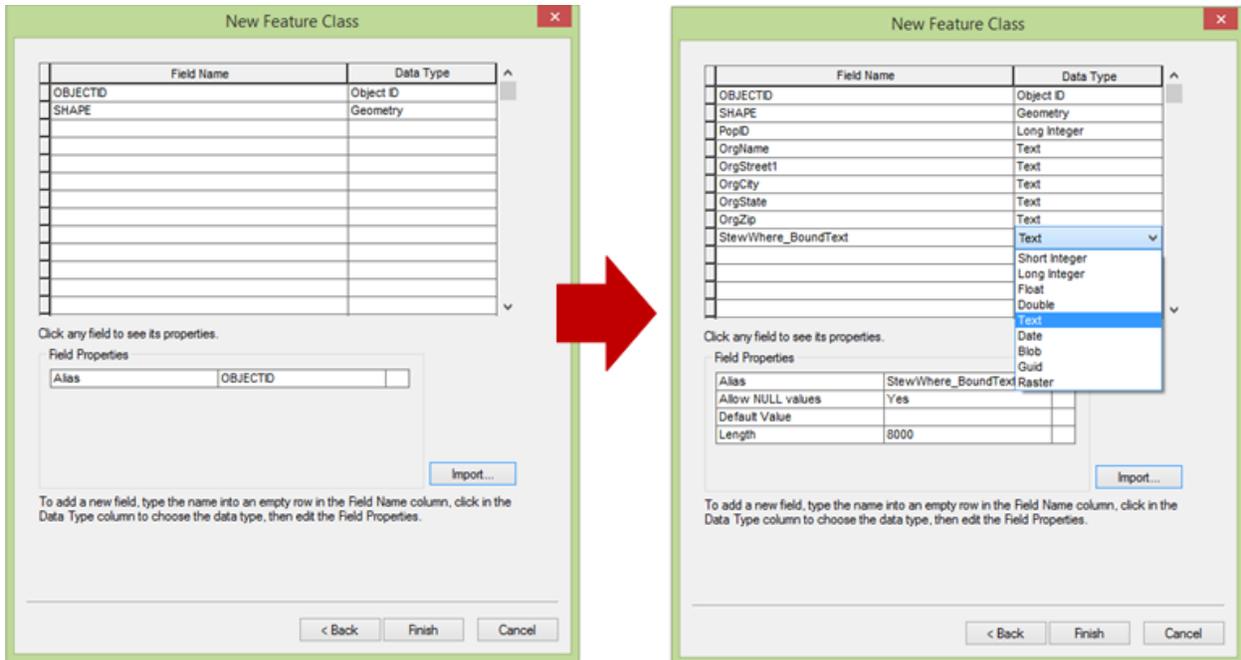
By clicking on the name of any field, or its data type, you can adjust the type and the properties as necessary, although the defaults should give you what you need in most cases. When your fields are good to go, select Finish. Note that your new Feature Class will have the field headers that you need, but no data for them. That comes in the next step.

f.   Load Data to Feature Class.

