Southwest Florida Water Management District

Mapping & Geographic Information System
(MGIS)

Standard Operating Procedures
2016

Table of Contents

Creator: T. Mulroney
L. Vershowske Date 07/02/13
Revision # Original
Date of last review: 6/9/2016

ArcGIS Online for Organizations Map and Service Process

Purpose

This document defines the use of the District's ArcGIS Online for Organizations (AGO) for creating mapping applications and/or mapping services. It is intended for those users who have an AGO account with the District. It describes guidelines for content and development procedures of mapping applications.

AGO Administrators

The Mapping and Geographic Information Section (MGIS) manager will designate three staff to serve as the District's AGO Administrators

User Profiles and Accounts

The AGO Administrators will be responsible for managing all AGO accounts. Request for an account will be submitted to the MGIS manager and/or by the supervisor of the new account. It should require the following minimum information for the requesting account:

1. Name
2. Section
3. Bureau
4. Extension
5. Business Purpose
   a. How the requested account will be used
   b. What is the benefit to the District
6. Duration of Account
   a. Specified duration (typically when associated with a project)
   b. Permanent (Note that the MGIS Manager reserves the right to cancel an account if an employee's job function and/or position change no longer requires an account)

Upon approval by the MGIS manager, the AGO Administrators will notify the user via email that their account has been approved and provide them with the appropriate setup and login instructions.

The AGO Administrators will conduct a semi-annual audit of all accounts to determine if they are still being used in a manner that is beneficial to the District. Whenever those in the list have changed position or have left the District, Human Resources will email the AGO Administrators so the account can be modified as needed.

Once logged into AGO, users should update their profile to include the following minimum items in the description:

1. Title
2. Section and Bureau
3. Contact Information

4. The District's Staff Search photo (Currents) will be used as thumbnail image

Groups

The following are groups in the AGO. These groups contain services, maps, and applications that will be used to create mapping applications. Groups are created per project, but other groups may be created for other purposes, such as public services.

The following are the core groups, which can contain maps, services, and applications. Project specific, user group specific, or content specific groups will be created and removed as needed.

1. Development Applications
   This group contains applications that are not yet made public or widely available to District staff. This is a temporary holding group for applications. Testing is done to the applications in this group. The AGO Review Committee will review the applications in this group prior to promoting to the public or internal gallery groups. When an application is ready for testing, the application should be shared to this group. The status is Organization.
2. Featured Content
   Group containing items to be displayed on the GIS map and data portal homepage. This group is owned by the SWFWMD_Publisher account. The status is Public.
3. Open Data – Hydrography
   Group created for the Open Data application. It contains services for hydrography type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
4. Open Data – Boundaries
   Group created for the Open Data application. It contains services for boundary type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
5. Open Data – Demographics
   Group created for the Open Data application. It contains services for demographic type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
6. Opn Data – Elevation
   Group created for the Open Data application. It contains services for elevation type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
7. Open Data – Environmental
   Group created for the Open Data application. It contains services for environmental type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
8. Open Data – Land Resources
   Group created for the Open Data application. It contains services for land resources type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
9. Open Data – Land Use Land Cover
   Group created for the Open Data application. It contains services for land use and land cover type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).
10. Open Data – Permits

11.
    Group created for the Open Data application. It contains services for permitting and/or regulatory type data in the SWFWMD. This group is owned by the SWFWMD_Publisher account. The status is Public (open data).

12. SWFWMD Applications
    This group contains applications viewable by the general public. Only AGO administrators can grant public privileges to this group. Applications in this group will be available in the public gallery, found in the SWFWMD Holding Group. The status is Public.
13. SWFWMD Basemaps
    This group contains basemaps utilized by the District. These are Esri basemaps that are registered with the District's AGO. The status is Organization.
14. SWFWMD Permits
    Group containing maps related to Regulation and Permitting. This group powers the Access Map Gallery link in the ePermitting page. The status is Public.
15. SWFWMD Services
    Contains all registered services that should be used to create any public mapping applications. The status is Public. See Cartographic Standards for more information.

AGO Review Process

The AGO Administrators will perform regular audits on the applications and maps created. Any out of date or unused applications and/or maps will be removed after informing the proper staff, i.e. product owner.

Cartographic Standards

Services will be available to AGO account users. The services will contain consistent symbology, attributes, aliases for attributes, and scale dependencies. The following can be adjusted in the map:

1. Pop-ups
    a. Skinny pop-ups (as few attributes as possible or only show what is necessary)
    b. Aliases – these can be changed if more user-friendly terms are needed.
2. Transparency
3. Show in legend/Hide in legend

If a layer is needed that is not in an existing service, a layer file should be created and given to the AGO Administrators. The layer file should have the feature class in SDE, with proper user connection or SDE file used, cartography similar to existing layers, scale dependency set for feature type (point, line, and poly), attributes and aliases.

The existing layers in the services are in WGS 1984 Web Mercator (Auxiliary Sphere) or the District's standard State Plane Feet NAD83 HARN Florida West. New feature classes will also be added with either projection.

Metadata

AGO Users will be required to create metadata for any maps and applications that are created and will be shared to the public gallery or internal gallery(ies). The following are required elements of each service/map/application registered in AGO.

1. Title
    Provide a good concise title for the mapping application.
2. Summary

3.
   Provide a short sentence or two describing the function of the application.

4. Tags
   Tags will be used to find the application. Better tags mean more use of the application.
   a. SWFWMD
   b. Basic (Primary) functionality of the application
   c. Carry over primary layer's service group tags, for example:
      i. Permitted WUPs would have (WUP, Water Use, Permits)
      ii. Self Cert Permits would have (ERP, Permits)
5. Descriptions
   A more complete description of the use or function of the map compared to the summary. Use the Abstract or Purpose from Metadata of the primary layer whenever possible.
6. Access and Use Constraints
   The data are being provided on an 'as is' basis. The District specifically disclaims any warranty, expressed or implied, including, but not limited to, the implied warranties or merchantability and fitness for a particular use. The entire risk as to quality and performance is with the user. In no event will the District or its staff be liable for any direct, indirect, incidental, special, consequential, or other damages, including loss of profit, arising out of the use of these data even if the District has been advised of the possibility of such damages. All data are intended for resource management use and have not been collected or certified by a Florida-registered Surveyor and Mapper.

Application Development Procedures
The following must be followed if AGO account users want a mapping application and/or map service to be promoted to the public gallery.

AGO Workorder
1. The District's Footprint (FP) Ticket application allow users to request accounts, maps, and applications.
2. AGO Administrators will review incoming Footprint tickets.
3. The AGO Admins may assign the FP tickets to other staff as needed.
4. The development process can be separated into five types: create or modify an existing user, create a new web map, create a new application, modify an existing web map, or modify an existing application.

Periodic review of existing applications for relevance and/or usage will be done. Notification of the new applications will be given to the District so those staff can filter the data to the proper external users. Information about new applications may also be displayed in the public gallery page.

Create or modify an existing user
The AGO Administrators will create or modify an existing account upon request. If a new account, the request should include the role needed for the account, such as publisher or user. A user in AGO can create maps, add items, share content, and create groups. A publisher role can do what a user can plus publish their features and maps as hosted web layers. Only the Administrators can share content as Public. The account can also have the ArcGIS Pro Advanced license. This is managed in AGO by the Administrators. Once

the account has been set up, the AGO Administrators will notify the user via email and provide them with the appropriate setup and login instructions. Once logged into their account, staff should update their profile as stated in the Administration section of this document.

Create a new web map

The request for a new web map is when staff will use the map only in AGO and not for creating an application. If the final product is an application, then 'New Viewer' should be chosen. The purpose of the web map should be disclosed, along with data needs. It should also state weather the MGIS staff or the product owner will create the map. When a data layer is required that is not already a registered map service, the user should create a layer file or work with the AGO Administrators to create a layer file, with the SDE data using the 'mapview' SDE account. Set scale dependencies, aliases for attributes, and any definition queries or labels. The layer file should be given to the AGO Administrators. They will create a service and register it with AGO. Once the services are available, the web map can be created. Items such as pop-ups, transparency, which basemap to default display, and if legend of service should be displayed will be configured. The web map is then shared to the organization. Testing of the web map while shared at the organization level should be done by the user/product owner. Once testing is complete, the user/product owner emails the AGO Administrators and requests to make it publicly available. One of the AGO Administrators will share the map to the public.

Create a new application

The type of mapping application and purpose for the application must be given to best determine the workflow for creating, testing, and promoting the new application. Mapping applications may be in the form of Operations Dashboards, AGO Web Map Applications, and/or Story Maps. If possible the requestor/customer will create a web map in AGO to be used in the application. The requestor will also provide any data needed for the application not already stored in the enterprise SDE database. The AGO application developer will then use this web map in the application. Configuring the application may include the following: Title text and checking on or off of menu items such as editor, time slider, layer list, and share. The AGO application developer will work with the customer to determine the configuration needs for the application. The web mapping application should be tested by the customer. Once testing is complete, the customer emails the AGO application developer and requests to move the application to the public gallery. One of the AGO Administrators will promote the application to the public gallery.

Modify an existing web map

Modifying an existing web map may be either an easy on the spot change or more complex, make a copy workflow. If only symbology, pop-ups, filtering existing data, changing transparency, and other simple map changes are needed then it can be done on the spot and then 'Save' again. If more complex changes, such as added layers or schema changes to existing data are required, then a 'make a copy' workflow should be followed. The data changes needed must be provided to the AGO application developer. Once completed with the changes, the map will be saved with 'Save As' a copy. This copy will be reviewed by the customer to determine if all changes were made appropriately. Once approved by the customer, the map can then be saved again using the original name for the map. The map will then be shared again to the Public or the organization that it was originally shared with.

Modify an existing application

Modifying an existing application may have several workflows depending on what in the

application is changing. If just the information in a web map portion of the application is being modified, review the ‘Modifying an existing web map’ portion of this document. If the application itself if being modified, such as new tools added, then a copy of the application will need to be made. The AGO application developer will work with the customer to modify the application as needed. Once the application has been tested by the customer, the AGO application developer will ask the AGO Administrators to promote the application to the public gallery. The link to the application has now been modified and must be given to the Web Master if the application is embedded or linked in other web pages other than the gallery.

Creator: T. Mulroney
Date 06/11/13
Revision # 4
Date of last review: 4/19/2016

ArcServer Map Service Standards

Purpose

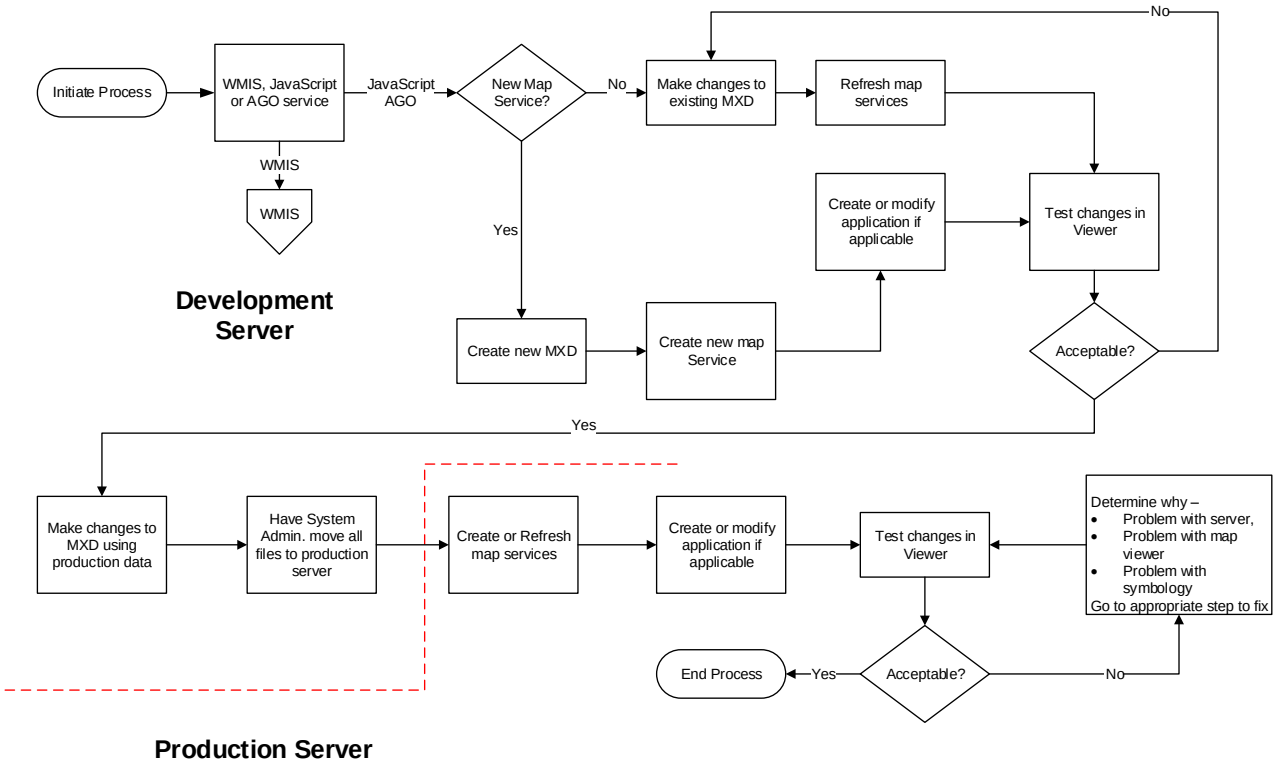
This document defines the District's procedures and guidelines in modifying or creating new map services. These procedures and guidelines are to be followed for both external use and internal use.

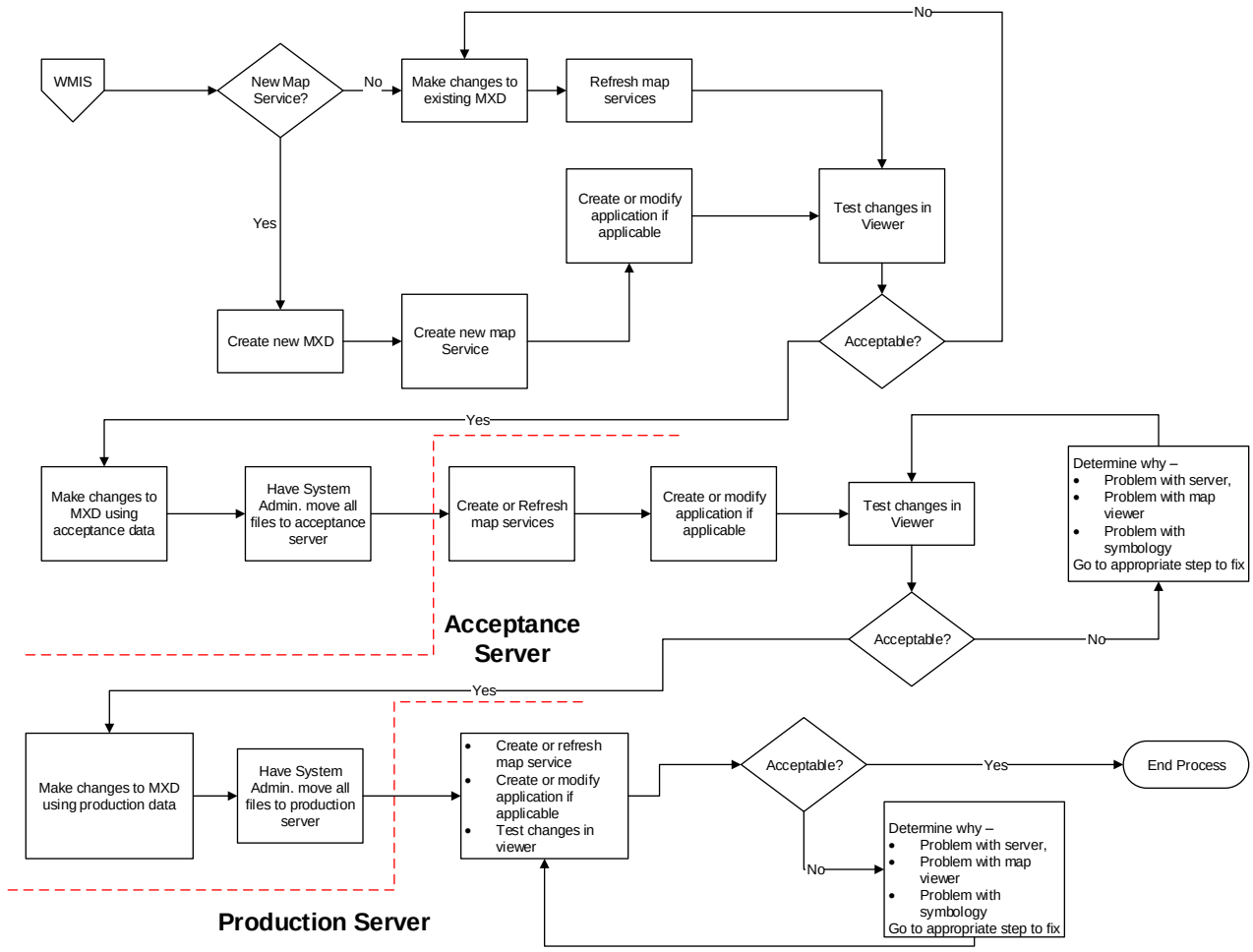
Scope

The District's mapping applications uses Esri's ArcServer map services either with JavaScript or ArcGIS Online for Organization applications. The mapping application will govern the promotion process from development to production. Communication and cooperation between ITB Application Systems and the ITB System Administrator is required for the promotion process.

Procedures

Refer to the following diagram for the procedure to promote ArcServer Map Services to Production.





Guidelines

Servers

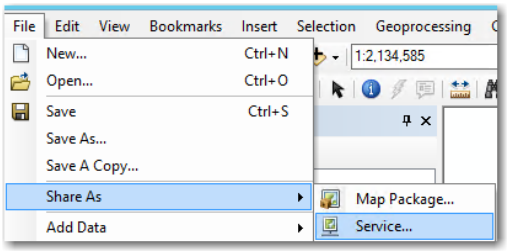
Access to the ArcServer servers are through the 'Remote Desktop' application. A technician account is given to authorized staff on the development servers only. The AD account is used for reading files only on the acceptance and production servers.

MXD Files

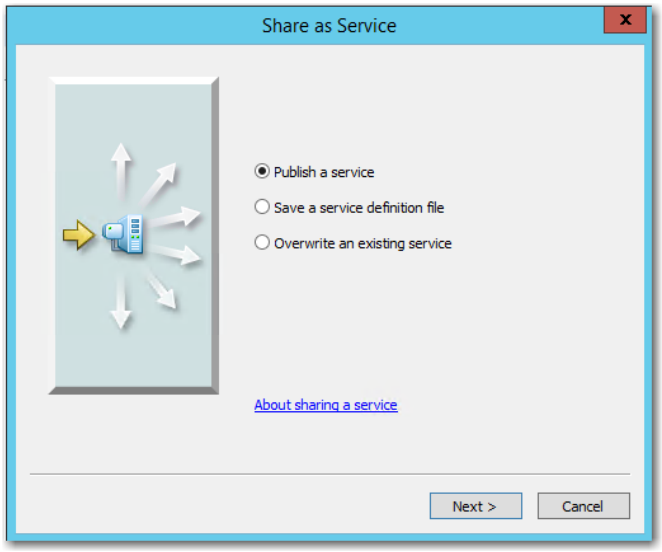
The MXD files are ArcMap project files. These contain symbology, query definitions, labels, scale dependency, and other layer properties. The MXD is created pointing to the correct GIS database depending on the application. For ArcGIS Online for Organizations applications, all services and thus MXDs may point to production data. Other applications will point to data in the corresponding database as the application, i.e. an acceptance application uses acceptance database.

ArcMap and the MXD files are now used to create the services. Services cannot be created by any other application.

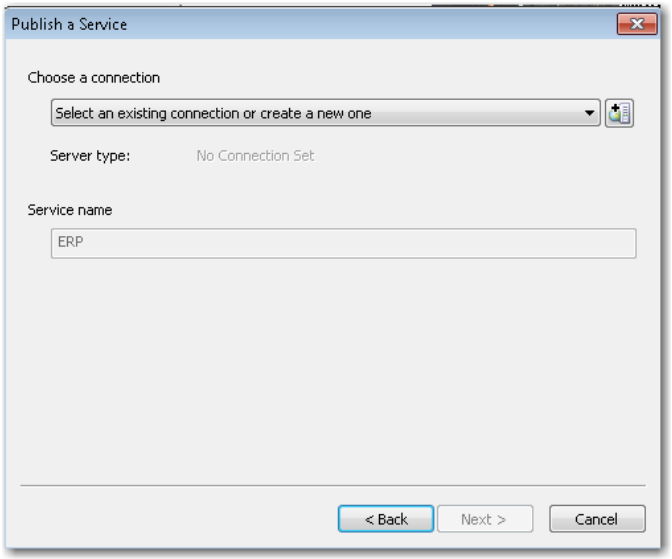
With the MXD open in ArcMap, go to File, Share As, Service.



