

Boxborough Water Dashboard Data Instructions

Boxborough and the Metropolitan Area Planning Council collaborated to create an online Water Resources Dashboard and public-facing Boxborough Water Story to support municipal water management decisions. This document describes the process for updating a key dataset featured in both online products.

The dataset is the locations of water quality test results at public water supplies within Boxborough. Water quality test results at public water supplies in Massachusetts are publicly available as Microsoft Excel file exports from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA/EEA). Spatial data on public water supplies' locations are available from the Massachusetts Bureau of Geographic Information (MassGIS). Web links to pages with downloads of both datasets are given below:

Public Water Supplies:

<https://docs.digital.mass.gov/dataset/massgis-data-public-water-supplies>

Water quality:

<https://eeaaonline.eea.state.ma.us/Portal/#!/search/drinking-water/results?Town=BOXBOROUGH>

What the tool does

- Create an updated version of the public water supply water quality test result spatial dataset mapped on Boxborough's Water Resources Dashboard and Boxborough Water Story.
- The tool works by adding spatial information to publicly available water quality test results. The result is a shapefile with one point for each compound and date tested at the public water supply locations.
- The tool will create a zipped version of the updated water quality test point shapefile. The zipped shapefile can be used to update an existing ArcOnline hosted feature layer.

Requirements

- ArcGIS for Desktop 10.7 (function not tested on other versions) basic license

Setup Requirements

Software

The Boxborough Water Story data update tool was developed using ArcGIS 10.7.1. The Python Script tools require no special licenses or extensions beyond an ArcGIS 10.7.1 and onward basic license. The tools run on ArcGIS internal 32-bit Python 2.7.

Tool Setup Instructions

To create the toolbox, open an ArcMap document that you plan to use as your workspace. Ensure the catalog window is shown on the ArcMap window. In the Catalog tree, right-click on the folder in which you plan to work. Right-click on the folder name, navigate down to "New" in the pop-up, and select "Toolbox" from the second pop-up drop-down menu. The "Toolbox" option will have a red icon on its left.

A new toolbox will appear in the folder with an editable name "Toolbox.tbx." To help the analyst remember what is in the toolbox, we recommend renaming the toolbox to "UpdateData.tbx."

The next series of instructions indicate how to set up the script tool that will update your data, which we will call "Spatialize WQ."

To set up the SpatializeWQ tool, right-click on the toolbox name ("UpdateData.tbx") and select "Add" → "Script" from the menu that appears. In the pop-up window that appears, type "SpatializeWQ" in the "Name" box and "Spatialize Data" in the "Label" box. Click "Next" at the bottom of the window.

In the "Script File" box, navigate to the location where the "spatializewq.py" script is saved. Click on it, then click "Open." Click "Next" at the bottom of the window.

The next pane allows the user to configure the inputs and input data types to the tool. Set up the "Display Name" and "Data Type" columns as follows:

Display Name	Data Type
Workspace File Geodatabase	Workspace
Water Quality Excel File	File
Thresholds Excel File	File
Public Water Supplies Feature Class	Feature Class
Output folder	Folder

When the table is set up as shown above, click "Finish" at the bottom of the window, which will vanish. A script tool labeled "Spatialize WQ" will appear under "BMP_suitability.tbx." The tool is now ready to use.

Running the Spatialize WQ Tool

Data Preparation

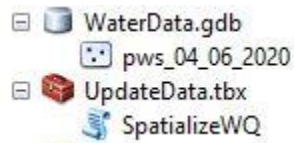
Prior to running either tool, assemble all data required to run the tools in a file geodatabase. The Spatialize WQ tools three components: A file geodatabase, a table of water quality test results, and a point feature class of public water supply locations formatted identically to the MassGIS public water supply schema.