In the ArcCatalog window, right-click on your new feature class and select Load-->Load Data. This will open a Simple Data Loader set up window.
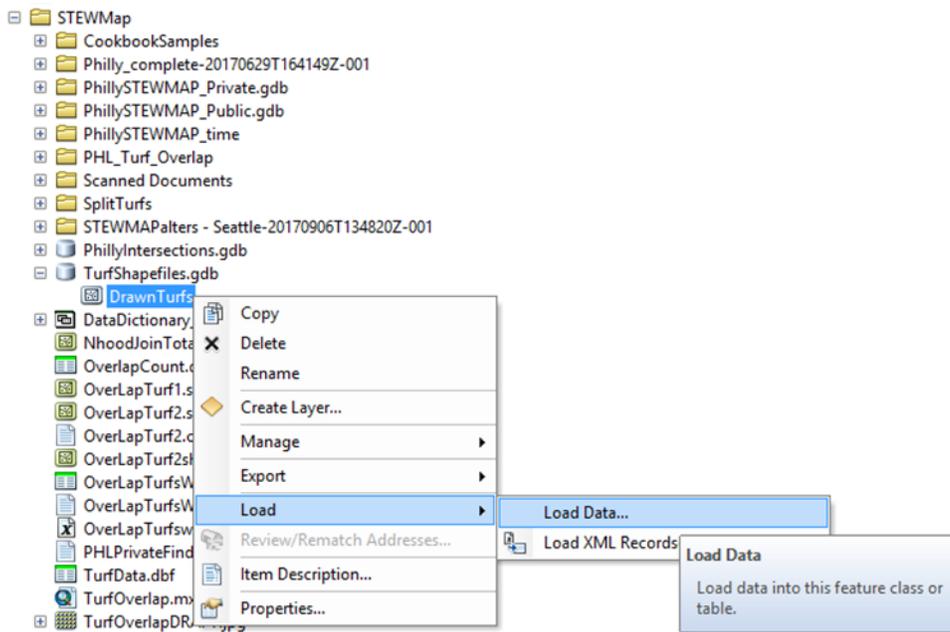
The first window will ask you to navigate to your data table, and then select *Add* in order to put in the List of Source Data to Load:
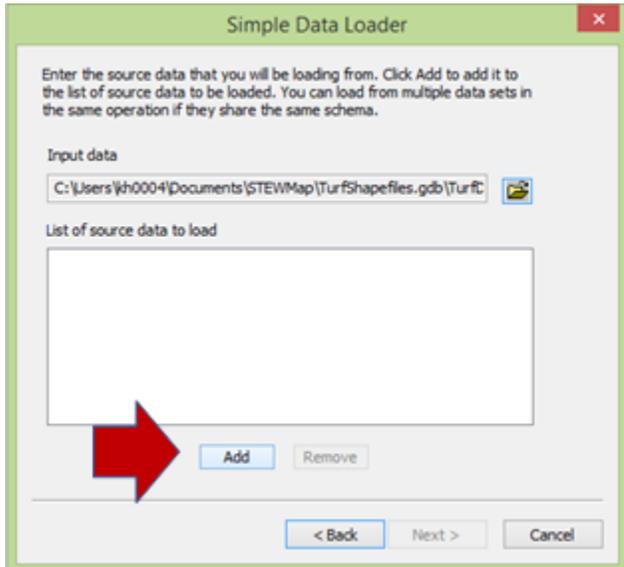
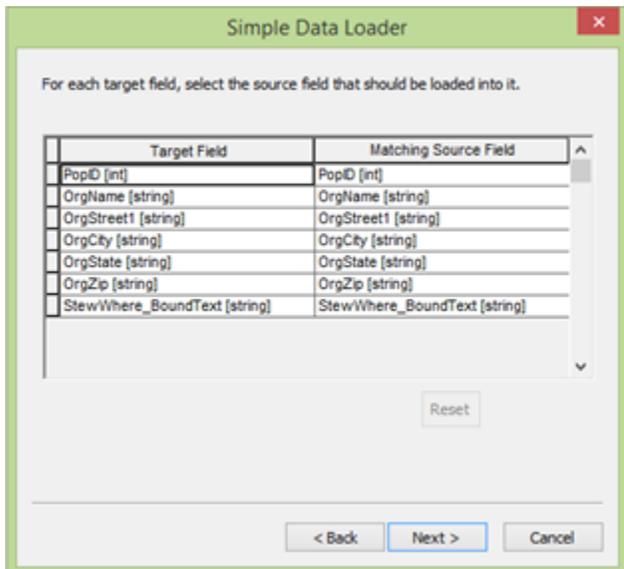Click *Next*, and leave the defaults for the geodatabase and target feature class (it already knows what these are). Click *Next* again, and review the fields list to ensure that the Target Field and Matching Source Field are identical:

The next window will be about limiting your data with an attribute query, which you can skip, and that will take you to the summary page where you can choose *Finish*, and your data load will be done. Add the feature class to the map - you won't see anything on the map itself, since you haven't drawn anything yet; open the attribute table to make sure the data loaded and looks OK.