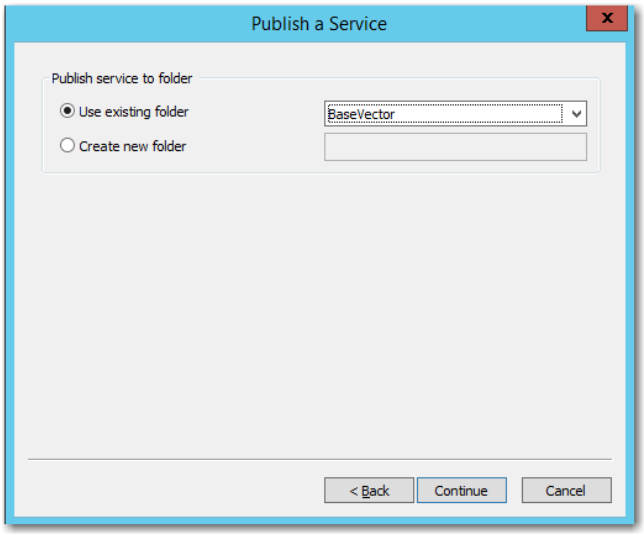
For new services, choose ‘Publish a service’. If updating symbology on an existing service, choose ‘Overwrite an existing service’.



Choose the connection and Service name for the service.



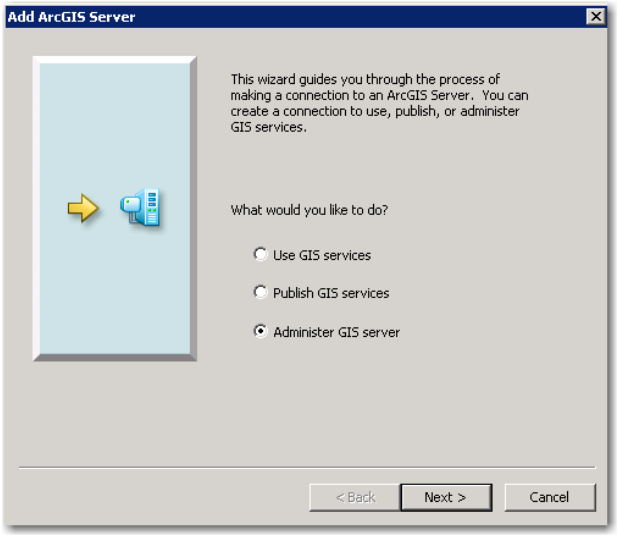
Put the service either in an existing folder or create a new one.



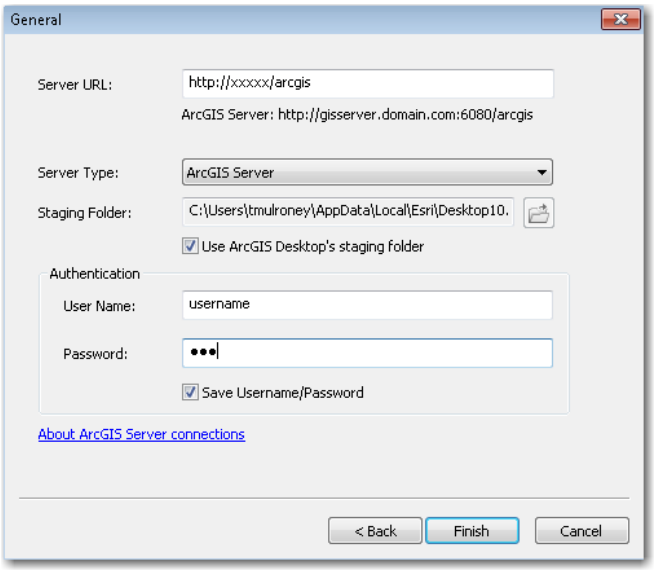
Go to the Service Properties section for information on each tab.

Map Services
ArcServer map services can be managed either using ArcCatalog or ArcServer Manager. ArcCatalog is the preferred application to manage map services for ArcServer administrators, while system administrators will use ArcServer Manager on the server. The ArcServer Service is stopped every night at 10 PM and then restarted at 5:40 AM. The map services are stopped and started using python scripts.

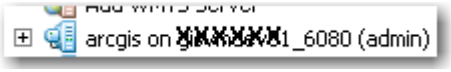
ArcCatalog
Administrator connections can be made using a local install of ArcCatalog.
If new connections are needed, go to GIS Servers, Add ArcGIS Server, and then Administer GIS Services.



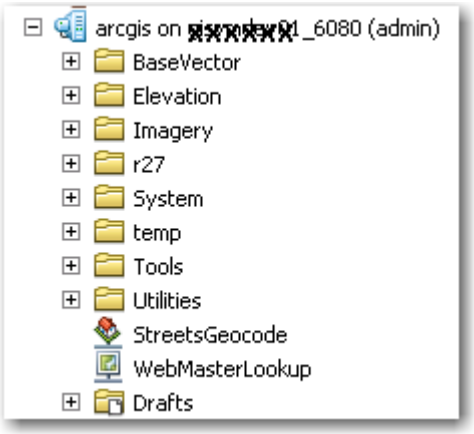
Type in the Server URL, 'http://<server name>/arcgis/services', and then the server name in the Host Name window. This creates a local connection to the server which allows you to stop and start services and create folders.



You will then see a connection under the GIS Servers.



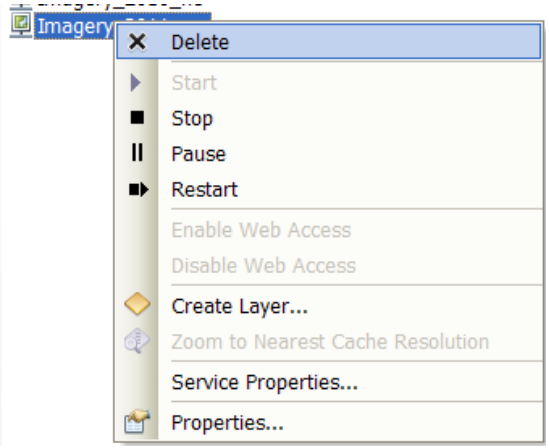
Double click the connection to open it.



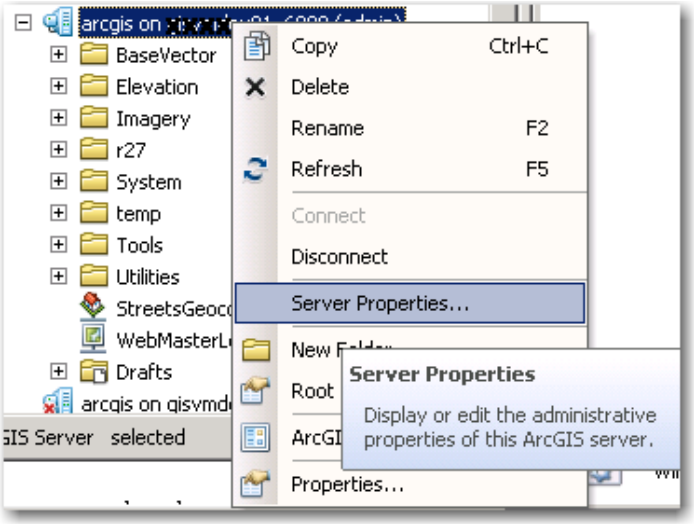
Each folder will consist of map services. The folder names correspond to the function of the service type, such as Imagery for imagery services. The Contents tab in Catalog will display the name of the service, the type of service, if started or not, and the number of instances started and if any are in use.

Name	Type	Status	Instances Running	Instances in Use
Imagery_2009_nc	Map Service	Started	0	0
Imagery_2010_nc	Map Service	Started	0	0
Imagery_2011_nc	Map Service	Started	0	0

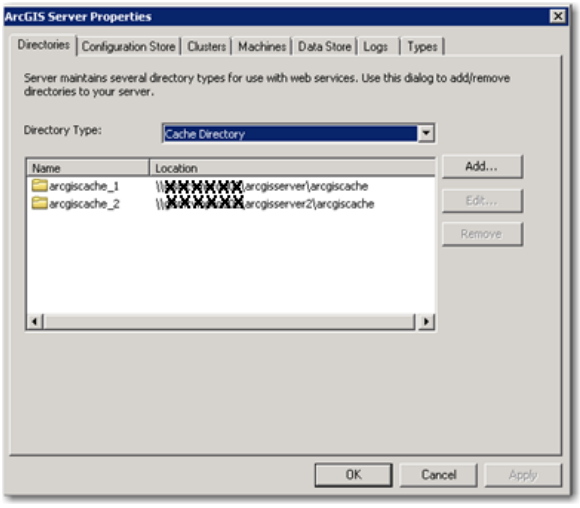
Right click on a service to stop, start, or view service properties. Go to Service Properties for more information.



For Server Directory information, right click on the server name and go to 'Server Properties'.



The ArcGIS Server Properties window will open.

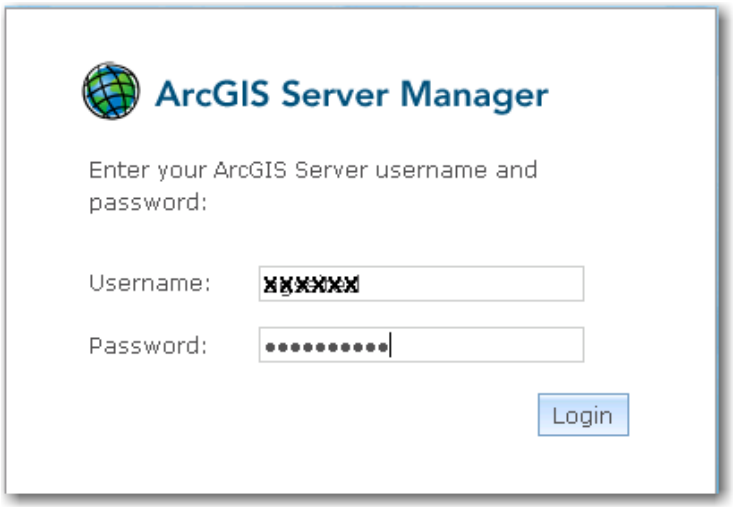


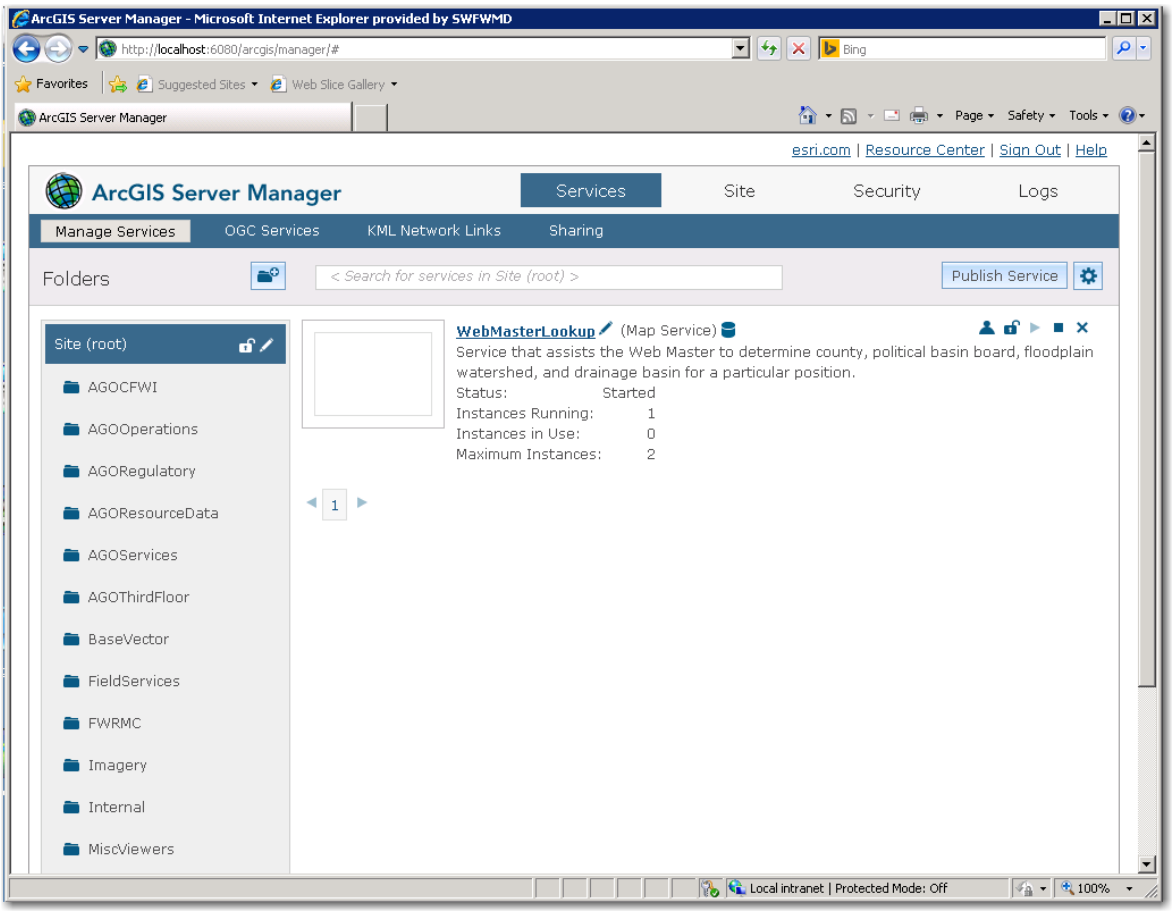
UNC virtual directories should have been set-up for cache directories. The Directories tab displays the directory location information. The Configuration Store tab displays the file path for the config store. The Clusters tab displays the clusters set up for the server. The Machines tab displays the machine name. The Data Store tab displays the registered databases and folders for use in the services. The Logs tab displays the path for the log file, how long they are kept and what level the logging is set to. The Types tab can be ignored.

ArcServer Manager

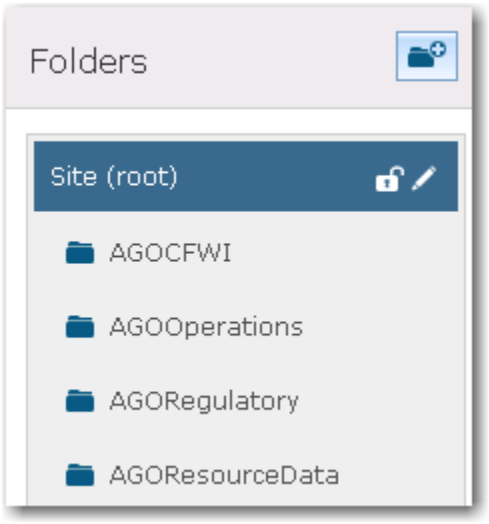
When on the server, the ArcServer Manager can be opened and used to manipulate the map services. In 'Start', go to 'ArcGIS', then 'ArcGIS 10.2.2 for Server', and then to 'Manager'.

Use the 'Administration' account to log into the manager. This account is environment dependent.

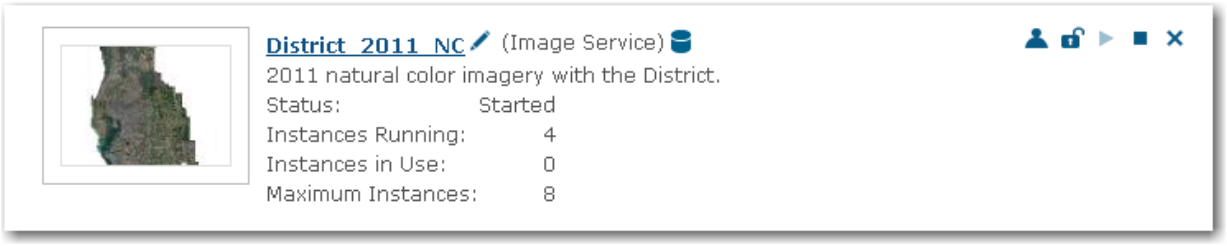




The ‘Services’ menu is selected upon opening. The Service folders are listed under the ‘Site (root)’ listing on the left.



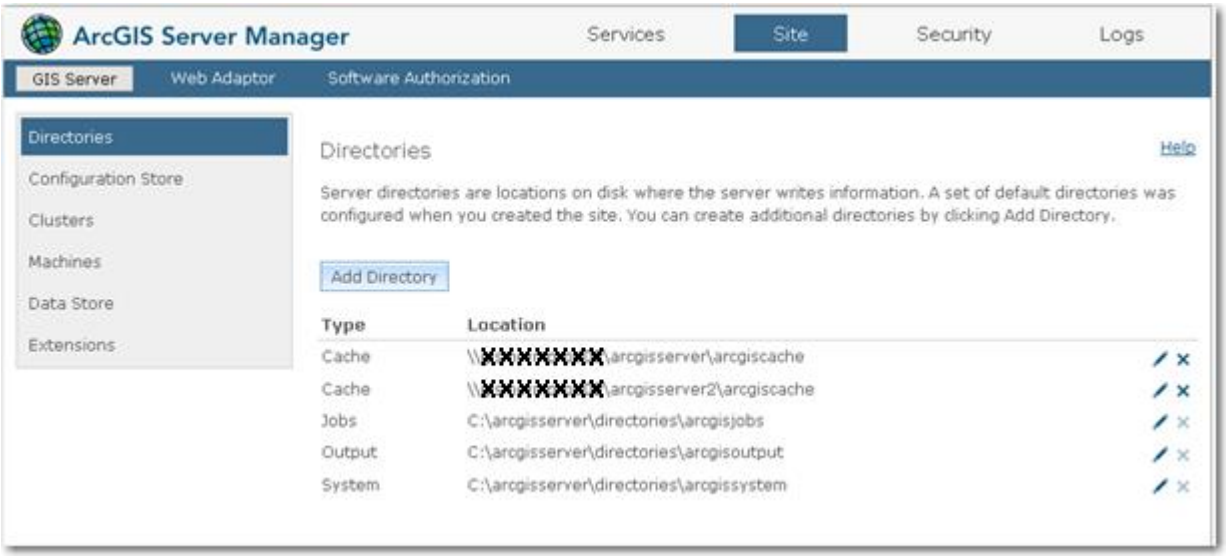
Within a particular folder, the name of the service, the type of service, the description of the service, if started or not, the number of instances running, the number of instances in use, and the maximum instances allowed will be displayed.



Clicking on the name of the service will allow the service to be edited. Go to the Service Properties section for more information on the properties.

The service can be stopped, started, and/or deleted.

For Server Directory information, go to the 'Site' menu. On the left, the Directories, Configuration Store, Clusters, Machines, Data Store, and Extensions will be listed.

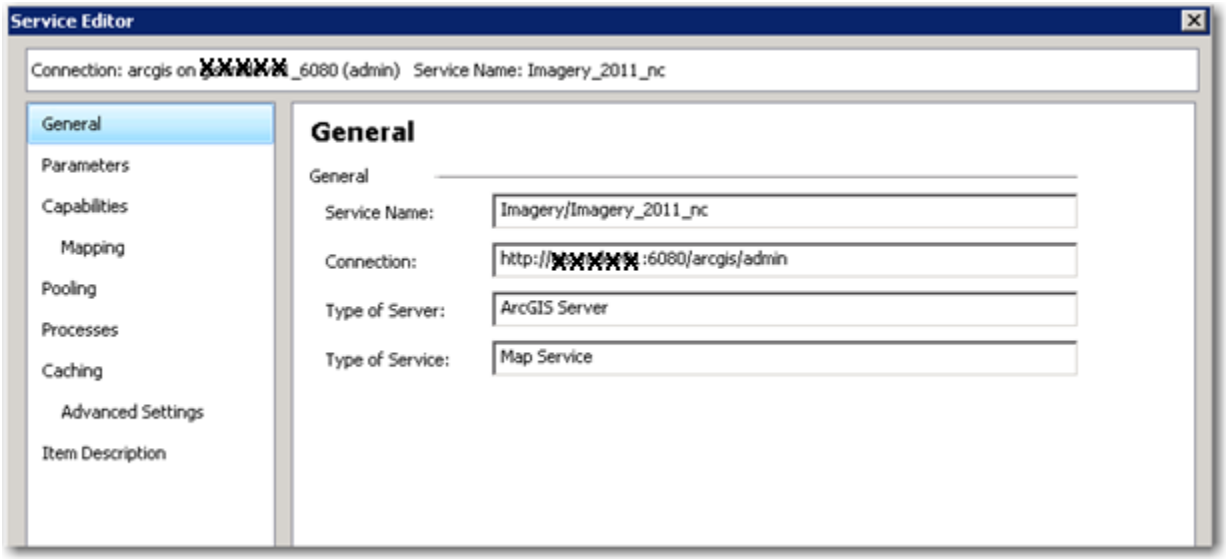


The cache directories should be set up to use the UNC path to the cache servers.