1. Create a file geodatabase to use as the workspace if one does not already exist from installing the tool or from previous updates. We recommend creating the the file geodatabase in a folder dedicated to the Boxborough water project and giving the file geodatabase a descriptive name, for example, "Boxborough_pws_wq.gdb." This will become the first input parameter to the Spatialize WQ tool.
2. Download the latest water quality test results at public water supplies in Boxborough from <https://docs.digital.mass.gov/dataset/massgis-data-public-water-supplies>. The default format is Microsoft Excel. The file should contain one sheet named "Results." This will become the second input to the Spatialize WQ tool.
3. Check the location of the Thresholds excel file. This file was provided by MAPC along with the toolbox program and setup instructions. It is titled "Water_quality_thresholds.xlsx."
4. If it has been updated since you last ran the tool, download the latest public water supply shapefile from MassGIS at <https://docs.digital.mass.gov/dataset/massgis-data-public-water-supplies>. Save and unzip the shapefile in the project folder or a subfolder thereof. Import the

shapefile to the file geodatabase created in step 1 with a descriptive name, perhaps “pws_[date of download].” This will become the third input to the Spatialize WQ tool.

5. Determine a folder in which the resulting shapefile will be stored. If you have run the tool before, this should be the same folder in which you would usually save the shapefile; perhaps the folder that contains the Workspace File Geodatabase.

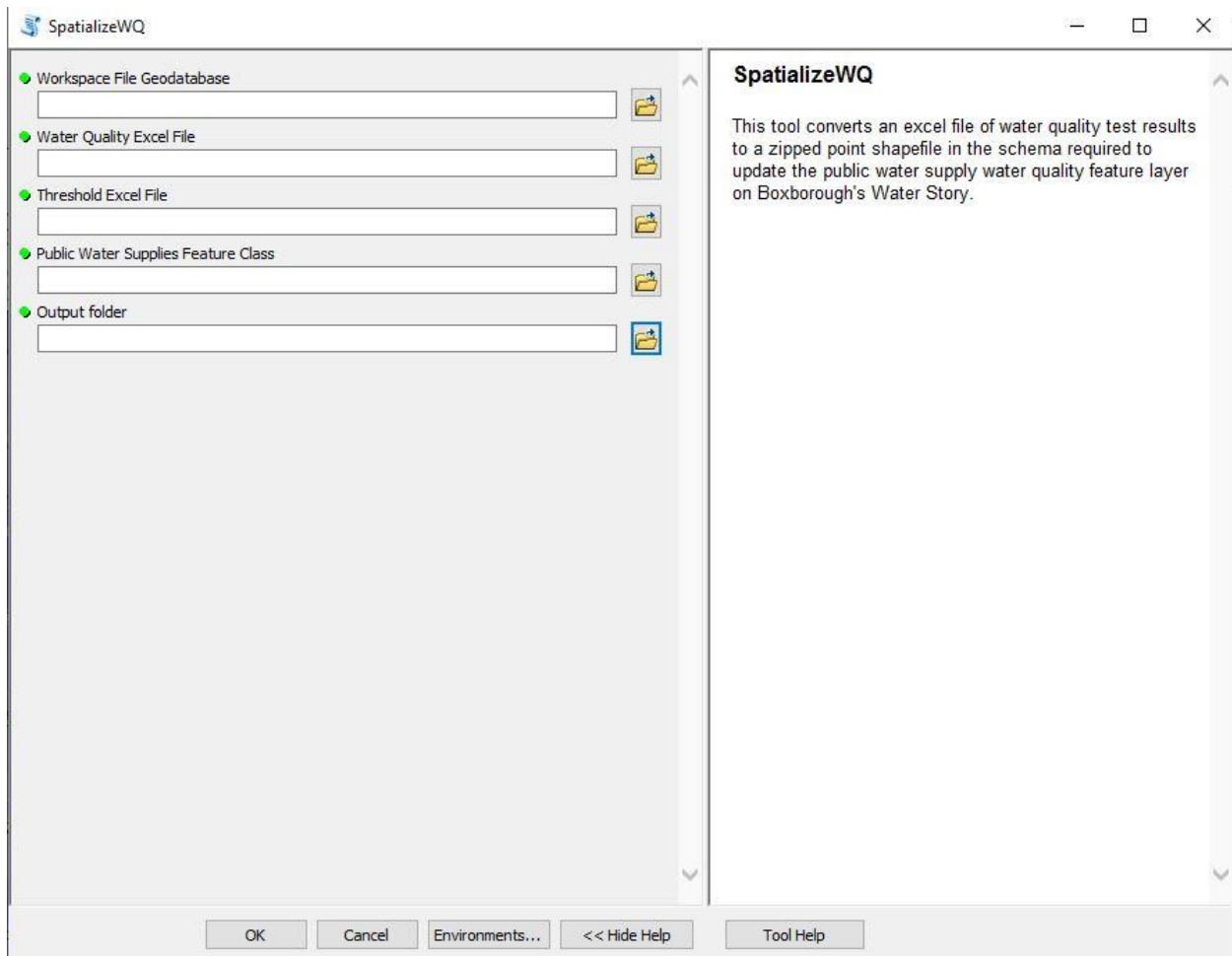
You should now be ready to run the tool. The file geodatabase and toolbox, expanded in your ArcCatalog window, should resemble the following:



The ArcCatalog window should also contain the folder in which the resulting shapefile and zipped shapefile should be stored (perhaps one level up from the file geodatabase). If you have run the tool before, products of previous runs may also exist in the file geodatabase. We will explain how to manage these products later.

Running the Tool

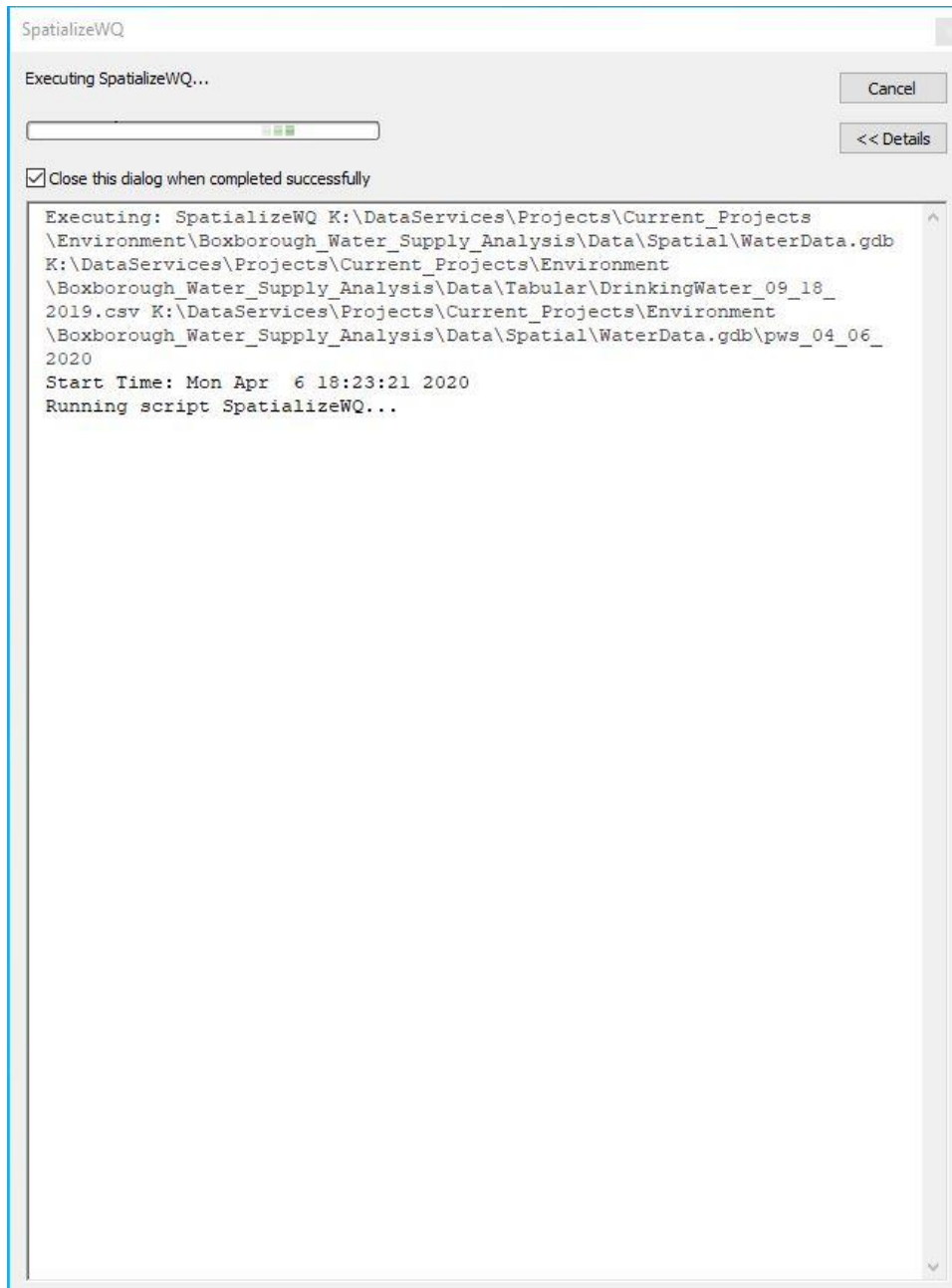
To run the Spatialize WQ tool, double click on “SpatializeWQ” under “UpdateData.tbx” in the catalog tree. A window resembling the following should open:



Use the yellow “folder” button next to each box to navigate to the inputs described in the Data Preparation section.

The tool is set up to overwrite existing features with the same name that are created in each file geodatabase or folder, so ensure that dated backups exist if desired. The water quality results feature class created in the file geodatabase will be named with a date extension, so past versions will not be overwritten unless the tool is run multiple times the same day.

When all inputs are loaded in the five sub- windows, click “OK.” The tool will begin to run. A window resembling the following will open:



When the tool completes the process, the moving green bars at the top of the tool will stop moving and the text in the box will notify you that the process is complete. At this point, close the window.

Navigate to the workspace file geodatabase you used to run the tool. Right-click on the file geodatabase in the catalog tree and scroll to “Refresh.” Click on “Refresh.”

When the contents of the file geodatabase have refreshed, you should see several new items in the file geodatabase. One of these will be labeled “wqtests_YYYY_MM_DD”, in which “YYYY” will be replaced with the current year, “MM” with the current month, and “DD” with the current date.

The file geodatabase will also contain a feature class labeled simply “wqtests.” This is a copy of the most recently dated “wqtests_YYYY_MM_DD” feature class. It is overwritten each time you run the tool with the latest water quality results.

Outside the file geodatabase in the file folder specified in the tool inputs, a shapefile labeled “wqtests.shp” will appear with accessory files. A zipped copy of the shapefile, “wqtests.shp.zip”, will also appear (or, if the tool has been run with this folder as an input before, be refreshed with the latest water quality data). You will use the zipped shapefile to update the “wqtests_shp” hosted feature layer in the ArcGIS Online Boxborough Water Story group content.

Troubleshooting script tool

Error in getting parameter as text: This error indicates one of the following:

- The troublesome parameter is missing: For example, during toolbox setup, the analyst missed one or more of the parameters in the above table. Now the internal mechanics of the tool are looking for the third parameter, but only two parameters are set up. This might also occur if the optional parameters are not listed as “optional” in the toolbox setup.
 - Fix: Review the parameter properties. Ensure that the tool is set up to take all three parameters and that the parameters are listed in the correct order. Ensure that parameters are designated as “required” or “optional” correctly.
- The troublesome parameter is the wrong data type: This could occur if the analyst setting up the toolbox accidentally selected the wrong data type. Alternatively, it could occur if the analyst has formatted the input data as a similar but incorrect data type- for example, entering a shapefile as a parameter that must be a feature class.