- ● ProTip: at the bottom of the attribute table, you can see the number of records that now exist in your shapefile. This should be identical to the number of records you just loaded from the survey data

You are now totally set to start drawing Turfs!

g.   Add your reference data to your map.

The simplest way to draw new areas in Arc is to line them up with or trace existing shapefiles. You'll notice that many of your organizations reference their boundaries with the names of streets, zip codes, waterways, parks, or other institutions. You can include any of these reference layers for use, or add a Basemap from the *Add Data* icon options; the Streets basemap provides a good starting point for these references, even if you do have the relevant shapefiles. Additionally, there may be times that using the satellite Imagery basemap is also useful.

h.   Edit your new feature class to draw your Turfs.

In order to draw the boundaries of an organization's Turf, you will need to Edit your feature class. Start by opening the Editor Toolbar from the Customize options and selecting *Toolbars-->Editor*. This will pop open the editing tools. Under the Editor drop down menu, select *Start Editing*. Arc may ask you to identify the file you wish to edit, in which case you'll select the feature class for your Turfs. Once you've told Arc to Start Editing, it will open the Create Features window on the left of your screen:
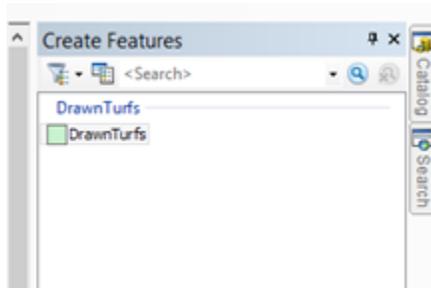