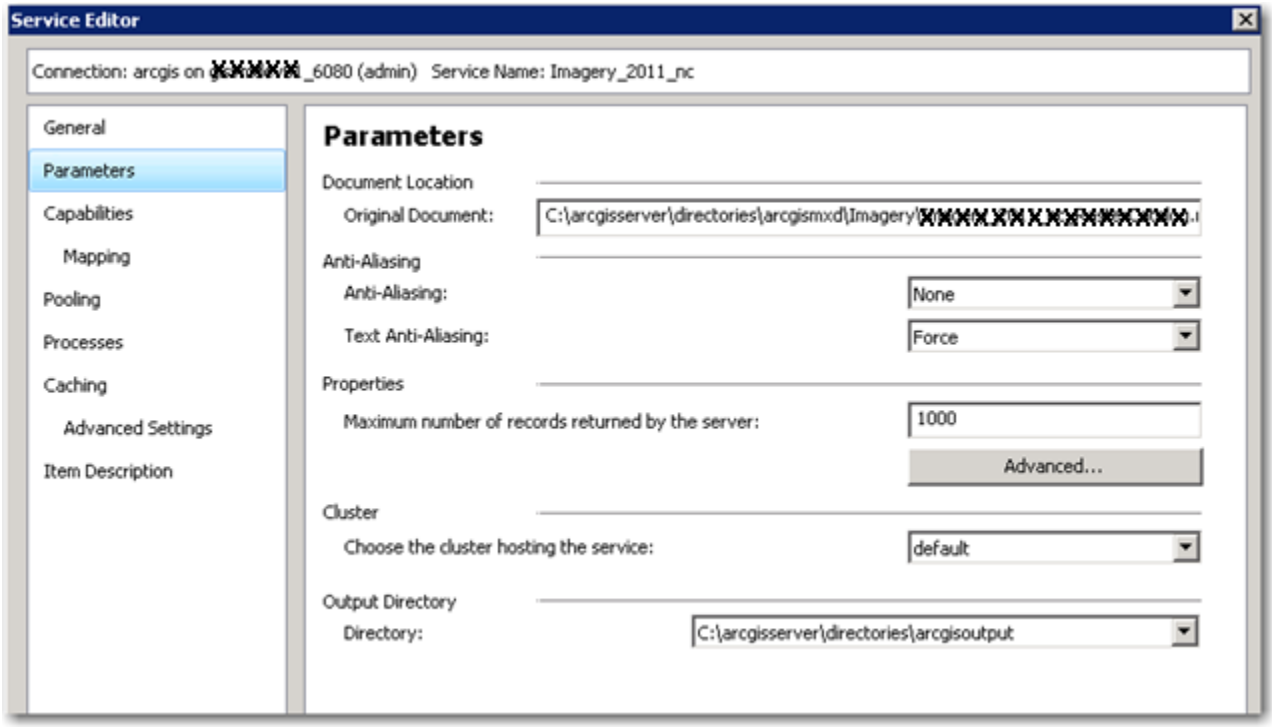
Service Properties

The same properties are displayed whether using ArcCatalog or Server Manager to display service properties, but a slightly different look and feel.

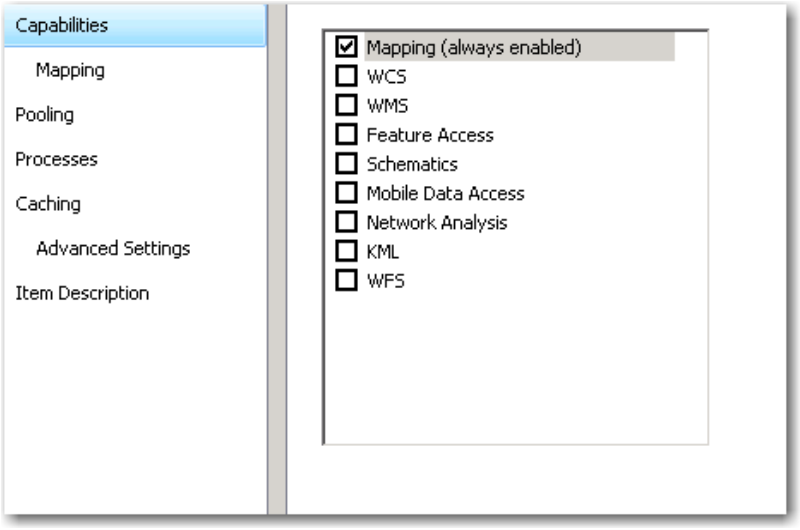
General Tab:
Provide a distinctive name, which ArcServer is being used, and a service type (map is default).



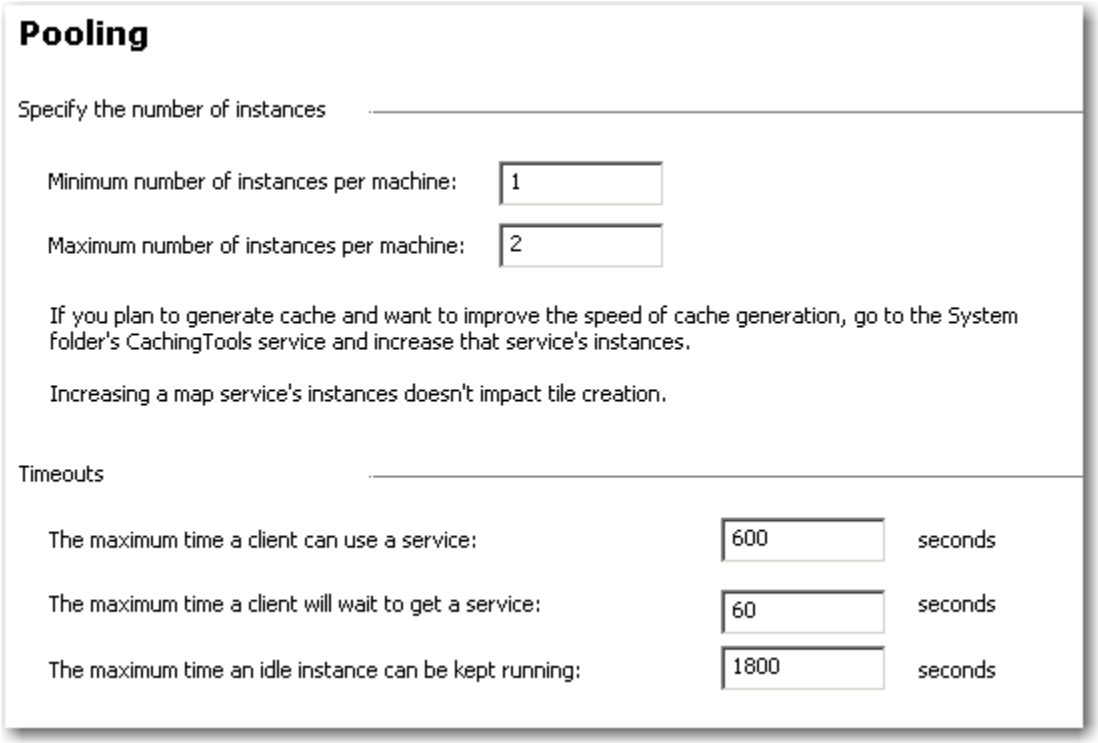
Parameters tab:
Points to the location of the MXD.



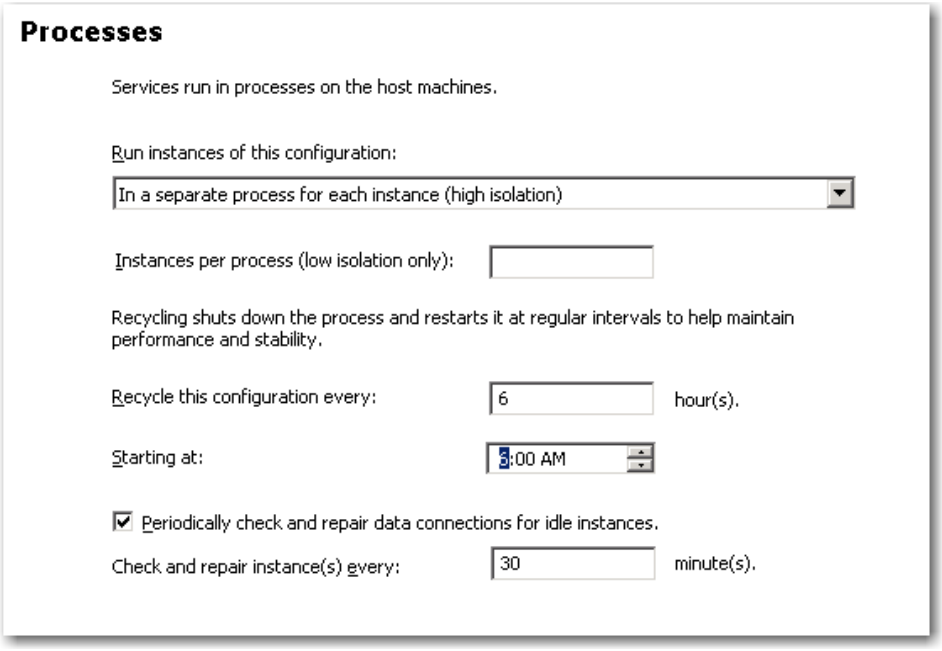
Capabilities tab:
The KML should be removed from this tab, except for Open Data services. If Feature Access is needed, check this check box. If editing will be done via Collector or some other AGO application, check the ‘Sync’ check box in the Feature Access properties.



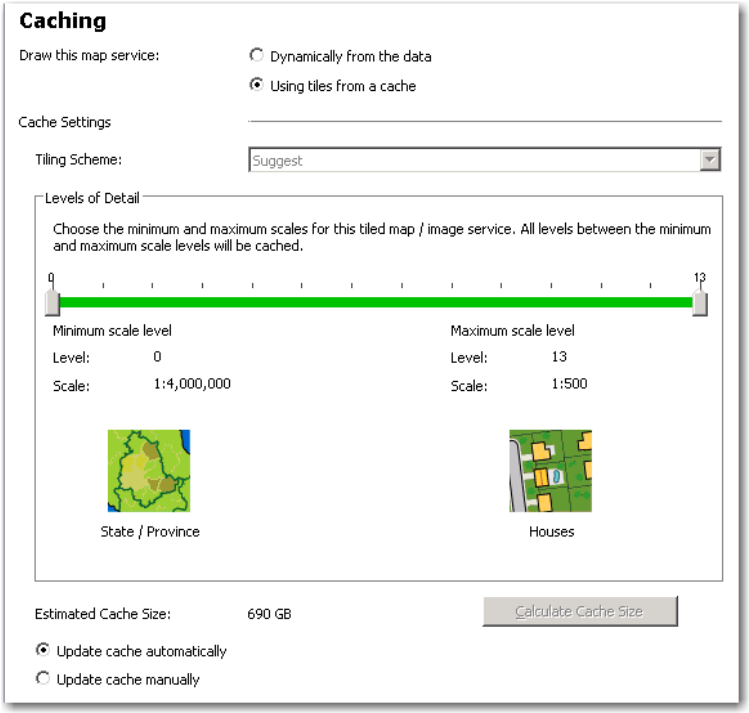
Pooling tab:
If development, use the minimal number of services for the min and max number of instances. The timeouts can be left to the default values.



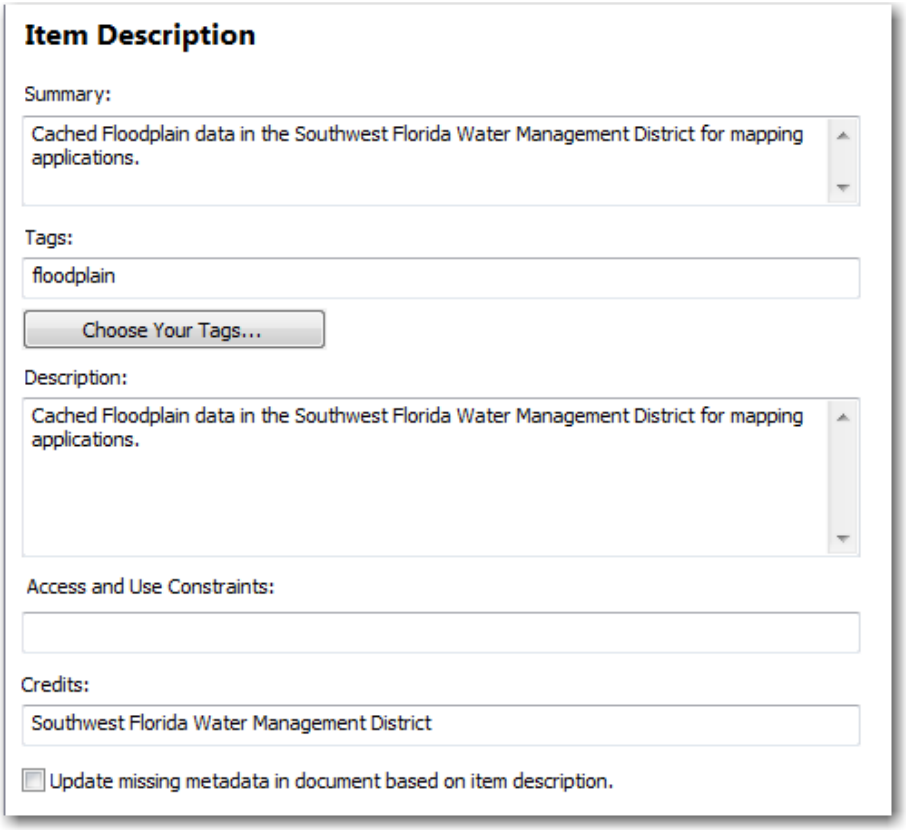
Processes tab:
Change the Starting at: time to 6:00AM and change the ‘Recycle this configuration every’ to 6 hours. The ‘Check and repair’ checkbox should be checked on as default.



Caching tab:
Go to the Cache Service Properties for more information on creating cache services.

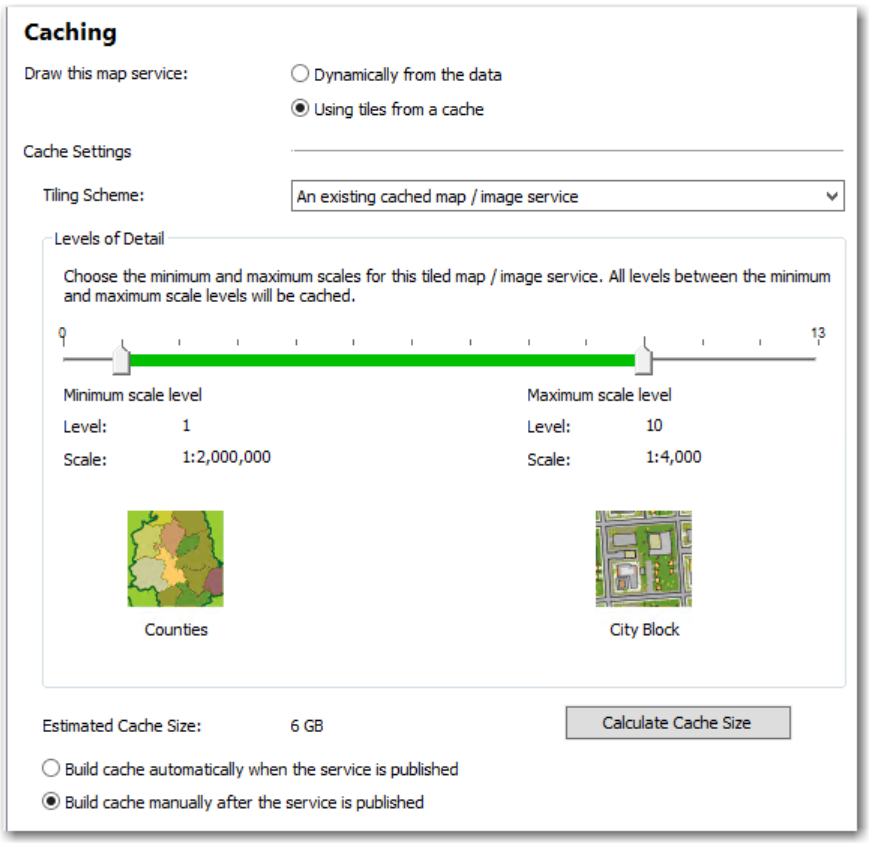


Item Description tab:
If not auto-populated from the MXD properties, fill in the Summary, Tags, Description, and Credits sections.

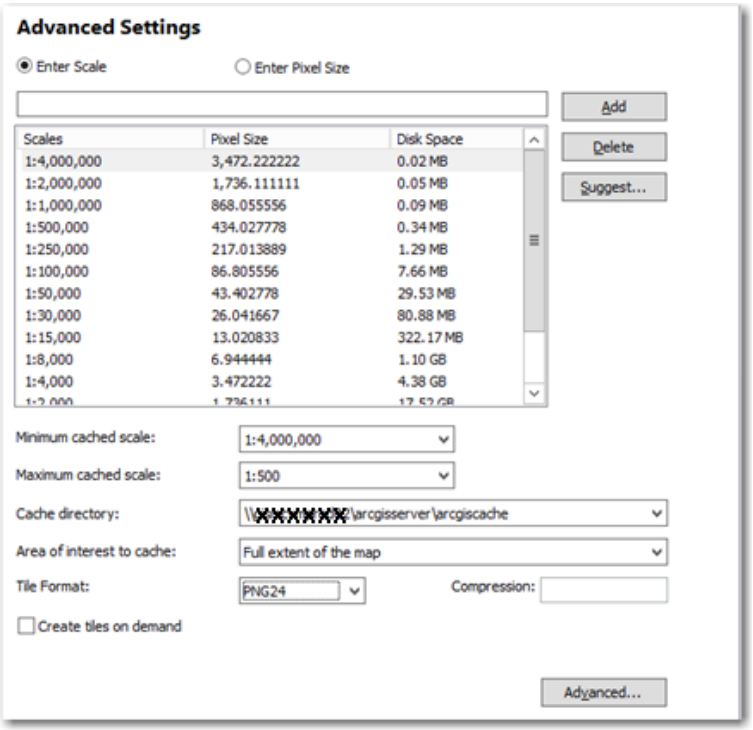


Cache Service Properties
Currently cache services are done in the District's NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_feet projection. There are 14 scale levels, 4 million, 2 million, 1 million, 500K, 250K, 100K, 50K, 30K, 15K, 8K, 4K, 2K, 1K, and 500. Not all scales have to be built for caches, but they do need to be defined (parcels is an example).

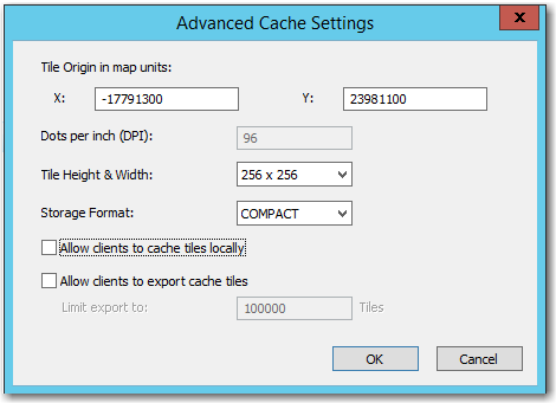
The cache services are created using ArcMap. Choose the radio button 'Build cache manually after the service is published'. Choose the Tiling Scheme from an existing service to get the correct levels.



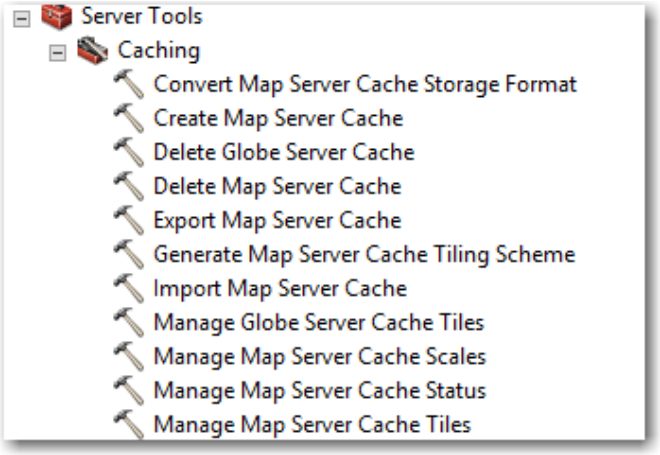
Under the Advanced Settings, choose the scales, cache directory, and tile format. Do not check the 'Create tiles on demand' checkbox.



Click on the ‘Advanced’ button. Uncheck the ‘Allow clients to cache tiles locally’.



Analyze and publish the service.
Once published, use the set of ArcToolbox tools to manage and update the caches.



The ‘Manage Map Server Cache Tiles’ is the tool most often used. The service must be started to update the cache tiles. The cache process may take +17 hours for 161 grid tiles at 1:500.

Create or Modify Application

WMIS
If a service for WMIS has been modified, inform the WMIS GIS developer. They will test and if accepted, promote upward.

ArcGIS Online for Organizations
Any changes to existing services should be seen immediately in an AGO web map or mapping application. See the ArcGIS Online for Organizations Governance documentation for information on creating/modifying applications with mapping services.

References
ArcGIS Online for Organizations Governance.doc

Creator: C. Denninger
Date Created: 3/7/2014
Revision # 2
Last Review Date: 6/9/2016

Calculating Net Irrigation Requirements (NIR)

Purpose

To document the procedures used to calculate the Net Irrigation Requirement (NIR) for a given geographical area and time-period of interest. This analysis uses numerous GIS models developed by C. Denninger, GISP, with assistance from Y. Gonzalez.

Scope

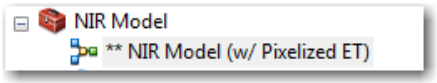
The MGIS section assists the Water Supply section with numerous GIS modeling efforts. The Net Irrigation Requirement GIS model is one of those efforts and was developed by Corey Denninger, GISP, Senior GIS Analyst in 2008, based upon work completed by former district Economist. The effort originally required multiple personnel and software platforms (e.g. SAS, Excel, Access, GIS, and Internet Explorer/WMIS) to complete specific tasks at each stage of the analysis. The goal in 2008 was to reduce the total number of software platforms used, the number of staff involved, and the number of hours needed to derive a final NIR figure. The analysis can now be completed by one staff member in half the time. These model results are used by the Water Supply section to supplement and support numerous water use analysis including water use trends, compliance, and water supply/demand projections.

Guidelines

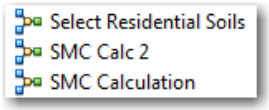
The NIR model actually consists of one ArcMap toolbox, with one main GIS model and three sub models, which are nested within the one main model. The model also calls for the execution of six custom scripts (five of which were developed in part by Corey Denninger). When conducting an NIR analysis, you will only need to use the model titled 1) **NIR Model (w/ Pixelized ET); the other models and scripts are stored within the toolbox as they are all necessary components to the analysis, but are not required to be opened or accessed directly by the user (unless revising the model which is not recommended unless absolutely necessary). The NIR Model will need to be run once per area of interest (AOI) per time frame being analyzed (e.g. month or year).

Toolbox:

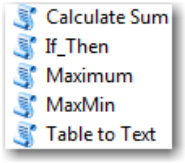
Main models:



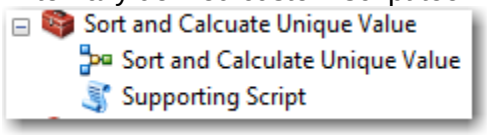
Sub/nested models:



Custom script tools:

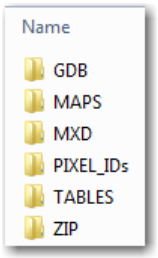


Externally derived custom script tool:



Procedure

Folder Structure – Set-up the following folder structure for each new project in this location: L:\Mapping-GIS\PLN\GIS\Projects\NIR_Analysis\PROJECTS\projectname folder\...



After deciding on the specific geographic area of interest to study, you must open ArcMap or ArcCatalog and add the NIR Toolbox titled '*NIR Model*' located in the following location: L:\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\TOOLBOXES\NIRModel.tbx

To add any toolbox to the ArcToolbox window, right-click inside the empty space area and click Add Toolbox as illustrated below. Browse to the location containing the toolbox you want to add and select the toolbox.

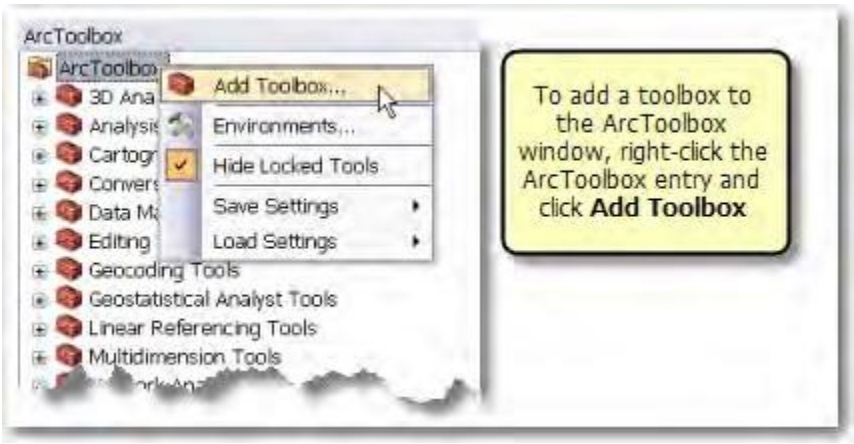


Figure 1 - Adding the NIR Model Toolbox

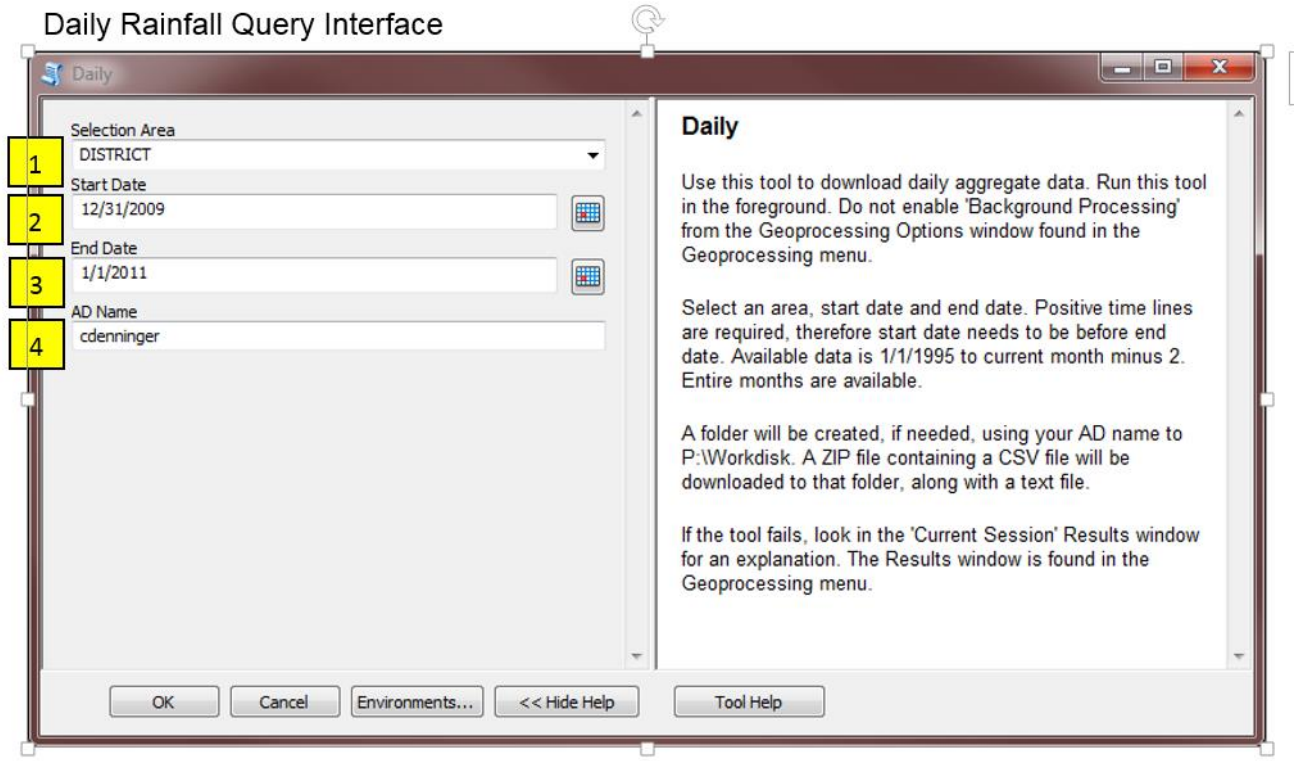
Step 1 – Downloading the NEXRADGRID Rain Table for each Date Range

Rainfall, or precipitation, is a key component of the NIR analysis. In order to conduct the analysis described herein, the NexRad rainfall data must be acquired and this should be done

using the District's tool, developed by the MGIS section, which is located within ArcMap. Unless conducting an NIR analysis for an area exclusively contained within one county (e.g. a PS_SERVICEAREA), *run the NexRad Rainfall for the entire District*; otherwise a particular county can be downloaded if determined this is the more appropriate method. Using the DISTRICT as the area will allow for inclusion of all the rain data for an AOI (Area of Interest) that may cross county boundaries; this includes analyses for entire counties whose boundaries may not precisely match the predetermined county Selection Area from the tool. The exact rainfall cell data needed for your AOI is specifically selected using overlay tools in the NIR Model discussed later.

NexRad Rainfall Toolbar

1. Add the NexRad Rainfall Toolbar in ArcMap by selecting Customize → Toolbars → NexRad Rainfall
2. Select Daily aggregation level



1. Select the AOI (i.e. DISTRICT or specific County)
2. Date Range must be the time frame for the study, plus one day before and one date after. For the year 2007 the Start Date = day before study period. (i.e. 12/31/2006)
3. End Date = day after study period (i.e. 1/1/2008)
4. Name main folder the data will be placed into on the P:\Workdisk\...

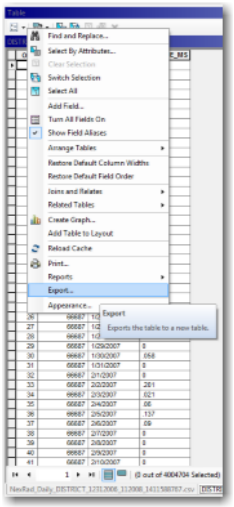
Step 2 – Unzip the Rainfall Data file and prepare for use in the GIS model

Now that the NexRad Rainfall dataset has been exported using the ArcGIS custom tool (above), it must be unzipped and prepared for the GIS Model. This step prepares the rainfall data for incorporation into the GIS model. There are other methods that may work, but they can be limited by the software, creating potential issues the user may not notice, and as a result create erroneous output results. This is the preferred and recommended method for taking the rainfall data and converting it into a usable format for the model.

1. When the tool completes running, the zip file has been export to P:\Workdisk\.... At this point, navigate to that location and double-click the zip file to begin extracting it.
2. Verify that the file has been unzipped. Once successfully verified, open your ArcMap project where the NIR analysis will be conducted and add the unzipped .csv file.
3. After adding the .csv file to ArcMap, open the table and verify that the fields look as expected and the number of records (or rows) are reasonable for the time frame and area queried. For example, if querying the entire District, for one year plus 2 days (367 days on a non-leap year), the number of records should be 4,004,704. Also verify that there are no NULL values. If NULL values exist, then the error could be an ArcMap glitch, failing to recognize the decimal values of some fields (creating LONG fields instead of DOUBLE or FLOAT). NULL values could also be a sign of issues with the background tables. In the case of the former, you may need to use MS Access to open and export the table or create empty geodatabase tables and import the data (described below) as this may be an ArcMap specific issue. This issue has been known to be user-specific; another user may need to pull the tables for you if necessary. In the latter case, issues with the background tables should be brought to the attention of Chief Scientific Data Analyst and GIS Database and Server Administrator for identification and resolution of issues.

   IMPORTANT: New process may be required. ArcMap is creating <NULL> values and a LONG field when the TSVALUE_MS field should be DOUBLE and contain decimals. Tried this process and seemed to work:
   - Unzip .csv file
   - Create empty gdb table and add appropriate fields
   - Load data from .csv into new gdb table
   - Open table and QC to ensure no <NULL> values exist and all rows present

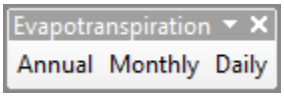
4. Once verified, click Table Option icon (top left corner of table) → Export → navigate to the desired geodatabase location and name the new geodatabase table. (see figure below) For consistency sake, rainfall dbf tables can be placed here: L:\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\TABLES\Rainfall_Data_1995_plus
   While Evapotranspiration .mdb (personal geodatabase) files can be placed here: L:\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\TABLES\ET_Data_1995_plus
5. After the export completes, add it to the ArcMap session and inspect to ensure the data has exported correctly.



Step 3 - Downloading the Potential Evapotranspiration Table for Each Date Range

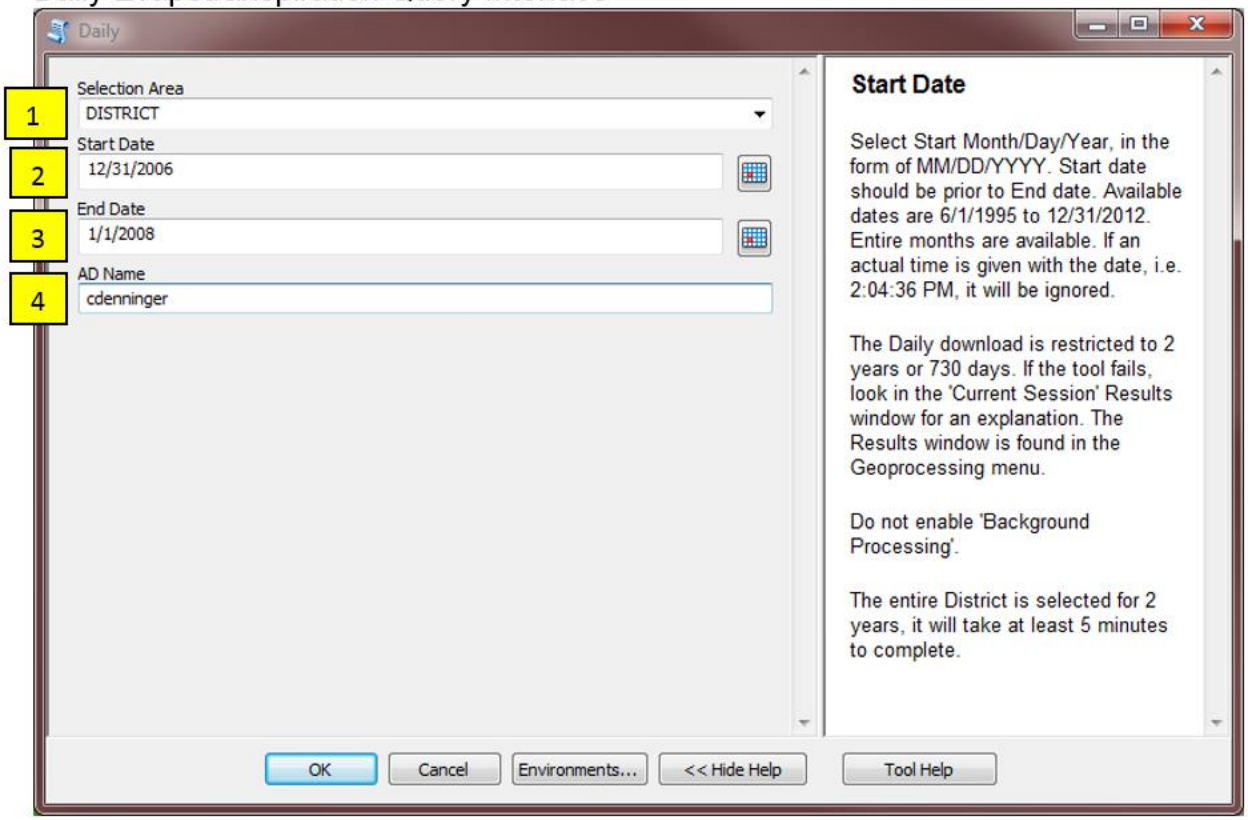
Evapotranspiration, specifically Potential Evapotranspiration is another key component to calculation NIR. The District's MGIS section developed an ArcMap based tool for querying and downloading the ET tables.

Evapotranspiration Toolbar



1. Add the Evapotranspiration Toolbar in ArcMap by selecting Customize → Toolbars → Evapotranspiration
2. Select Daily aggregation level

Daily Evapotranspiration Query Interface



Interface instructions

1. Select the AOI (i.e. District or specific County)
2. Date Range must be the time frame for the study, plus one day prior and one date after. For example, the year 2007 would be Start Date = day before study period. (e.g. 12/31/2006)
3. End Date = day after study period (e.g. 1/1/2008)
4. Name main folder the data will be placed into on the P:\Workdisk\...

Step 4 – Unzip the Evapotranspiration Data file and prepare for use in the GIS model

1. When the tool completes running, the zip file has been export to P:\Workdisk\....
   At this point, navigate to that location and double-click the zip file to begin extracting it.
2. Verify that the file has been unzipped. Once successfully verified, open your ArcMap project where the NIR analysis will be conducted and add the unzipped .csv file.
3. After adding the .csv file to ArcMap, open the table and verify that the fields look as expected and the number of records (or rows) are reasonable for the time frame and area queried. For example, if querying the entire District, for one year plus 2 days (367 days on a non-leap year), the number of records should be 4,004,704.

   IMPORTANT: Since the NIR analysis requires two extra days for a given year's analysis, there are situations where the dataset required for the study period is not available at the time of the study; as the Evapotranspiration data for the previous year data does not arrive until the year is completed and does not arrive in-house from the vendor until about mid-way through the following year. For example, if attempting to calculate the NIR for 2014 in April

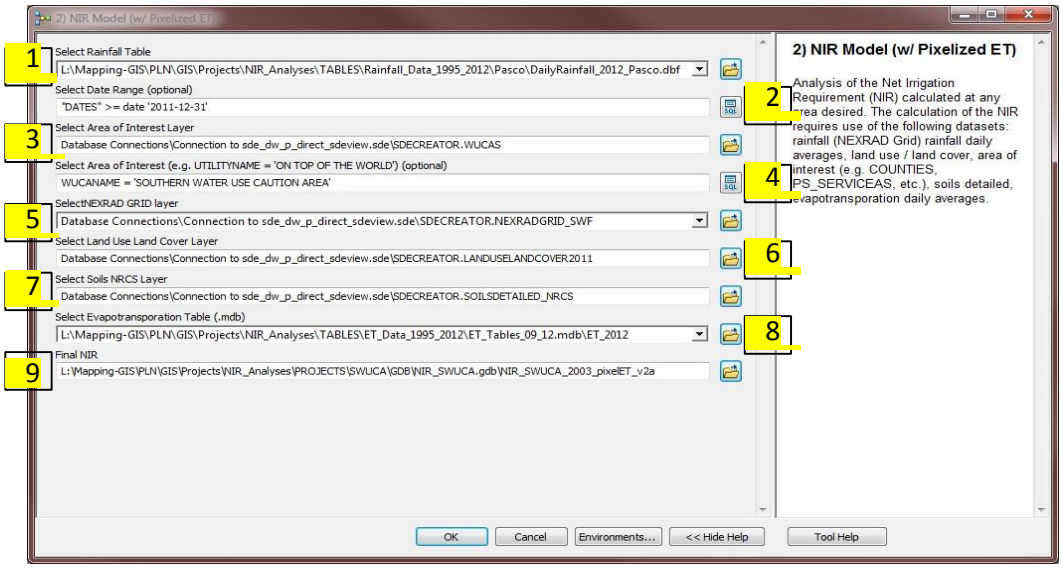
of 2015, you will require data from date range 12/31/2013 to 1/1/2015. In this example, 1/1/2015 is not yet available and will not be until about June 2016. As a result, you may need to run the model from 'Edit' mode and calculate and provide an average for three EVT fields that will have no data for the final day of the analysis. This will be discussed again, and in more detail in the next section (Step 5).

4. Once verified, click Table Option (top left corner of table) → Export → navigate to the desired geodatabase location and name the new geodatabase table. (see figure below) If the table is exported as a .dbf, some important fields may be truncated resulting in model errors.

5. After the export completes, add it to the ArcMap session and inspect to ensure the data has exported correctly.

Step 5 – Open ArcGIS and run the NIR Model

This is the portion of the analysis that produces the final NIR value in inches. Model run time will vary depending on the size and duration of the area being analyzed. For an area the size of a county, the model run-time might take 30 minutes, whilst an area the size of the SWUCA might take an hour-and-a-half to two hours. Important to note, that the model is set-up to run only for residential land use land cover (LULC) codes (LEV3 = 110, 120, 130) within the area being analyzed. If that is to be changed, then you have to go into one of the sub-models and modify. Also, select the LULC layer year closest to the year being analyzed, if one is not available for that year. For example, we do not have a 2002 LULC layer, so 2004 should be used in this case.