Click once on the name of your feature class (to select it); a variety of Construction Tools will appear below. You'll most likely want to choose the Polygon tool, but you can use any of the options that will best draw your area. Click once on your selection tool to choose it. Return to the Editor drop down menu, and select *More Editing Tools-->Advanced Editing*. This will place a few extra icons on the toolbar, including the one you'll use to create your Turf boundaries:
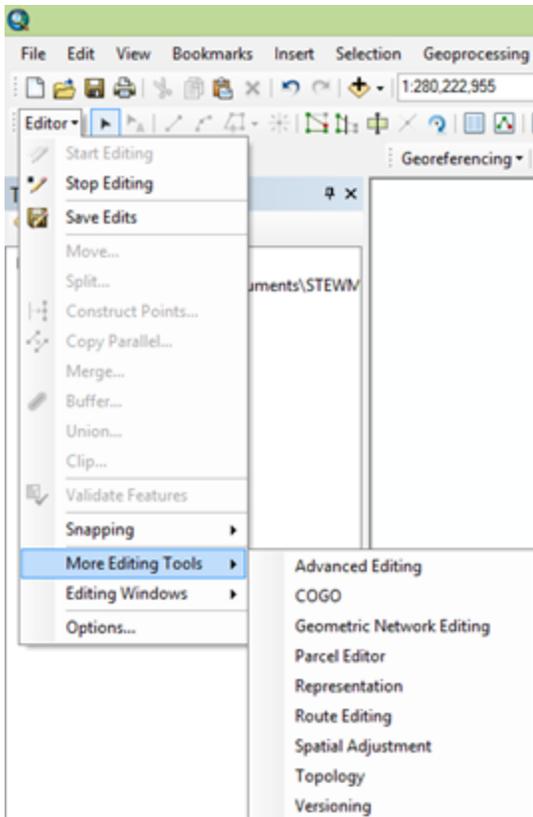
Click on the icon called *Replace Geometry* from this advanced toolset; it looks like a polygon shape with 2 arrows:
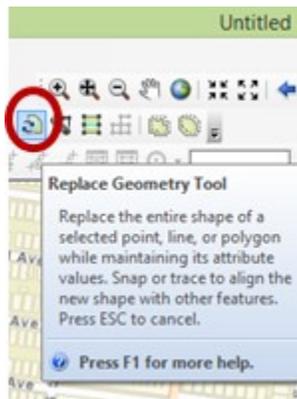
Your cursor will now appear as a crosshair symbol. Right-click on your feature class in the table of contents, and *Open the AttributeTtable* to view your data. Select the first record you want to draw, scrolling the table so that you can see the Description. Use your cursor/Replace Geometry tool to click on the map and draw the desired boundary:
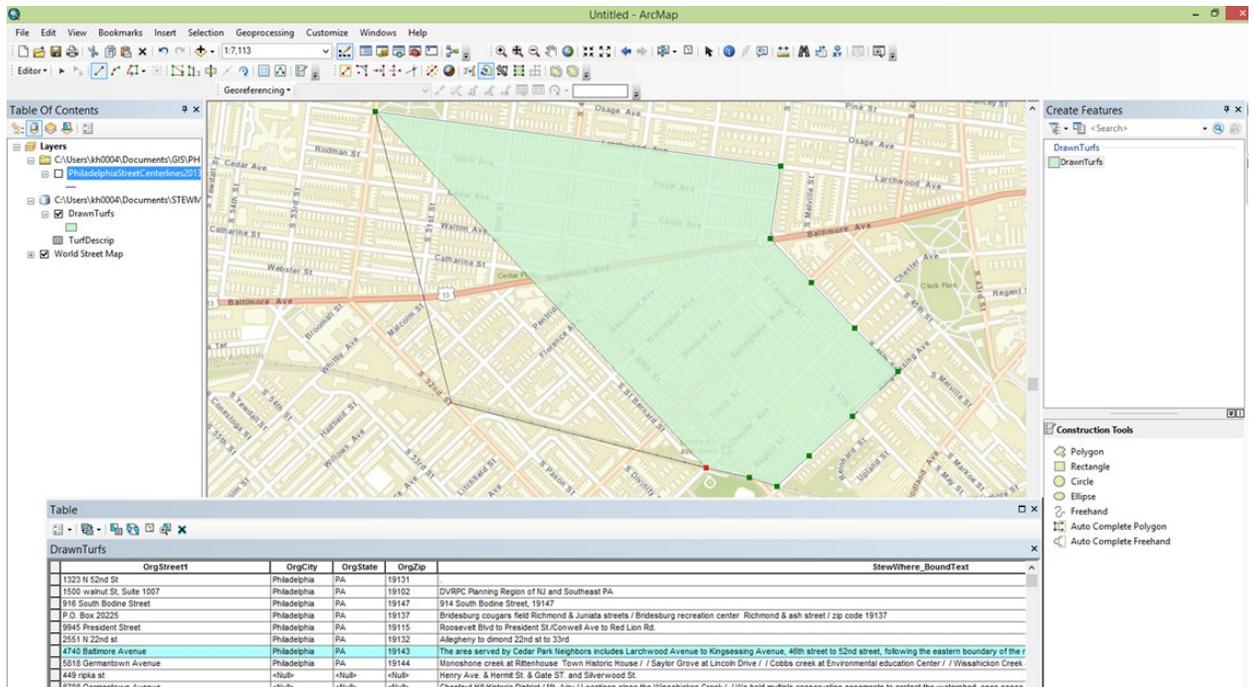
Click on the map any time you want to place a vertice or change direction/go around a corner; double-click when you have finished the boundary at your starting point to complete the polygon. You can then select the next entry to draw.

- ProTip: Under the Editor drop down menu, there is an option to *Save Edits*; you'll want to remember to do this frequently so that you don't lose any of your drawn Turfs

i. **Add your notes and new attributes.**

While you are in Editing mode, you can double-click into any of the cells in your attribute table to enter new information. Once you have completed drawing the turf boundary, navigate to the fields/columns in the attribute table where you will enter Yes or No for Completed, Your Name as the person drawing the turf, the Date if you are including that, and any Comments or Notes on the boundary.