Final Step: Option 1 of 2 - Running the NIR Model from the GUI
Double-click the 'NIR Model' (Note: if the EVT data is not available for the last day of the analysis (ex. 1/1/yyyy), then run the model from Edit mode and see instructions below in Option 2 of 2).

1. Select the rainfall table created in Step 1 above

2. Enter the date range for the analysis; or select an 'equal to or greater than' statement that selects the start date of the analysis, such as: "DATES" >= date '2004-12-31'
3. Select the area of interest layer to be analyzed, e.g. DISTRICTCOUNTIES or WUCAS, etc.
4. Select the specific area of interest (optional), e.g. COUNTYNAME = 'PASCO'
5. Select the NEXRADGRID layer; either the main layer on the GIS server titled "NEXRADGRID_SWF" or any sub-set selection of that layer if created. This layer is used in an intersection with the area of interest layer so only those PIXEL_IDs intersecting the area will be used in the analysis.
6. Select the LULC layer that is closest to the year being analyzed.
7. Select the Soils Detailed NRCS layer. This layer contains the data for calculating the soil moisture capacity (SMC) which is built into the model. This is the soils layer that must be used; otherwise the formulas will not work.
8. Select the evapotranspiration table for the year of the analysis (e.g. ET_2007) created in Step 3 above. You may also select the previously downloaded and prepared ET tables located here: \\bkvshare\bkvDCB\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\TABLES\ET_Data_1995_plus
9. Name and location of the final NIR table and hit "OK" to run the model. This table will contain as many rows as there are days in the analysis and the NIR value will repeat that many times in the table; this is not an error. The field titled "NIR_Sum" is the field needed to obtain the NIR value. After the model completes running, the table is added to the ArcMap table of contents. Open the table. See example below Figure 8, where the final NIR = 22.55206:

NIR_Sum
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206
22.55206

Figure 8 - Final Output, NIR Value

Final Step: Option 2 of 2 - Running the NIR Model from Edit mode
Right-click the 'NIR Model' in the toolbox and select 'Edit…' (Note: This is the method for running the NIR model if the EVT data is not available for the last day of the analysis (ex. 1/1/yyyy).

In Edit mode, populate and run the model similar to that outlined in Option 1 of 2; however, when the model gets to Calculate Field (2) tool, it will not complete and will output the 'AvgRainz' table into the ArcMap TOC. (Do NOT close the model. Leave the model open.) When this happens three fields must be populated for the final record row (which is usually 1/1/yyyy). Taking the December MEAN values (or previous 30 day values or other appropriate time frame) for those three fields is an acceptable solution to this dilemma. Currently, the mean is calculated in a non-automated fashion using the following methods:

1. Open the AvgRainz table and select the month of December (For example - AvgRain_Rainz_Rain_TSDATETIME >= date '2014-12-01 00:00:00' AND AvgRain_Rainz_Rain_TSDATETIME <= date '2014-12-31 00:00:00')
2. Then right-click each of the three field names separately → Statistics → Copy/Paste their respective 'Mean:' into a text file. The three fields are
   a. AvgRain_Adj_Avg_Precip
   b. EVT_Stats_MEAN_EVT_Aggregated (*alias* MEAN_EVT_Aggregated)
   c. MEAN_EVT_Agg_In
3. Then clear the selection and select only the final row (For example - AvgRain_Rainz_Rain_TSDATETIME = date '2015-01-01 00:00:00')
4. Field calculate those three fields with their respective MEANs determined in # 2 above herein
5. Clear Selection of all records
6. Go back to the model, which should still be open, even if minimized and click Run
7. Optional – If running another model, click Model → Validate Entire Model → Model → Delete Intermediate Data. The model will usually, and inexplicably not function properly and will often yield errors, if these steps are not followed when running a model immediately after.

At this point the model will complete and provide the final output table into ArcMap's TOC.

Appendices

Net Irrigation Requirement (NIR) Formula:
Net Irrigation Requirement is defined as the net amount of water that must be applied by irrigation to supplement stored soil water & precipitation to supply the water required for the full yield of an irrigated crop or more simply, the amount of water not effectively provided by rainfall.

$$NIR_i = \sum_{d=1}^{365} (ET_d - ERAIN_d - SOIL_{d-1})$$

Where:

ET_d = Evapotranspiration on day d (in inches of water)

$ERAIN_d$ = effective rainfall on day d (in inches of water) = Min ($RAIN_d$, SMC – $SOIL_{d-1}$ + ET_d)

$SOIL_{d-1}$ = amount of water in the soil at the start of day d

$RAIN_d$ = rain on day d (In inches of water. Daily rainfall less than 0.2 times ET_d inches per day was set to zero. [1])

Old Methodology – Downloaded evapotranspiration tables (these can be used, but were set-up prior to the ArcGIS ET Toolbar being developed):

After downloading the ET table they will be placed in the mdb's here:

\\bkvshare\bkvDCB\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\TABLES\ET_Data_1995_plus

Evapotranspiration tables, or ET tables that are used in the NIR model, have been downloaded and prepared for the years 1995-2012. The 2013 ET table was not available as of this document's completion. As the other years become available, use SQL Developer to query and download the ET table for the desired years. Change the date range, one year at a time, accordingly. Add these files to one of the existing or a new Access .mdb file for use in the models.

Figure 9 - Resource Data connection in SQL Developer

SQL Developer Query

--Query ET Table, with name change on "DATE_DT" field to --> "DATE_". Main one I used.

SELECT TO_CHAR(DATE_DT,'MM/DD/YYYY') AS "DATE_", FEATURE_ID, POTENTIAL_MS, REFERENCE_MS

FROM RESDATA.EVAP_DAILY

WHERE DATE_DT >= TO_DATE('12/31/1994', 'MM/DD/YYYY') and DATE_DT <= TO_DATE('01/01/1996', 'MM/DD/YYYY');

After the query runs, right-click on the Query Results, click Export

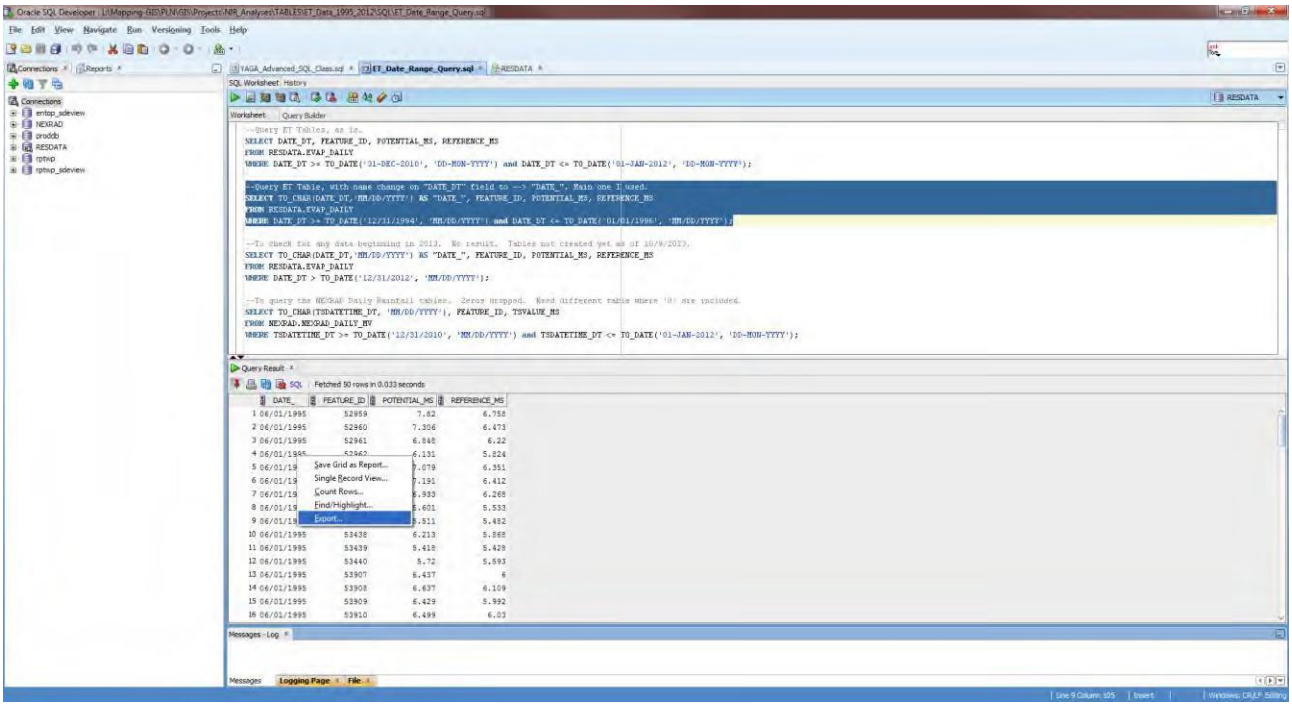


Figure 10 - Query Results to be Exported as txt file

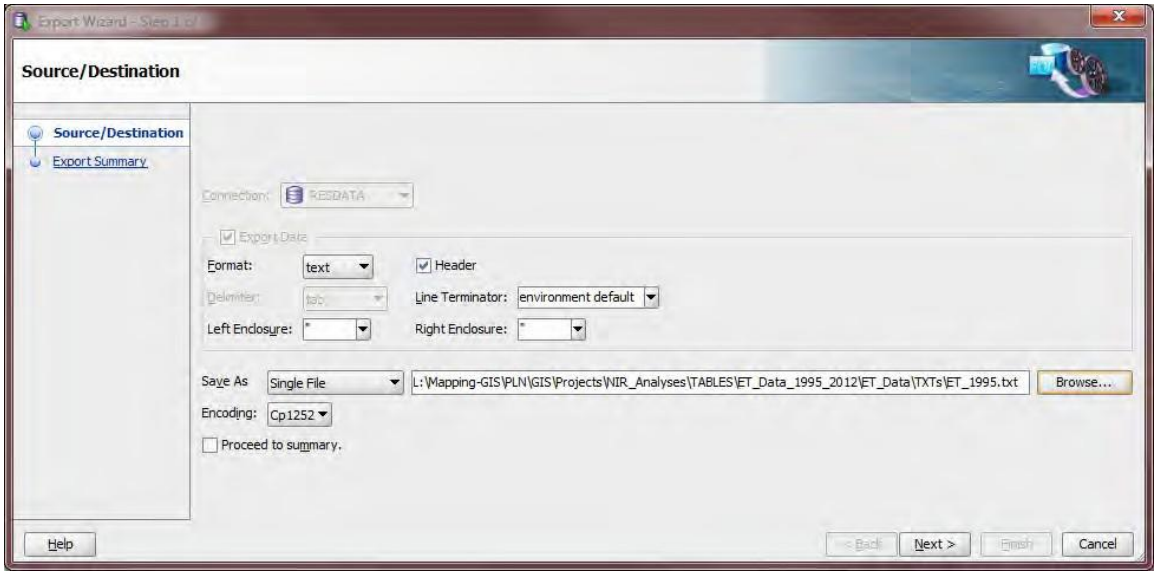


Figure 11 - Export Wizard settings for text file

After all the ET text files are created, import them into an Access database and save.

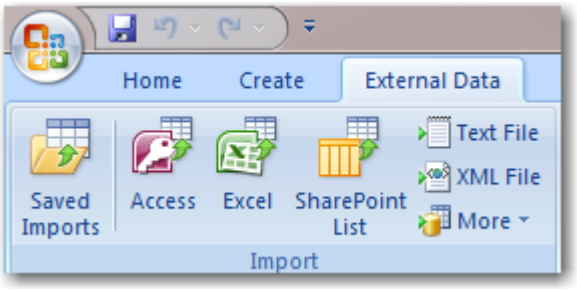


Figure 12 – Import External Data

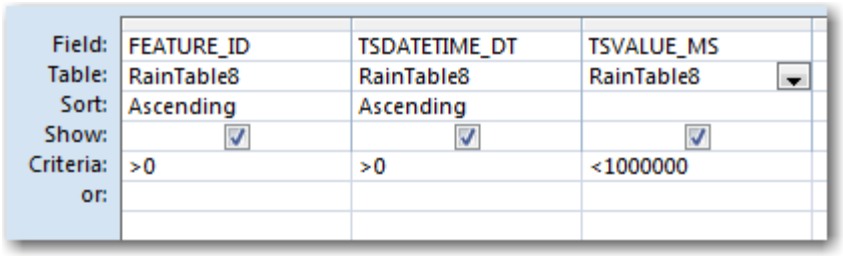


Figure 13 – Access Query Settings

Custom Python Scripts for the NIR Model, saved here:

L:\Mapping-GIS\PLN\GIS\Projects\NIR_Analyses\SCRIPTS

Calculate Sum script

```
#CalcFieldSum.py - sums the values in a field
# and writes that value into another (existing)
# field in that table
#args to pass in:
  ##1 = input FC or table
  ##2 = field to sum up
  ##3 = field to write sum into
 #
 #T. Giles 12/2007
 #-------------------------------------------------
 import arcgisscripting, sys gp
 = arcgisscripting.create()
 intable = sys.argv[1]
 field = sys.argv[2]
 # Create search cursor
 rows = gp.SearchCursor(intable)
 row = rows.Next()
 x = 0.0
```

```
 # Enter while loop for each feature/row

 while row:

     x += row.getvalue(field)
     print x
     row = rows.next()

#note value can be rounded depending on field type
gp.calculatefield(intable,sys.argv[3],float(x),"PYTHON")
```

If_Then script

```
#

#This script compares two fields and populates a third field with the result.

#The formula in Excel is as follows: =if<G3>0.2*I3,G3,0> where the G3 and I3

#are the rows being analyzed, however the script continues for all rows in the

#table until exhausted.

#

#import modules and create the geoprocessor object

#

import arcgisscripting, os, sys, string  gp =
arcgisscripting.create()
#

# Get the input values

#

InTbl = sys.argv[1]        # input table
Gfld = sys.argv[2]         # G field
Ifld = sys.argv[3]         # I field
Hfld = sys.argv[4]         # H field
#

#

def calc_v(Gval,Ival):  if
    Gval > (0.2*Ival):
        v = Gval
```

```
    else:
        v = 0.0

    return(v)

#

#Calculate H field Values

#

rows = gp.UpdateCursor(InTbl)  row =
rows.next()
try:

    while row:

        Gval = row.GetValue(Gfld)  Ival
        = row.GetValue(Ifld)  Hval =
        calc_v(Gval,Ival)
        row.SetValue(Hfld, Hval)
        rows.UpdateRow(row)
        row = rows.next()  del
    rows
    del row
except:
    gp.AddWarning(gp.getmessages())

    gp.AddError("Encountered a problem calculating values. (Exiting Script)")  del rows
    del row
    sys.exit()
#

del gp
```

Max script

```
#

#This script calculates the maximum value of certain input columns

#<=Max of (Pot EVT minus Eff Rainfall minus previous day's SMB> or 0; whichever is
greater).

#The formula calculates all rows until exhausted.

#

#import modules and create the geoprocessor object

#

import arcgisscripting, os, sys, string  gp =
arcgisscripting.create()
#

# Get the input values

#

InTbl = sys.argv[1]        # input table
Ifld = sys.argv[2]         # I field
Kfld = sys.argv[3]  # K field  Lfld
=  sys.argv[4]   #  L  field   Mfld  =
sys.argv[5]     # M field
#

#

def calc_m(Ival,Kval,Lval):
    m = Ival - Lval - Kval
    if m < 0.0: m = 0.0
    return (m)
```

```
#

#Calculate M field Value

#

Kval = 0.0

rows = gp.UpdateCursor(InTbl)  row =
rows.next()
try:

    while row:

        Ival = row.GetValue(Ifld)  Lval
        = row.GetValue(Lfld)
        Mval = calc_m(Ival,Kval,Lval)  Kval =
        row.GetValue(Kfld)
        row.SetValue(Mfld, Mval)
        rows.UpdateRow(row)
        row = rows.next()  del
    rows
    del row
except:
    gp.AddWarning(gp.getmessages())

    gp.AddError("Encountered a problem calculating values. (Exiting Script)")  del rows
    del row
    sys.exit()
#

del gp
```

MaxMin_Loop script

```
#

#This script Calculates two fields in the Net Irrigation Requirement (NIR) model.

#1. Soil Moisture Balance (SMB) on day t in inches & 2. Effective Rainfall in inches.

#The formula calculates all rows until exhausted. In Excel sheet for columns K & L.

#

#import modules and create the geoprocessor object

#

import arcgisscripting, os, sys, string  gp =
arcgisscripting.create()
#

# Get the input values

#

InTbl = sys.argv[1]        # input table
Hfld = sys.argv[2]         # H field
Ifld = sys.argv[3]         # I field
Jfld = sys.argv[4]         # J field
Kfld = sys.argv[5]         # K field
Lfld = sys.argv[6]         # L field
#

#
```

```
def calc_kl(Hval,Ival,Jval,Kval):  l =
    Jval - Kval + Ival
     if Hval < l: l = Hval  k
     = Kval - Ival + l


     if Jval < k: k = Jval  if
     k < 0.0: k = 0.0
     return (k, l)
#
#Calculate K & L field Values
#
Kval = 0.0
inc = 0
rows = gp.UpdateCursor(InTbl)  row =
rows.next()
try:
      while row:
        Hval = row.GetValue(Hfld)  Ival
        = row.GetValue(Ifld)  Jval =
        row.GetValue(Jfld)
        KLval = calc_kl(Hval,Ival,Jval,Kval)  if
        inc == 0:
            row.SetValue(Kfld, Kval)  inc
            = inc + 1
```

```
        else:
            row.SetValue(Kfld, KLval[0])  Kval
            = KLval[0]
        row.SetValue(Lfld, KLval[1])
        rows.UpdateRow(row)
        row = rows.next()
    del rows  del
    row
except:
    gp.AddWarning(gp.getmessages())
    gp.AddError("Encountered a problem calculating values. (Exiting Script)")  del rows
    del row
    sys.exit()
#
del gp
```

Table_to_Text script

```
#Table to Text.py

#

#Script written by: David Bollinger; modified by Corey Denninger (15JAN2009)

#

#Exports a field within a table to a text file (.txt), with commas added between each  record

#resulting output does not put comma on the end of the file

#

#import modules and create the geoprocessor object

#

import arcgisscripting, os, sys, string  gp =
arcgisscripting.create()
#

#

#

inTable = sys.argv[1]
inField = sys.argv[2]
delimiter = ","
outputFile = sys.argv[3]

fileHandle = open(outputFile, 'w')  rows
=  gp.SearchCursor(inTable)  row  =
rows.Next()
outputText = ""
```

```
while row:

  fieldValue = row.GetValue(inField)  if
  (outputText <> ""):
    outputText += delimiter
outputText += str(fieldValue)  row
= rows.Next()
fileHandle.write(outputText)
fileHandle.close()
```

Sort and Calculate Unique Value:

```
# Author: Esri

# Date:      February 2011

#

# Purpose: This script creates an Update Cursor sorted based on the user input and then

# loops through the cursor to populate a field with a unique integer based on user inputs

# for  what value to start with and by how much to increment each value.

try:

    import arcpy, sys, traceback

    inFC = arcpy.GetParameterAsText(0)  inSortFields
    = arcpy.GetParameterAsText(1)  calcField =
    arcpy.GetParameterAsText(2)  pStart =
    arcpy.GetParameter(3)
    pInterval = arcpy.GetParameter(4)  sortFields =
    ""
    listFields = inSortFields.split(";")

    for field in listFields:
```

```
        fieldName, sortType = field.split(" ") if
        sortFields == "":
            sortFields = fieldName + " " + sortType[0]


        else:


            sortFields += ";" + fieldName + " " + sortType[0]


    rows = arcpy.UpdateCursor(inFC, "", "", "", sortFields) rec = 0
    for row in rows: if
        rec ==0:
            rec = pStart else:
            rec = rec + pInterval row.setValue(calcField, rec)
        rows.updateRow(row)
    del rows, row


except:


    tb = sys.exc_info()[2]


    tbinfo = traceback.format_tb(tb)[0]


    pymsg = "PYTHON ERRORS:\nTraceback Info:\n" + tbinfo + "\nError Info:\n                " + \
            str(sys.exc_type)+ ": " + str(sys.exc_value) + "\n"
    arcpy.AddError(pymsg) print
    pymsg
    msgs = "GP ERRORS:\n" + arcpy.GetMessages(2) + "\n" arcpy.AddError(msgs)
```

Creator: Corey Denninger
Date 12/10/2014
Revision # Original
Date of last review: 6/9/2016

Creating Watershed Mailing List and Duplicates Removal

Purpose

To document the procedures used to identify and remove unnecessary duplicate records in the Excel file mailing list(s) created for either the A) Impacted Parcels analysis or the 2) Watershed Evaluation Notification List process for the ENG section. Those procedures are described in their respective SOPs, titled:

- Identifying Potentially Impacted Parcels using Updated Floodplain.docx
- Identifying Parcels for the Watershed Evaluation Notification List.docx

SCOPE

These procedures are used to create a final mailing list to which letters are sent notifying property owners that their parcel(s) may be impacted by the new floodplain or that a flood study is set to begin, notifying and soliciting information from the homeowners. Various GIS models are run and a list of potentially impacted parcel owners is then copied from a feature class attribute table into a macro-enabled Excel spreadsheet where possible duplicate owners and addresses are identified. It is at this point that this procedure is to be used to remove those duplicate, unnecessary homeowners from the list, creating the final spreadsheet. After the spreadsheet has been cleaned, and duplicates removed by Engineering (ENG) staff, it is then used by the Printshop to create the mail-outs.

GUIDELINES

There are two methods for identifying and removing, or deleting, the duplicates within the Excel file. This first method discussed will only work efficiently with smaller files where the total records are ~5,000 rows or less. If any larger, then the removal or deletion of records can tax the computer's processors and either freeze the program or simply take too long to perform simple procedures (e.g. save, delete a record, scroll down, etc.); however, this is highly variable and dependent on the computer in use. Some computers can handle many more rows of processing, but these guidelines should be adhered to when processing speed is a concern. The second procedure will work for any number of records and may be the preferred method for slower computers.

Begin this procedure after you have the Excel file that contains all the raw data from the final output feature class. This file should also have the data contained in filtered columns, with macros that have identified those records that contain duplicates. Using columns N and R, you can easily investigate the duplicates contained in the list and delete the appropriate records accordingly. The formula contained in column N, uses the output from the formulae contained in columns L and M; where the duplicate Owner Name and/or Address 1 are identified and labeled as '*Duplicate Exists'*. As Figure 1 shows below, column N identifies and labels those rows that have a duplicate in the Owner Name and/or Address1 columns with '*Duplicates Present*'. To begin deleting the duplicates, column N should be filtered by '*Duplicates Present*'; displaying only those records where a duplicate exists in either Owner Name (L) and/or Address1 (M).

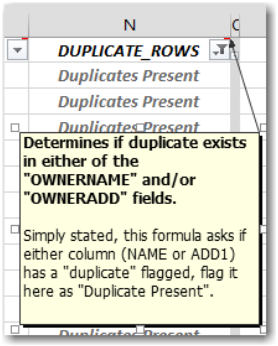


Figure 1 - Column N definition

As Figure 2 shows below, column R identifies and labels those rows that have a subsequent duplicate (2nd or more) in the Owner Name and/or Address1 columns with '*Duplicates Present*'. To begin deleting the duplicates, column N should be filtered by '*Duplicates Present*' and column R should also be filtered by '*Duplicates Present*'; displaying only those records where a subsequent duplicate (2nd or more) exists in either Owner Name and/or Address1. The procedures will be discussed in more detail below.

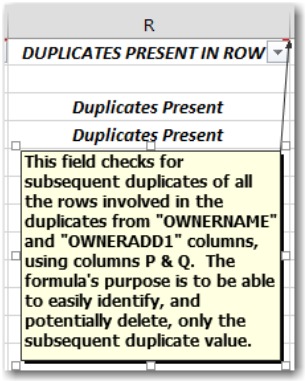


Figure 2 - Column R definition

PROCEDURES

Method 1 – Standard Process

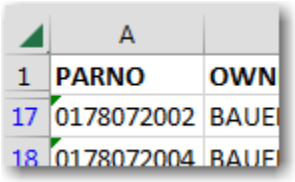
Note: (for use w/ ~5,000 records or less; depending on the computer)

1. Locate and open the Excel file created by the GIS analyst during the Potentially Impacted Parcels Analysis or the Watershed Evaluation Notification Analysis
2. Ensure Column N (DUPLICATE_ROWS) is filtered by '*Duplicates Present*'
3. Filter Column R (DUPLICATES PRESENT IN ROW) by '*Duplicates Present*'; which essentially reveals only the subsequent duplicates (2nd or more). This is important because you want to keep the first record, which will become the record used for the mailing label. Filtering column R, only reveals the subsequent duplicates
4. Investigate and Delete rows at will
5. When you are finished deleting the duplicate, unnecessary records, **check on all** records in columns R and then N using the filter. **This is very important.** Without checking these on, you will not see, and therefore not include the records for the final mailing list

6. Copy and paste columns B-H into the '*Addresses*' tab by highlighting columns B-H → right click → copy → go to the *Addresses* tab → paste into cell A1
7. Remove any empty, unnecessary columns (if there are any). Often OWNERADD3, and sometimes OWNERADD2 are empty, if so delete them from the *Addresses* tab
8. Add a new column by selecting the entire OWNERCITY column by clicking on the letter (often "C") at the top of the spreadsheet → Right Click → Insert
9. Add the following formula to the new column =CONCATENATE(D2,",","," ",E2," ", F2) This formula will combine the OWNERCITY, OWNERSTATE, and OWNERZIP into one field for the conveyance of the print shop when creating the address for the mail-outs
10. Click the cell with the new formula, then double-click the small square in the bottom right hand corner to force the formula to be copied into all the rows in the new column
11. Save file. The file is now complete

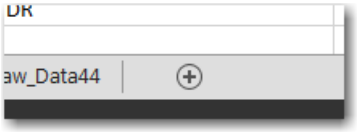
Method 2 – Faster Processing
(Can be used with any number of records; small or large)

1. Locate and open the Excel file created during the Potentially Impacted Parcels Analysis or the Watershed Evaluation Notification Analysis
2. Unfilter Column N (make **all** records visible)
3. Left-click top left corner arrow to highlight **all** records

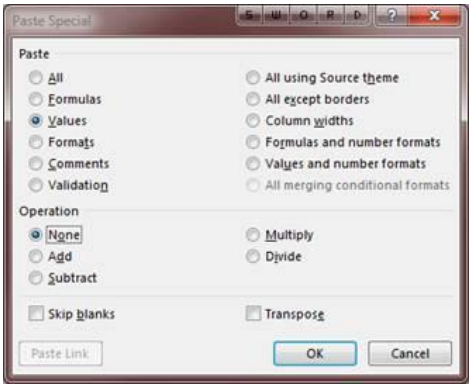


4. Right click, copy

5. Click plus (+) at the bottom of the spreadsheet to add a new tab worksheet



6. In the new worksheet, left click in cell A1 "Paste" □ "Paste Special" (*Values* and *None*)



7. Expand columns to see all
8. Add Filter to Columns L □ R (Select columns L through R, → Sort & Filter → Filter)
9. Check **on** Column N filter "Duplicate Present"
    a. Check **on** Column R filter "Duplicates Present" (to reveal only these records). This essentially reveals only the subsequent duplicates (2nd or more). This is important because you want to keep the first record, which will become the record used for the mailing label. Filtering column R, only reveals the subsequent duplicates.
10. Investigate and Delete rows at will
11. When you are finished deleting the duplicate, unnecessary records, **check on all** records in columns R and then N using the filter. **This is very important.** Without checking these on, you will not see, and therefore not include the records for the final mailing list
12. Copy and paste columns B-H into the '*Addresses*' tab by highlighting columns B-H → right click → copy → go to the *Addresses* tab → paste into cell A1
13. Remove any empty, unnecessary columns (if there are any). Often OWNERADD3, and sometimes OWNERADD2 are empty, if so delete them from the *Addresses* tab
14. Add a new column by selecting the entire OWNERCITY column by clicking on the letter (often "C") at the top of the spreadsheet → Right Click → Insert
15. Add the following formula to the new column =CONCATENATE(D2,","," ",E2," ", F2) This formula will combine the OWNERCITY, OWNERSTATE, and OWNERZIP into one field for the convenience of the print shop when creating the address for the mail-outs. Note: You may need to type (and not copy/paste) this formula into the cell for it to function properly.
16. Click the cell with the new formula, then double-click the small square in the bottom right hand corner to force the formula to be copied into all the rows in the new column
17. Save file. The file is now complete

References

Identifying Potentially Impacted Parcels using Updated Floodplain.docx

Identifying Parcels for the Watershed Evaluation Notification List.docx

Digital Terrain Surface Quality Control Handbook of Sample Issues

Purpose

This document is to serve as a guideline for the Southwest Florida Water Management District (SWFWMD) Mapping and GIS Section's Quality Control (QC) staff tasked with reviewing digital topographic data collected utilizing Light Detection and Ranging (LiDAR) technology and to assist in the assessment of these data. The issues contained within are a compilation of common examples identified during past QC efforts of digital topographic projects. Examples come from a variety of sources, and are meant to illustrate general breakline and point cloud errors. This document is meant to guide staff in their review of digital topographic datasets primarily collected using LiDAR technology.

Scope

LiDAR is the District's standard technology used to map digital elevation data. This technology provides a cost-effective method to map large areas in a relatively short amount of time. These seamless data are used to create base elevation maps or to update existing topographic data.

LiDAR data has several uses, and are often collected to support the Federal Emergency Management Agency's (FEMA) flood map modernization efforts to update Digital Flood Insurance Rate Maps (DFIRM) and to support Watershed Management Plan (WMP) Program modeling activities. LiDAR has also been used for regulatory purposes in the design and implementation of large-scale drainage improvement projects, to assist in emergency preparedness planning, and to meet Homeland Security requirements.

This handbook contains a diverse assortment of LiDAR QC examples, which is by no means complete, and is subject to review and update. The Mapping and GIS section maintains documentation on LiDAR digital elevation QC procedures and specifications. Refer to these documents for more information.

PART I – BREAKLINE SAMPLES

Breaklines are essential to ensure a hydrologically correct topographic model. Most commonly used to hydro-enforce and hydro-flatten features that convey water like lakes, ponds, and streams, breaklines are also used to delineate slope changes where the surface ***is not well defined*** (e.g. along obscured roads and streams, berms, islands) by the LiDAR. There are several possible errors seen with breaklines. The most common are floating or digging breaklines, missing or incomplete capture of features, and inaccurately compilation (geometry) of features. Below illustrates frequent errors dealing with breaklines.

Example 1 – Missing Hydrographic Feature

Hydrographic features can represent any linear feature conveying water such as a canal or stream, and may also contain features that impede the flow of water like islands.

The image on the left shows a hydrographic feature that is only partially delineated. Note the large section to the South that has not been enforced.

The image to the right illustrates the appropriate breakline.

*Note that the missing hydrographic feature is often not easily seen. Refer to the LiDAR laser points as guidance.

The image to the left shows hydrographic features obscured by trees that have not been breaklined.

The image to the right shows the corrected breaklines.

Example 2 – Missing Island Feature

An Island identifies an area with valid ground points, and exists inside of a linear hydrographic feature or a closed water body. When contained by a water body the island is clipped out of the water polygon and the island feature demarcates the valid ground boundary. The islands are a domain class within the linear hydrographic feature class. The ends should be snapped and no dangling nodes should exist.

Example 2A – Missing Island Feature within Linear Hydrographic Feature

In the example below, the image to the left illustrates a stream with several island features not breaklined.

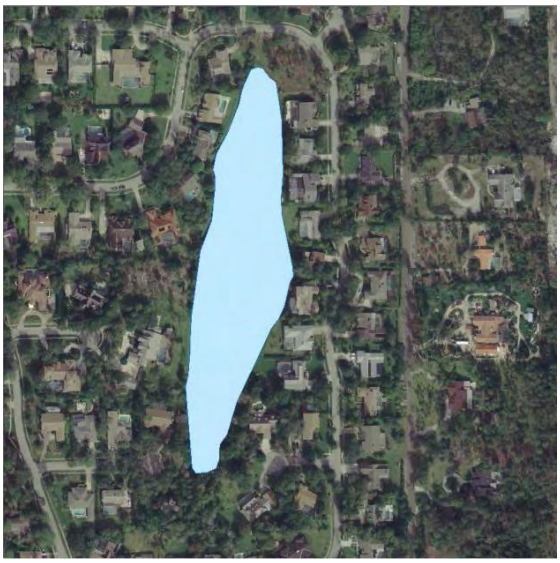
The image to the right illustrates the corrected breakline where the islands have been compiled and exist within the hydrographic feature class.

As shown in the image below, use laser point Class 2 to determine if valid ground exists.

Example 2B – Missing Island Feature Within Closed Water Body Feature

In the example below, the image to the left illustrates a closed water body with an island feature.

The image to the right illustrates the erroneous breakline where only the water body has been delineated and the island is not cut out of the water polygon.

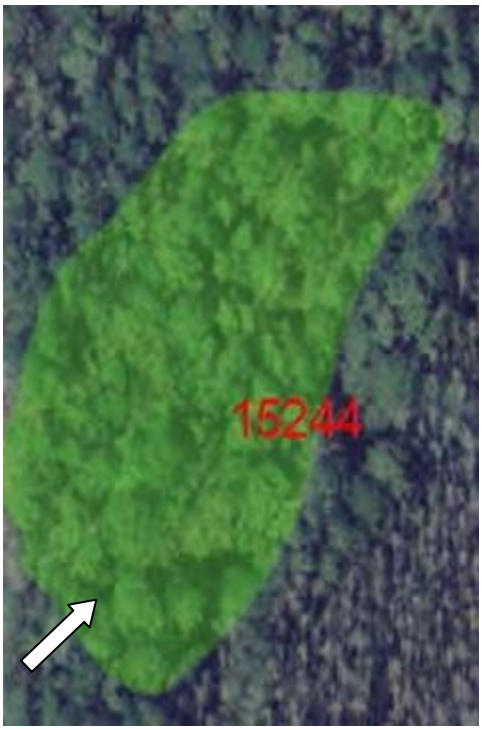


The image below illustrates the corrected breakline where the island has been cut out of the water body (light blue polygon) and compiled within the hydrographic feature class (the thicker blue line).

Example 2C – Invalid Island Delineation in Upland Area

An island should be enclosed by a hydrologic feature. The examples below illustrate upland areas that do not meet these minimum requirements and thus should not be breaklined as an island.

The image below shows an upland area in a marsh that has been delineated as an island.



Likewise, in the image below, the upland area is incorrectly delineated as an island. Notice the feature in red is not completely contained within a closed water body or linear hydrographic feature.

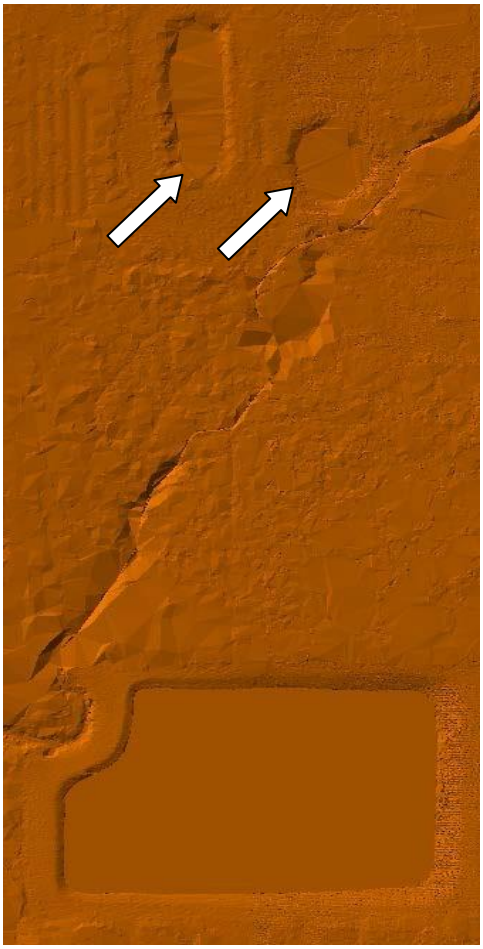
Example 3 – Missing Water bodies

Water bodies meeting the minimum mapping unit (MMU) but were not breaklined.

Between 2006 and 2011 the MMU for an enclosed water body (ex. pond) was set at ½ acre or larger. For 2012 onward, the District standard changed to remove the MMU and map all standing water bodies regardless of size.

The image to the left shows missing water body breaklines. Note the larger water body to the South is breaklined (blue polygon) whereas the smaller, northern water bodies are not. Utilize the laser point cloud (Class 9 – Water represented here as blue points) and the current imagery to assist in identifying standing water.

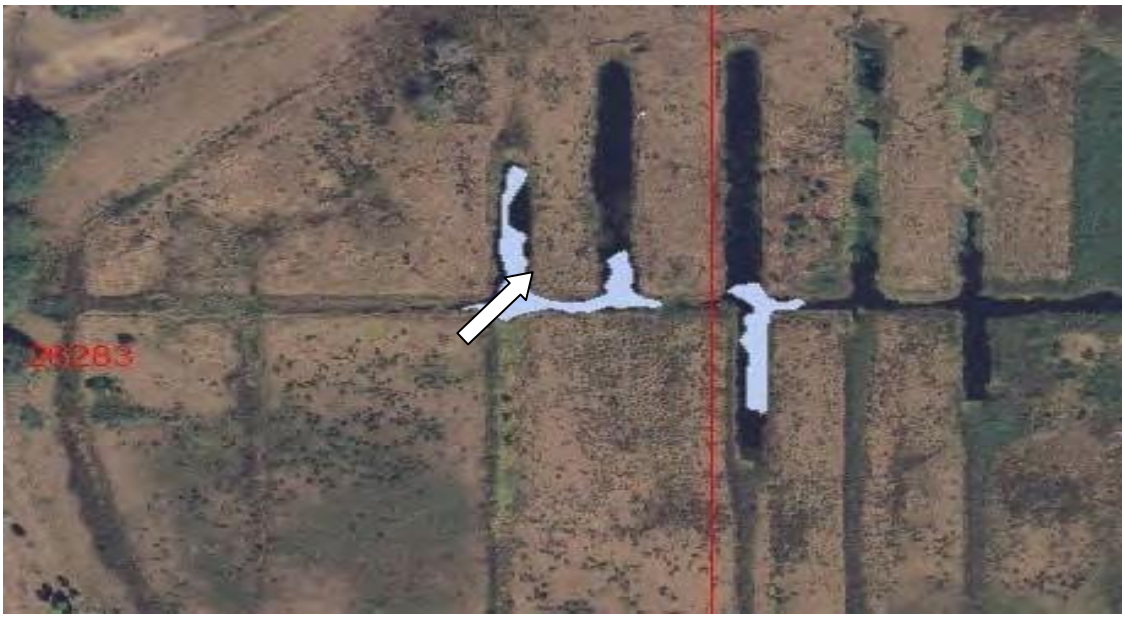
The triangulated surface to the right further depicts the error. Note the smooth, glass-like appearance in the water body containing a breakline versus the rough, undulating depiction in the ones that are missing a breakline.



Example 4 – Incomplete Delineation

Similar to when a breakline is missing, incomplete delineation can occur with both linear hydrographic features and closed water bodies. Utilize the laser point cloud (Class 9 – Water) to assist in identifying standing water.

In the example below, only a portion of the closed water body is breaklined (blue polygons).



In the example below, the water body at the edge of the project boundary needs to be delineated completely.

Example 5 – Improper Delineation Hydrographic Feature

When examining hydrographic features, several delineation issues may exist. Issues dealing anywhere from missing the centerline of the stream, to missing the edge of a double lined breakline, to improper delineation along bridges. The thing to keep in mind is to examine the elevations and horizontal location of the feature using the LiDAR laser points and/or the triangulated surface. Often times the location of the hydrographic line should be obvious even in areas of dense vegetation.

When examining hydrographic features crossing under roads or bridge spans, the first determination to make is whether the bridge has a floating span. To do so, use the imagery and LiDAR laser points (Class 23, Class 2, and in some instances Class 1). Wider, higher elevated bridges usually indicate floating spans. Floating span bridges will have a hydrographic feature that runs under the bridge to indicate continuous flow versus non-floating span bridges act as damns where the breakline ends at the bridge span.