If you would prefer to use the Attribute window instead of the table itself (which may allow for less scrolling to enter your data), you can follow these steps: From the Editor Toolbar drop down menu, select *Editing Windows-->Attributes*. This will open the Attributes window on the right of your screen, and will bring up all available fields for the selected turf polygon (which will be the one you've just drawn). Fill in your related fields right inside each cell:
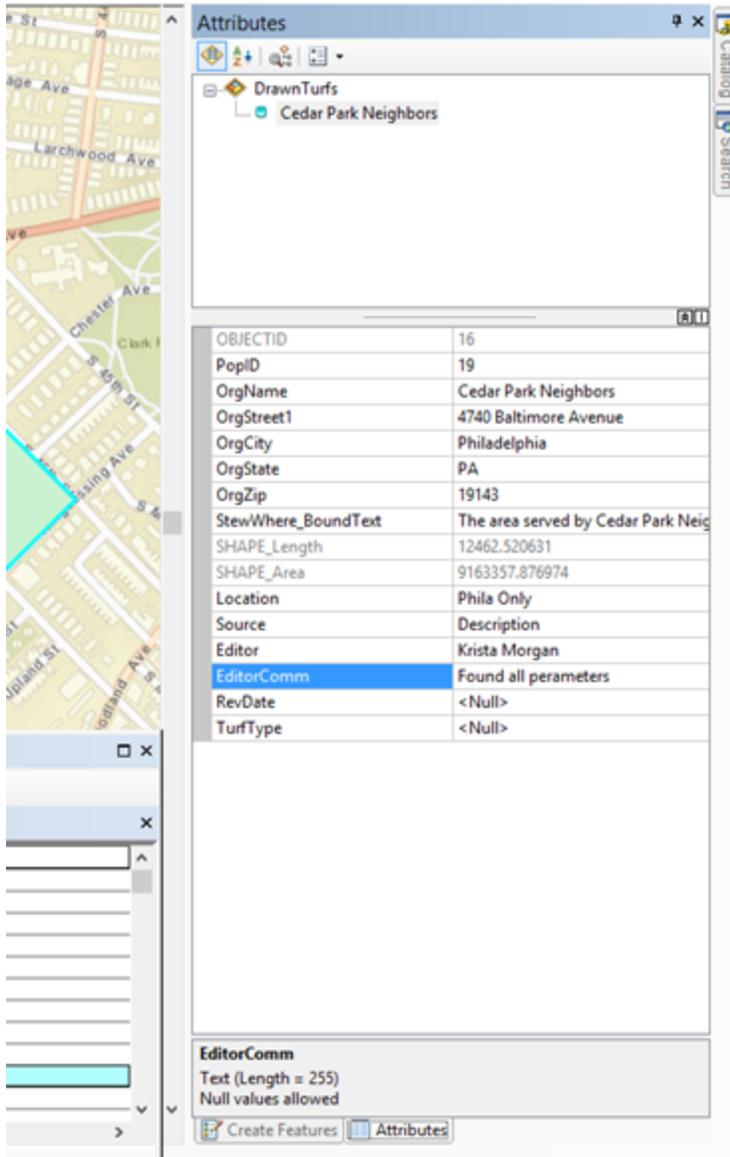
You should now be able to see your attribute data in the table for the feature class, and are ready to move onto the next Turf.

Don't forget to Save your edits often using the dropdown menu on the Editor toolbar...

Drawing Turfs Using Other Products

There may be any number of reasons why the steps outlined above for ArcGIS aren't the way to go for your STEW-MAP team. If it's not a program you already have access to, or if you are lacking someone with GIS knowledge and/or the time to learn how to play with it, these can both be prohibitive. If that's the case, there are other utilities that may be worth considering.

Google MyMaps

Google MyMaps is separate from regular Google Maps, and by logging into it with any regular Google account, it gives you the capacity to make and save edits on a map. (https://www.google.com/mymaps).