Floating Span Bridge

Non-Floating Span Bridge

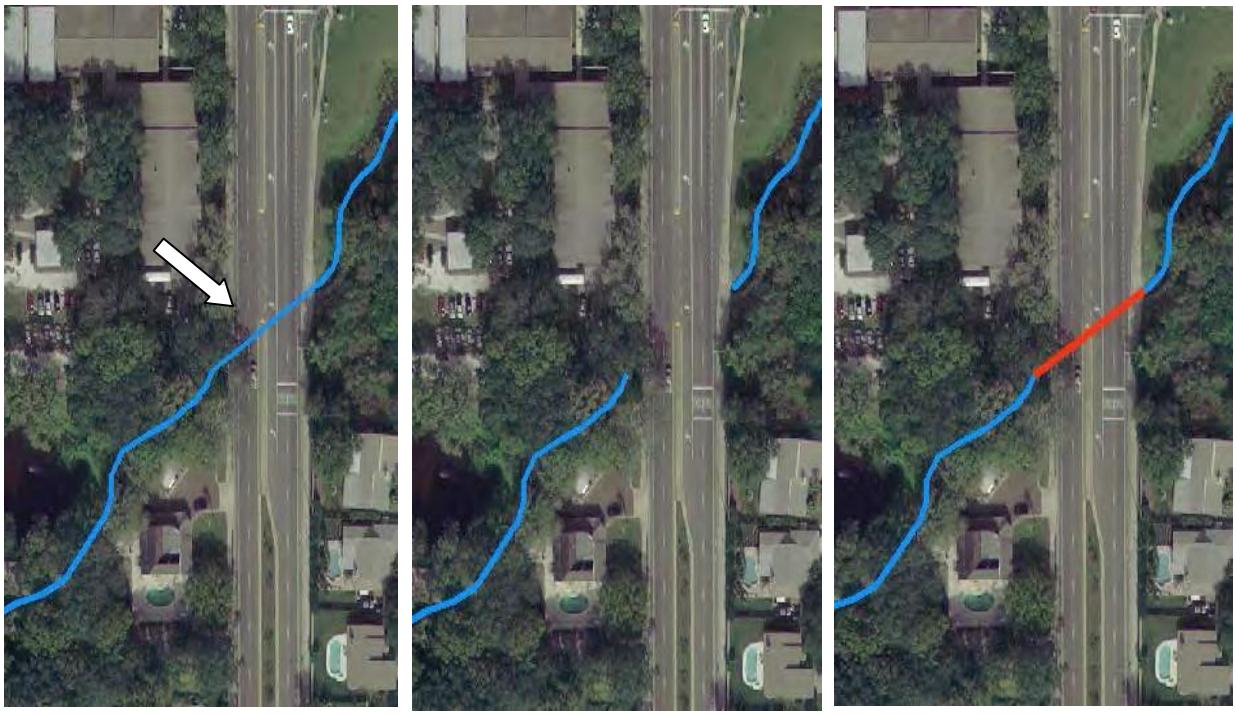
Example 5A – Hydrographic Feature and a Non-Floating Bridge Span

Hydrographic features for smaller bridges will stop at the span, and continue again after the span. A connector will traverse the span and join each end of the hydro feature.

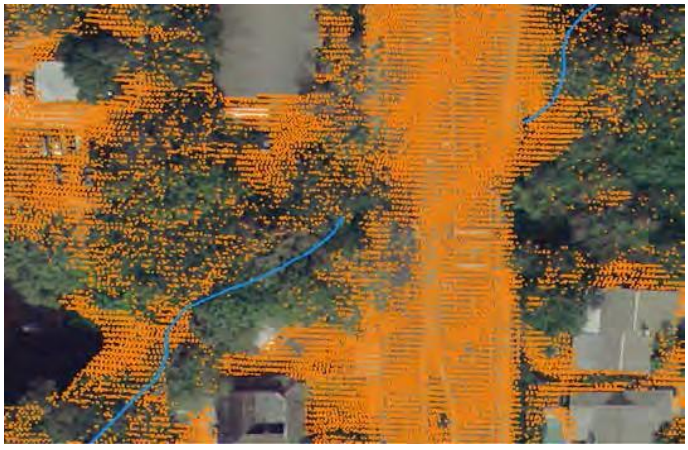
The image to the left illustrates an example where a hydrographic feature erroneously cuts across a non-floating span bridge.

The center image shows how the breakline should be delineated.

The right image further illustrates how a connector joins the two ends of the hydro feature.



The image below illustrates the expected filtering for non-floating span bridges. Notice that the laser points can be used to further determine that the road and bridge are part of the ground class.



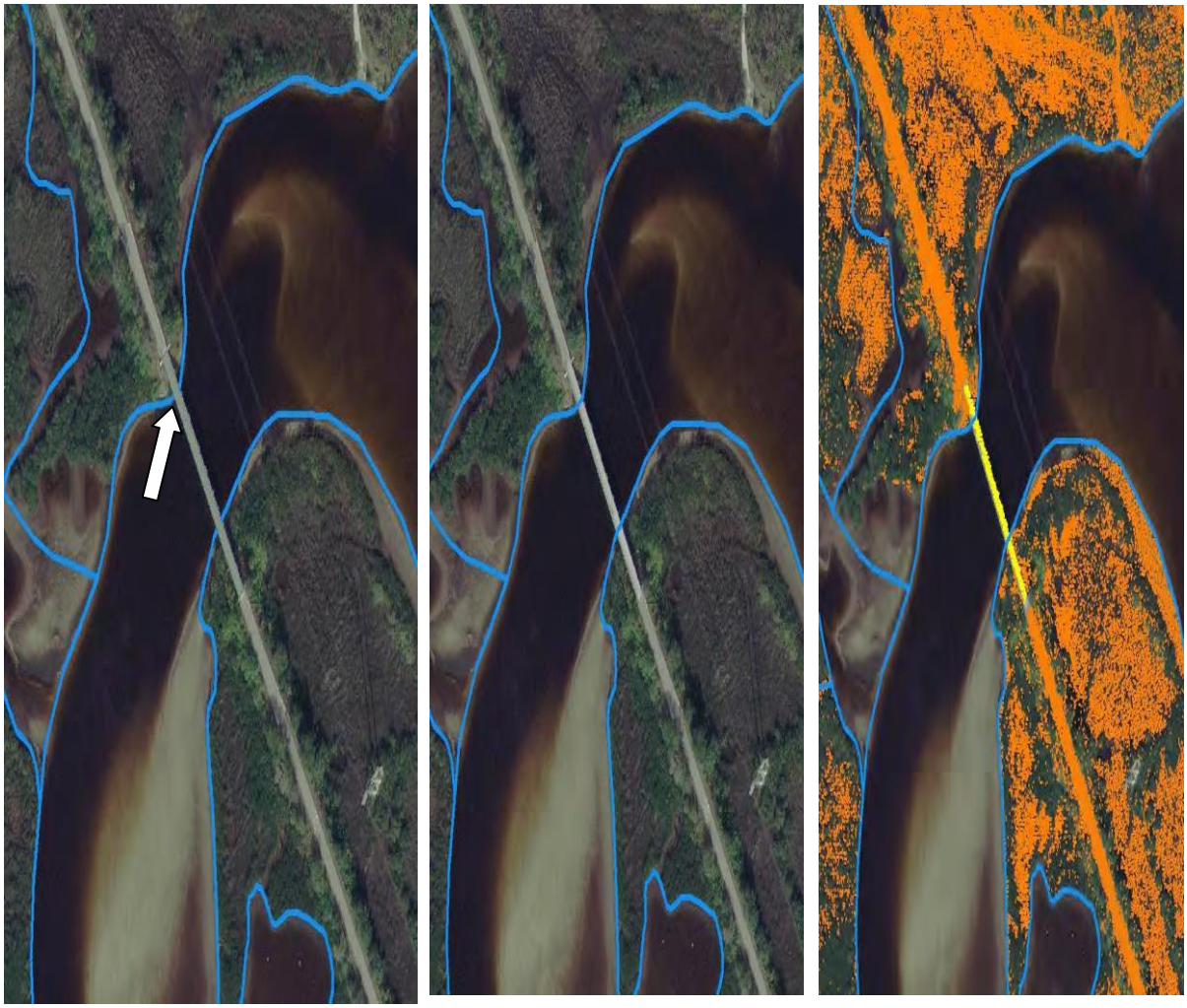
Example 5B – Hydrographic Feature and a Floating Bridge Span

Hydrographic features will be drawn under floating span bridges to show continues flow.

The image to the left illustrates an example where a hydrographic feature erroneously terminates at the edge of a floating span bridge.

The center image shows how the breakline should be delineated.

The right image further illustrates how the laser points clearly show a floating span bridge (Class 23 – yellow points) based on the classification.



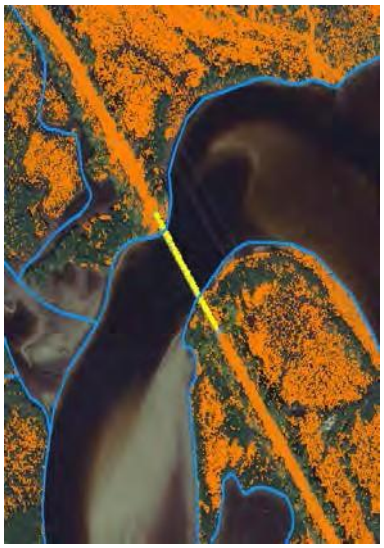
Example 6 – Missing Floating Span Overpass

The bridge and overpass breakline are meant to designate floating bridge spans, and are not required for non-floating overpasses or bridge spans. The points only located on the span are classified to Class 23. The breakline only demarcates the span and not the ramp.

The figure to the left illustrates the missing bridge span.

The center image shows the bridge span as classified in the laser point cloud.

The imager to the right shows the breakline as it should be.

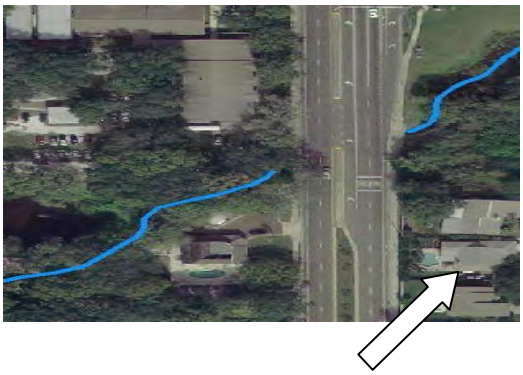


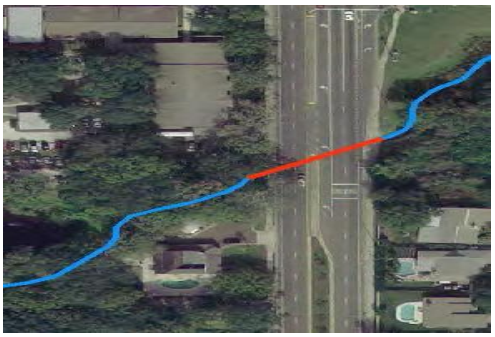
Example 7 – Missing Connector

Connectors are meant to identify areas along roads where there may be a structure that conveys water (e.g. culvert, pipe).

In the example below, the image to the left illustrates a stream flowing under a road. Note the connector is missing.

The image to the right illustrates the connector breakline that should exist.



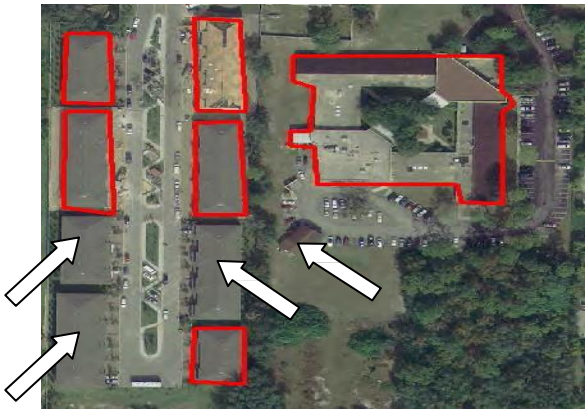


Example 8 – Missing Impervious

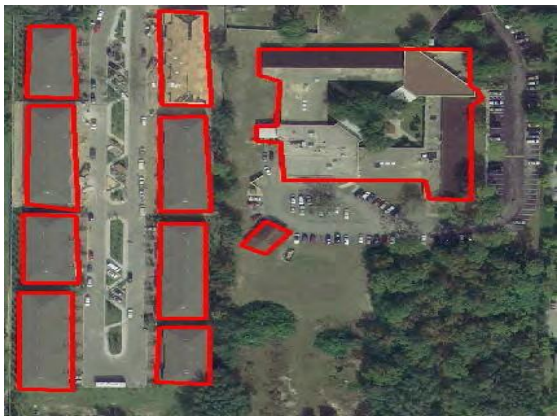
Impervious surface is meant to depict the directly- and indirectly- connected features that prevent the percolation of water and result in runoff. Common features collected are: rooftops, roads, sidewalks, driveways, compacted soils, clay ball fields, limestone roads, and paved surfaces around pools. Impervious features are collected in residential, commercial and industrial areas.

Example 8A – Missing Building Rooftops

In this example, the image to the left depicts building rooftops that have not been breaklined.

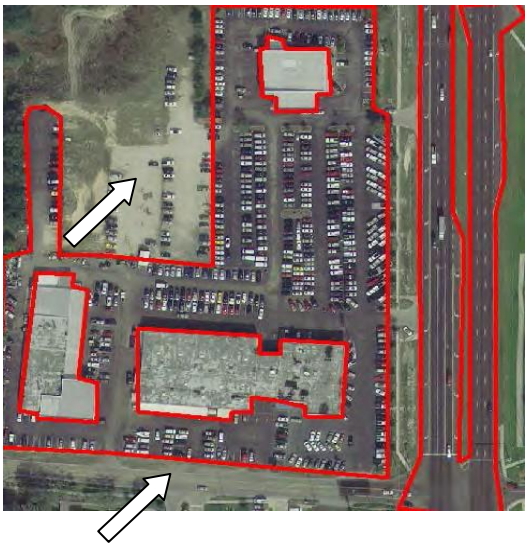


The image to the right shows the correct delineation where all rooftops are breaklined.

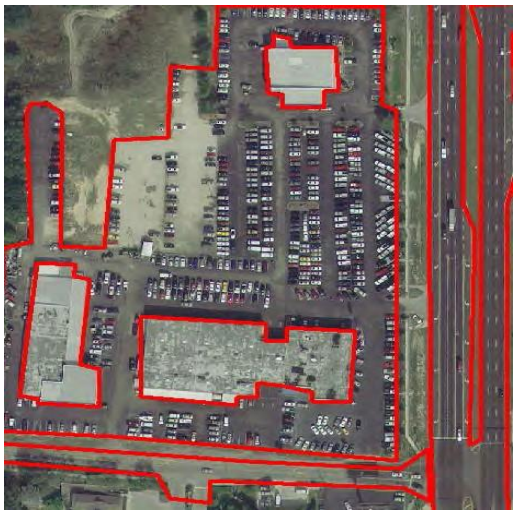


Example 8B – Missing Road or Impervious Surface Features

In this example, the image to the left depicts a paved road and a hard, compacted soil parking lot that is not breaklined.



The image to the right shows the correct delineation where the road and parking lot is included in the impervious surface layer.



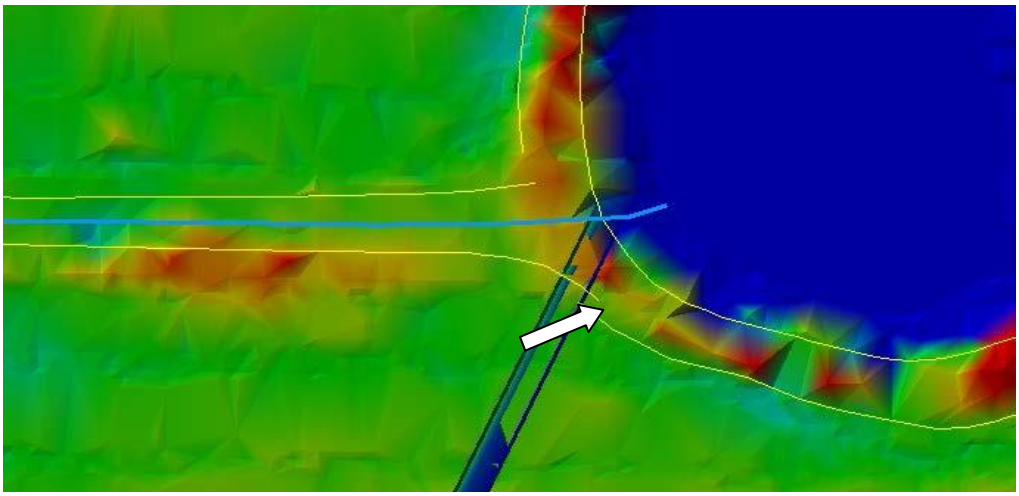
Example 9 – Breakline in Improper Feature Class

Placing features in the wrong feature class is an error that can exist for all feature classes.

In the example below, the road features have been erroneously placed in the soft feature class. These features should be in the respective road feature class. However, when the road is obscured for more than 250', that feature should be placed into the soft feature class.

Example 10 – Topology errors: Gaps, Dangles, and Intersecting Breaklines

Topology errors can exist in any feature class. The most common errors include: improper closer creating gaps, dangles, intersecting breaklines, and breaklines intersecting laser points. These errors can create improper triangulation of the surface. Refer to the image below which illustrates linear artifacts created in the surface from intersecting breaklines.



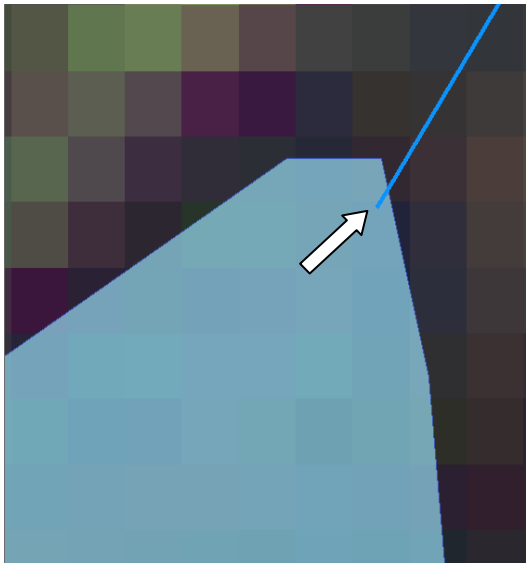
Example 10A – Dangling Breakline

The image to the left illustrates a dangle error where a small end exists.

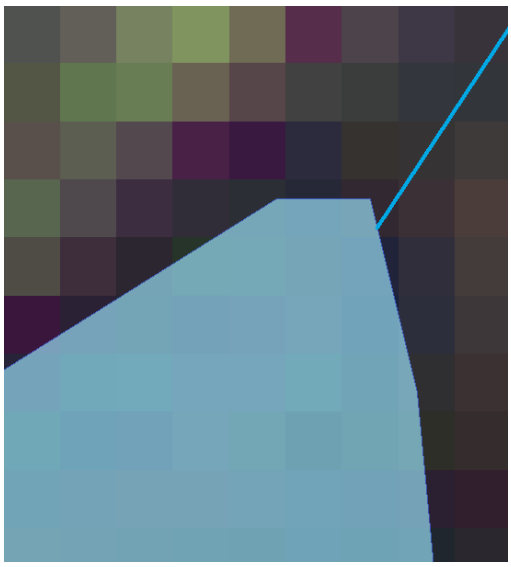
The image to the right shows the proper delineation where the ends snap together.

Example 10B – Intersecting Breakline

The image to the left illustrates an intersecting error where a linear hydrographic is not snapped to the closed water body feature.



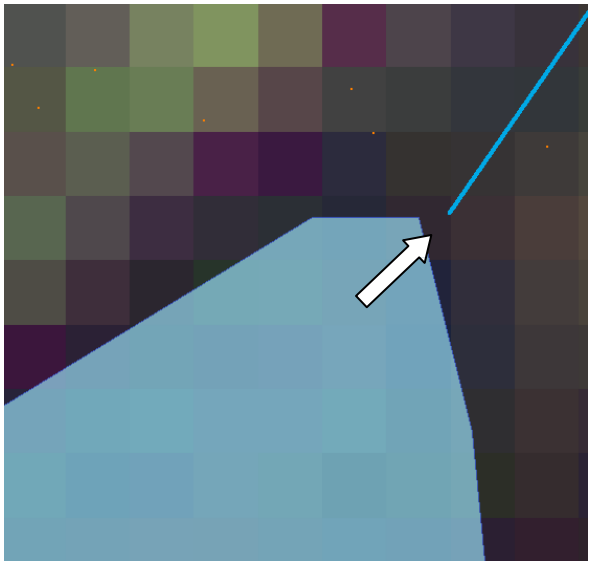
The image to the right shows the proper delineation where the end snaps to the water body edge.

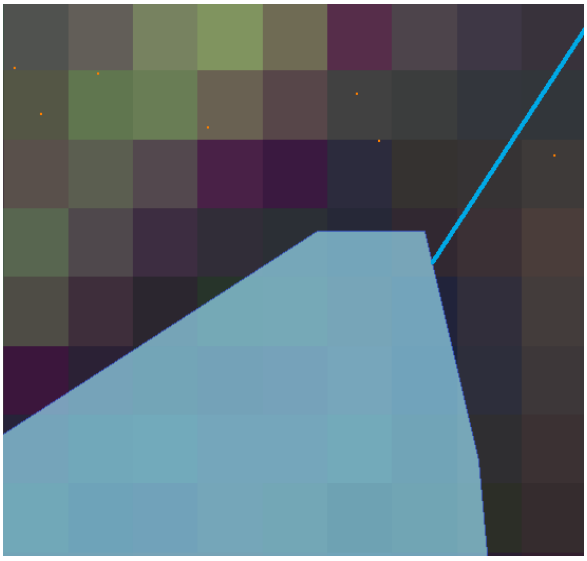


Example 10C – Gap in Breaklines

The image to the left illustrates a gap resulting from the connecting linear hydrographic feature not being snapped to the closed water body.