This can often be the simplest way to go, as it offers a familiar platform, and you can draw up as many polygon shapes as you need. There are several options for accessing tutorials on how to use this program, including help info from Google (https://support.google.com/mymaps/answer/3024454?hl=en&ref_topic=3188329) and tutorial videos (https://www.youtube.com/watch?v=fLhyr5MGi2g) .

The main key factors if using this route will be to incorporate the information from Section A when it comes to the fields you need to add as you are creating Turfs. The MyMaps features allow you to input the correct PopID for each organization as you draw their areas. You will likely want to have your spreadsheet open so that you can toggle back to the other fields (Comments, etc.) and complete them as you work. At the end of your drawing session, Google will have saved your Turf drawings in what's called a KML file. These types of files are exportable from Google, and you will be able to convert them into ArcGIS shapefiles when the time comes.

Another caveat to using Google MyMaps is that you won't always be able to trace certain geographies if they aren't already a feature of the Google basemap. Things like streets, institutions, and parks are often readily accessible, but you won't necessarily be able to see the outlines of things like county boundaries, ZIP codes, and the like.

QGIS

QGIS is a free and open source GIS platform that offers a fairly streamlined and accessible way to work with several simple GIS tasks. You can learn more about what the system includes, and how to use it, on their site (https://qgis.org/en/site/).

ArcGIS Student License

Arc GIS offers a significantly lower-cost option for students and those affiliated with academic institutions (i.e., folks with a .edu email address). You can learn more about how to obtain one at the ESRI site (http://www.esri.com/software/arcgis/arcgis-for-student-use). Licenses usually offer access for one year, and include most of the software's bells and whistles. This may be a viable option, especially if you are working with student researchers on your STEW-MAP team.

SECTION C: Work On Data From an Ongoing Survey (and Integrate New Data With Completed Data)

If you are anticipating that the responses to your STEW-MAP survey will be coming back to you on a reasonably consistent basis over an extended period of time, it may make sense to work with the responses periodically in batches (once every other week, e.g.) instead of waiting until your survey period is closed. An important part of choosing this method is understanding how to incorporate each of these batch updates consistently into your overall dataset. This guide will also talk about how to set up QA/QC procedures once your survey is closed, to ensure that all respondents have been added to the Turf shapefiles.

One of the ways to do this is with Excel's VLOOKUP function (https://support.office.com/en-us/article/vlookup-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1), which offers a way to track

your work as you download new survey responses, add them to your existing set of responses, and draw new Turfs for them. If you have someone on your STEW-MAP team who really knows how to make Excel (or Access) sing, this might be a very straightforward option.

SECTION D: Download Organization's Drawn Turfs from Their Survey Response

(To Be Completed)

SECTION E: Check Organization's Drawn Turfs for Accuracy

(To Be Completed)

Acknowledgments

Thanks to Stephanie Freeman for authoring a draft guide to mapping NYC STEW-MAP turfs, which inspired this universal guide.

STEW-MAP Network Cleaning Steps
Michelle Johnson, updated July 2020

This guide will show you how to clean the network data you have gathered for the STEW-MAP project. To start, we provide a glossary of network terms referred to in the guide.

Glossary of Network Terms:
Sender: Organization that names another organization as a collaborator.
Receiver (or Alter): Organization named by sender as a collaborator. Alter is another term used to mean receiver.
Edge: A tie between 2 entities. In STEW-MAP, this is a collaborative tie between two organizations.
Edgelist: A spreadsheet of edges between senders and receivers.
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 included survey results for groups that took the survey.
Master List: A spreadsheet of all groups across all networks, typically created by expanding off of the initial sampling frame of groups the survey was sent to.

Overview of Network Cleaning Steps:
The final product of your analysis will be a table called an edgelist, which will list all of the individual connections between the "nodes" in your network (in this case, organizations). In the completed edgelist each row will contain a link between a **sender** (the group that took the survey, or respondent) and a **receiver** (the group named in the survey, also sometimes referred to as an alter). At its most basic, an edgelist will be comprised of 2 columns:
1) unique ID number for sender and 2) unique ID number of receiver / alter.

Including 2 additional columns for 3) sender organization name and 4) receiver organization name can also be useful as reference, especially during the cleaning process.

This *edgelist* can then be linked with a *nodelist*. A node list is a list of all entities within a network, which can also contain other attributes about a group, like organization names and other responses from the STEW-MAP survey.

Additionally, this process will create a *master list*, which is a list of all entities across all networks for a location, not just a single network. For example, in STEW-MAP surveys, there is often a general *collaborate* network, but also *resources* and *knowledge* networks, based on the three types of network questions in the STEW-MAP survey.

Tables 1-3 demonstrate examples for edgelists, nodelists, and master lists:

Table 1. Example Master list for an example location

UniqueID	GroupName	Website	Notes	Network_Collaborate	Network_Knowledge	Network_Resources
121	Generic Community Garden			1	1	0
454	Generic2 Community Garden			1	0	0
101	Neighborhood 1 Street Tree Group			1	1	1

Table 2. Example Edgelist columns for an example network

UniqueID_Sender	GroupName_Sender	UniqueID_Receiver	GroupName_Receiver	GroupName_Receiver_Std	Website	Notes
121	Generic Community Garden	454	Generic2 Comm. Gdn	Generic2 Community Garden		
121	Generic Community Garden	101	Street Tree Group – Neighborhood 1	Neighborhood 1 Street Tree Group		
454	Generic2 Comm. Gdn	101	N1 St Tree Grp	Neighborhood 1 Street Tree Group		

Table 3. Example Nodelist for example network

UniqueID	GroupName	ContactPerson	ZipCode	PrimarySiteType	PublicMap
101	Neighborhood 1 Street Tree Group	Jane Smith	10001	Street Tree	1
121	Generic Community Garden	Jane Doe	11359	Community Garden	1
454	Generic2 Community Garden	John Smith	10001	Community Garden	1

Below we summarize each of the steps you will take to produce these final products.

Step 1: Adding each receiver group to an individual row in a new spreadsheet.

Depending upon your survey software, your survey responses should be in a spreadsheet, and they may provide responses as one row per responding group (sender group) (see Table 4a) or multiple rows per sender group (Table 4b). Other data structures may also apply.

Table 4a. Examples of unformatted survey responses for network questions (separate columns for each network question, responses separated by commas)

UniqueID_Sender	GroupName_Sender	Collaborate	Knowledge	Resources
121	Generic Community Garden	Generic2 Comm. Gdn, Street Tree Group – Neighborhood 1, 2nd Park Group	2nd Park Group	Generic2 Comm. Gdn
101	N1 St Tree Grp	Generic Community Garden		Citywide Street Tree Group
454	Generic2 Comm. Gdn	N1 St Tree Grp	N1 St Tree Grp	

Table 4b. Examples of unformatted survey responses for network questions (each named group on a separate row, network type formatted by checkboxes)

UniqueID_Sender	GroupName_Sender	PartnerGroup	Collaborate	Knowledge	Resources
121	Generic Community Garden	Generic2 Comm. Gdn	x		x
121	Generic Community Garden	Street Tree Group – Neighborhood 1	x		
121	Generic Community Garden	2nd Park Group	x	x	

To manually code network data, you will want to be able to create edgelists for each network question. You may want to have the network data setup as one spreadsheet tab per network question (e.g., collaborate, resources, knowledge) or bundle the responses for all network questions, making sure to have a column(s) that indicates to which network(s) the individual row applies.

Often, a respondent, or sender, group will name multiple receiver groups. To get to an edgelist that has multiple rows (or collaboration links) per sender group, you will need to format the data. How you complete this step will depend on how the survey responses are formatted in your survey.

If all named groups (e.g., receivers) are present in a single row/cell of data (Table 4a), they will need to be split onto multiple rows:

- For each respondent (or sender), copy the unique ID and group name into 2 columns of a new spreadsheet (e.g., Sender Unique ID and Sender Name).
- For each individual group named by that respondent, add to a third column (e.g., Receiver Name).
- After group names are standardized, a unique ID column will be populated for the receivers (e.g., Receiver Unique ID).
- While doing this process, be sure to track which survey responses have been formatted and which have not.

If all named groups (receiver) are present on separate rows of data in the survey responses (e.g., one respondent has 10 rows of named groups), format the data so you have 4 columns (Table 4b):
- unique ID for sender,
- group name of sender,
- unique ID of receiver (this will be populated after group names are standardized in step 2), and
- group name of receiver.

Ideally, you will clean network data after the survey is completely closed, but with some modifications, you can conduct this cleaning process in an iterative fashion, being careful with version control.

Step 2: a) Standardize group names and b) assign UniqueID (where needed)

Group names identified by responding groups may differ in spelling or abbreviation. A single standardized version is needed for each group name in the network.

Some general suggestions for standardizing names include the following:
- Delete leading or trailing white spaces
- Remove double white spaces
- Change all names to either Title Case, lower case, or UPPER CASE for consistency
- Scan for special characters
- Scan for Arabic numerals that might match to text (ie 6th could match to "sixth")

You may likely need several passes through the data to fully standardize names.

You can start with your initial sampling frame to make a master list of all groups:

Create a list of existing standardized group names and Unique IDs 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 used to distribute your survey). This will be a master list – and may include more group names than you have in a single network (Table 1).

In the edgelist that you started in Step 1, add a column titled "GroupName_Receiver_Std" (Table 1) next to the group name of the receiver provided in the survey, Use the standardized names you already have in your master list to populate this column. It can be manual or through some sort of formula, filtering, or sorting. For any groups not already on the master list, add them to the master list and create a standardized name and UniqueID.

To confirm the group's correct name and existence, you can use Internet searches and if a group has a website and/or social media accounts, add those in an additional column (e.g., a Website column).

For entries you can't confirm are groups through websearches or other research, add a Notes column and document categories of potential issues (e.g., Individual, Can't Locate Group, Not Enough Information). We define groups as two or more people; if just a single person is named, that receiver would be excluded from the network list. Additionally, there may not be enough information from the response to clearly identify a group. Registered non-profits will be searchable at the IRS and non-profit databases; informal community groups After passing through the edgelist multiple times, you may want to exclude these rows from the final dataset.

Step 3: Add new unique IDs where needed

For groups named in the network (alters) *that are not already part of the initial sampling frame*, assign unique ID numbers to all remaining groups, in both the edgelist and the master list.

Step 4: Compile nodelist for a specific network

From a particular edgelist (e.g., collaboration, knowledge, resources), filter the dataset so you only have unique groups.

In EXCEL, you can stack the sender and receiver columns together and then run the advanced filter in EXCEL, with the unique entries box checked.

In R, you could apply one of the following code snippet to create a nodelist:
- unique(dat$UniqueID_Sender)
- nodelist <- unique(dat$UniqueID_Sender)
- write.cvs(data.frame(unique(dat$UniqueID_Sender)), MyCityYEAR_nodelist.csv, sep=','), etc.
- distinct() would also work well in this application

This is your nodelist and additional data from the survey or elsewhere can be joined to each group here. For example, you may want to identify the sector of each group (e.g., civic, government).

A nodelist is different from a master list, as it is only for a single network, like collaborate or resources. The master list is used to ensure each group has a unique ID number, and its presence across networks is known.

Resources:

Gephi software (freeware) has some good tutorials on edge and nodelists and how to import them into Gephi: https://gephi.org/users/supported-graph-formats/spreadsheet/

Kumu software is also used for network visualization: https://kumu.io/

Other analytical software options include packages in R. Here are some overviews of social network analysis in R:

https://www.jessesadler.com/post/network-analysis-with-r/

https://statnet.org/trac/raw-attachment/wiki/Resources/introToSNAinR_sunbelt_2012_tutorial.pdf

http://doogan.us/netdata.html