The image to the right shows the proper delineation where the ends snap together.



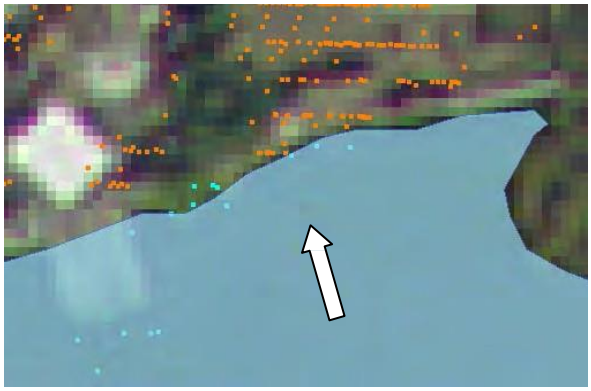


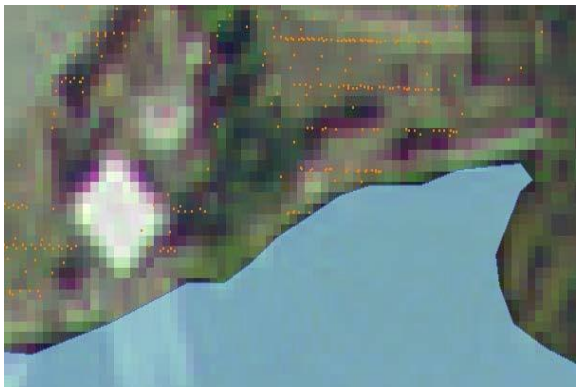
Example 10D – Intersecting Points with Breaklines

*Note that valid ground points should not intersect any breaklines, and are required to be buffered at least 2' from the breakline. If these points remain in the surface an interpolation error will occur.

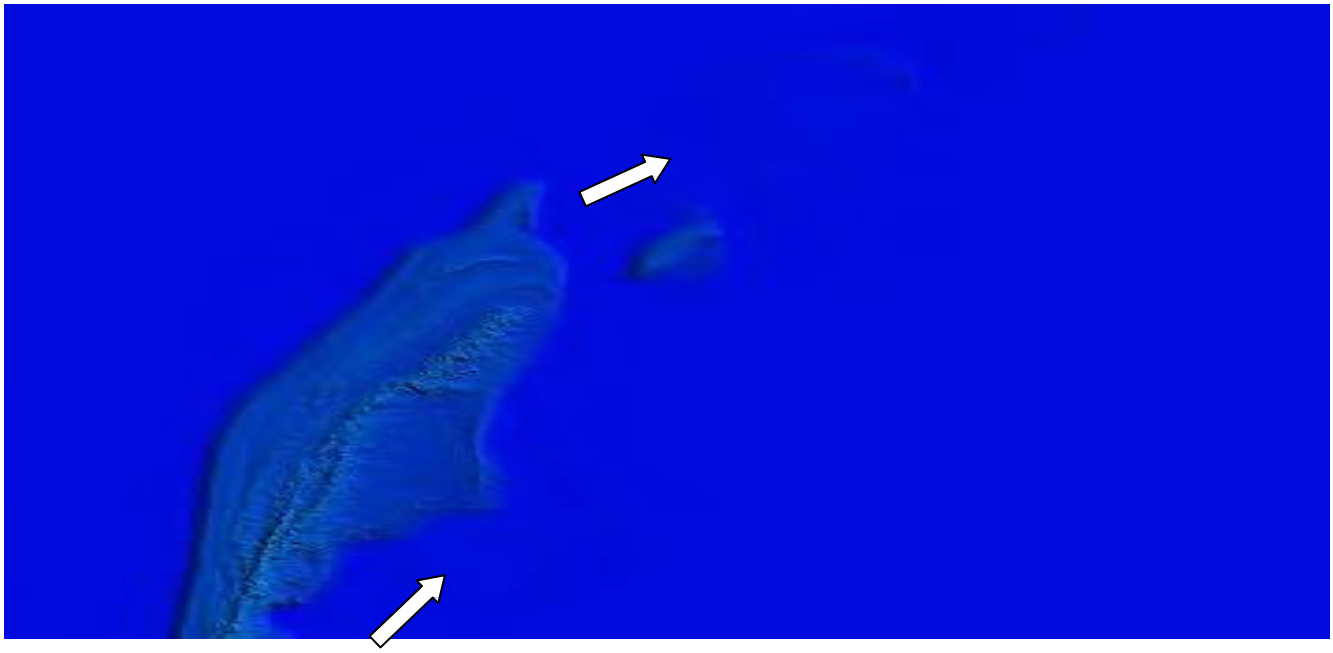
The image to the left illustrates intersecting laser points (shown in blue) with a water body feature.

The image to the right shows the proper delineation where the laser points are filtered out of the breaklined area.



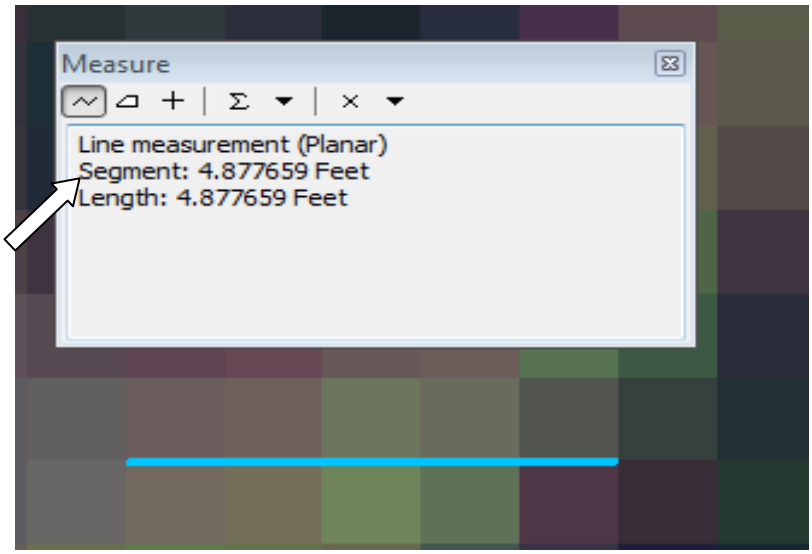


Similar to the previous example, the image below illustrates that when points are intersecting coastal polygons an artificial depression can occur.



Example 11 – Small Length Features

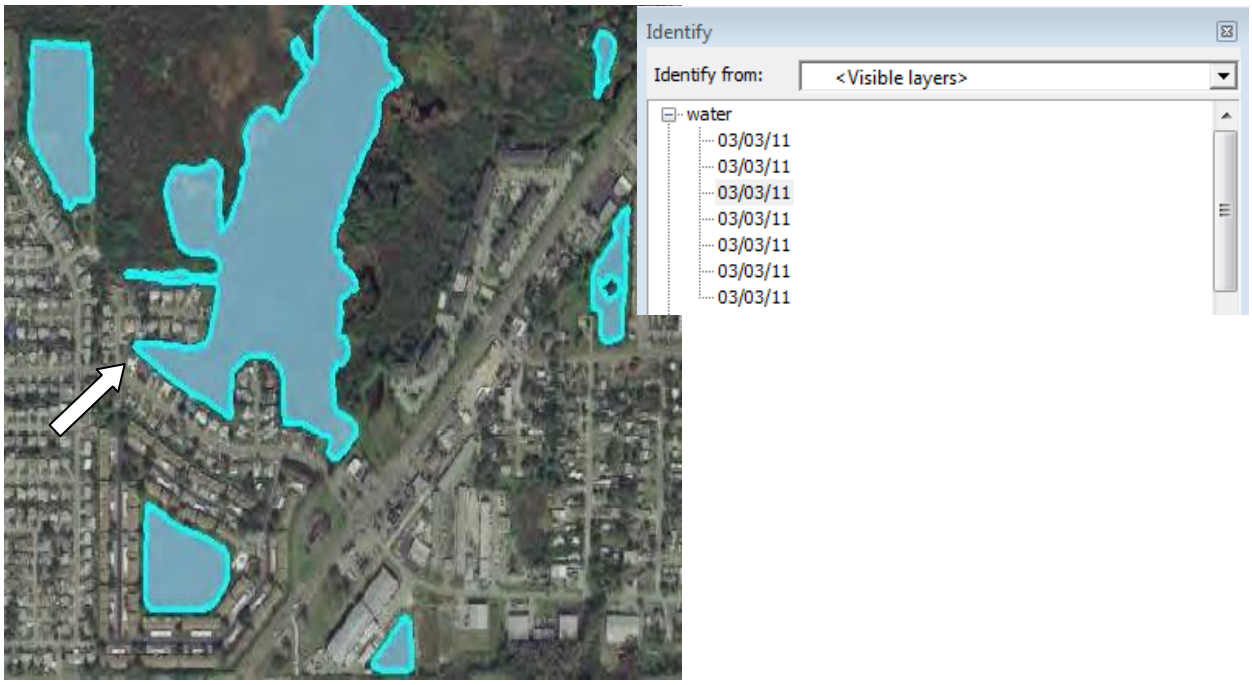
Check the length of all linear hydrographic features by sorting the feature table. Anything below 5' should be inspected for erroneously compiled breaklines that are not adding detail into the surface.



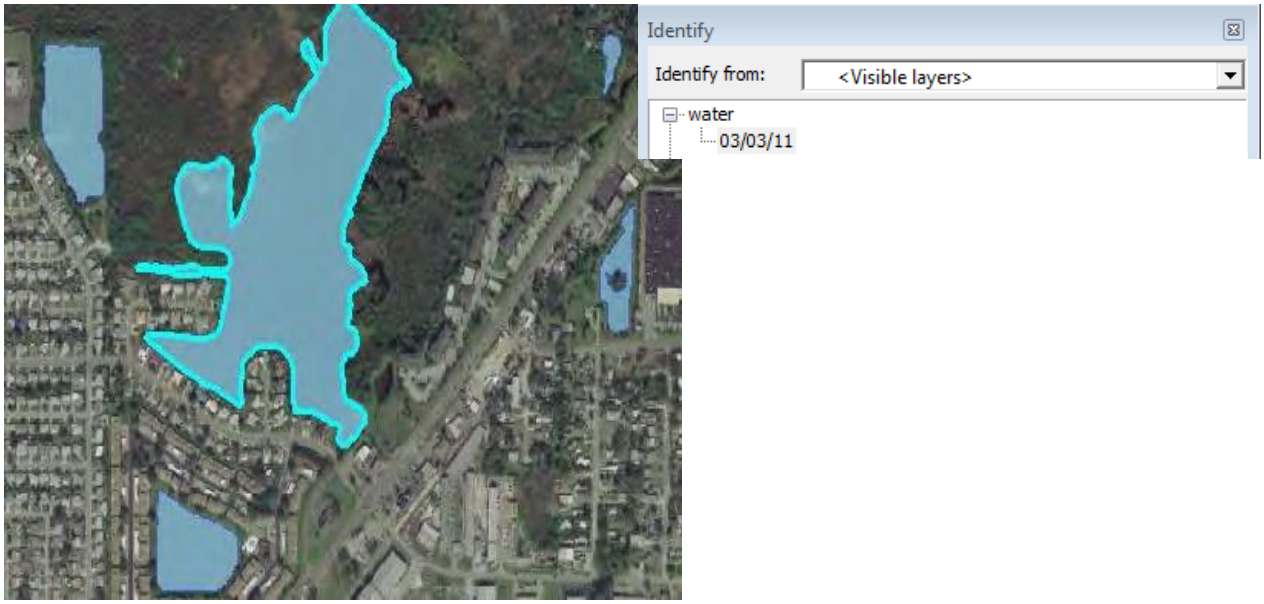
Example 12 – Multipart and Duplicate Features

Running topology checks should identify multipart and duplicate feature errors.

In this example, the water bodies are a multipart feature. Note that when one feature is identified multiple values and features are selected at once.



In this example, the water bodies are no longer a multipart feature but a single feature where one value is returned and one feature is selected.

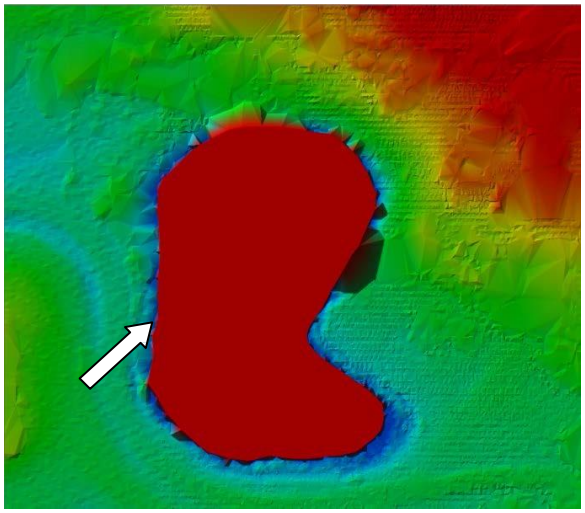


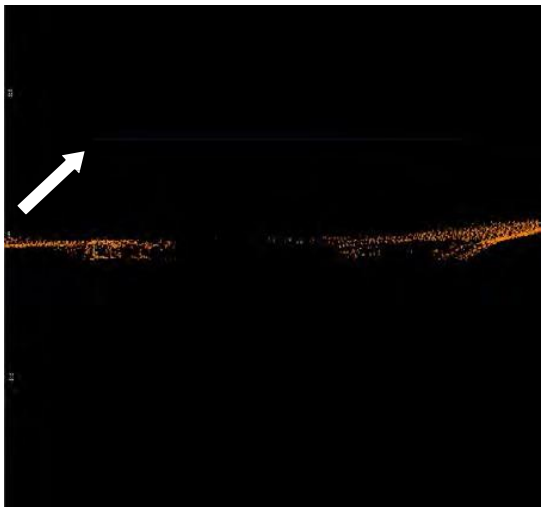
Example 13 – Floating, Digging and Zero Value Breakline Features

Elevation discrepancies can occur with both polygonal and linear features. The examples below illustrate common elevation issues associated with primarily water body and hydrographic feature classes.

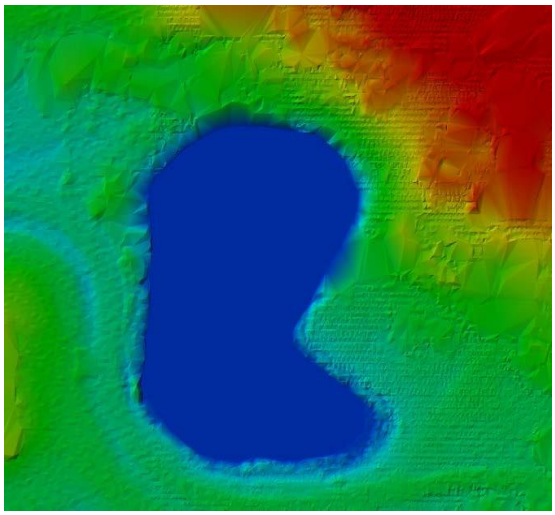
Example 13A – Floating Breakline

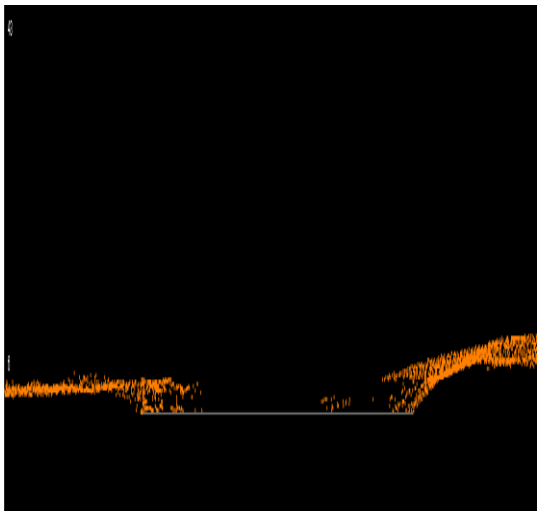
In this example, the water body has an elevation value assigned that is greater than the surrounding land elevations giving the impression that the water is floating. (Dark red color indicates a higher elevation.) The profile view to the right illustrates the breakline as a blue line floating above the ground (orange points).



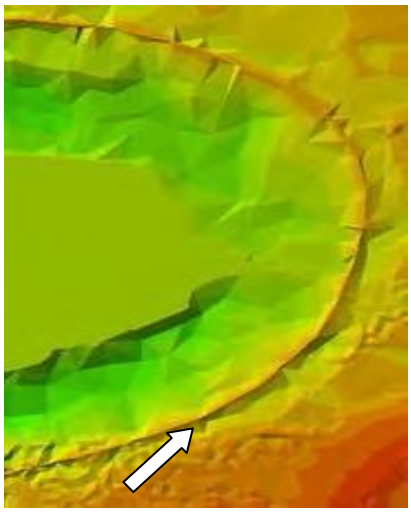


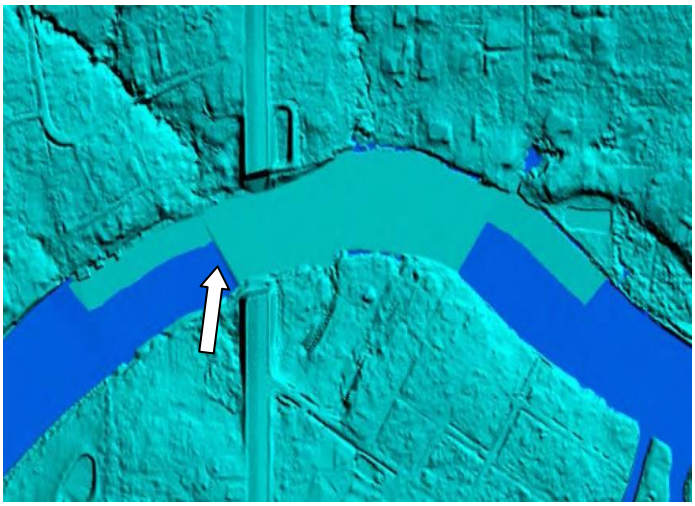
The image below shows the corrected breakline where the water body has an elevation that is lower than the land, and is contained by the land surface. In profile view the breakline (gray line) is below the ground surface.





Linear features may also float above the surface causing artificial ridges as is the case in the image to the left below or float above the surrounding ground as in the image to the right where a plateau is created.



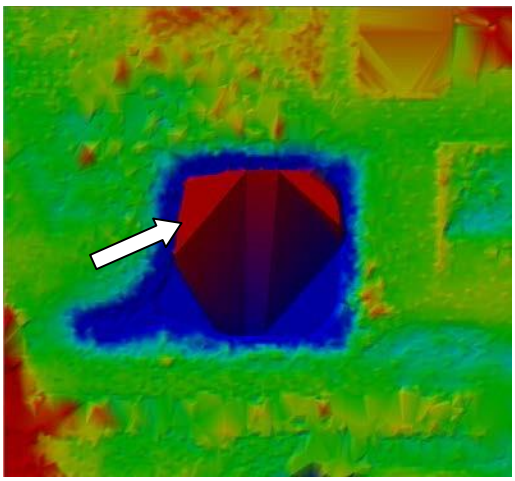


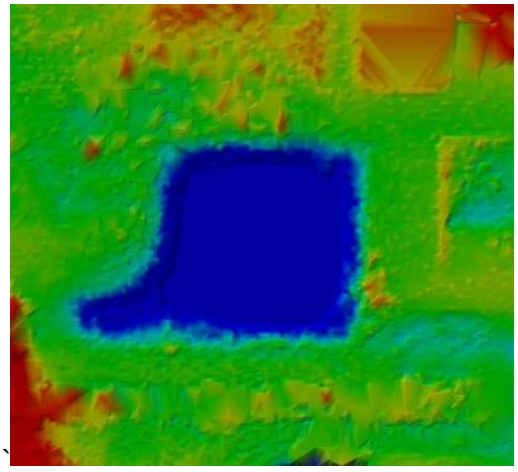
Example 13B – Lopsided Floating Breakline

*Note that lopsided floating breaklines can occur for both linear and polygonal features.

Similar to Example 13A, the image to the left shows a floating water body. The main difference is that the water body below has multiple elevations assigned to its vertices instead of one single, consistent elevation. Some vertices have values that are greater than the surrounding land elevations giving the impression that the water is floating on the one side (dark red color indicates a high elevation).

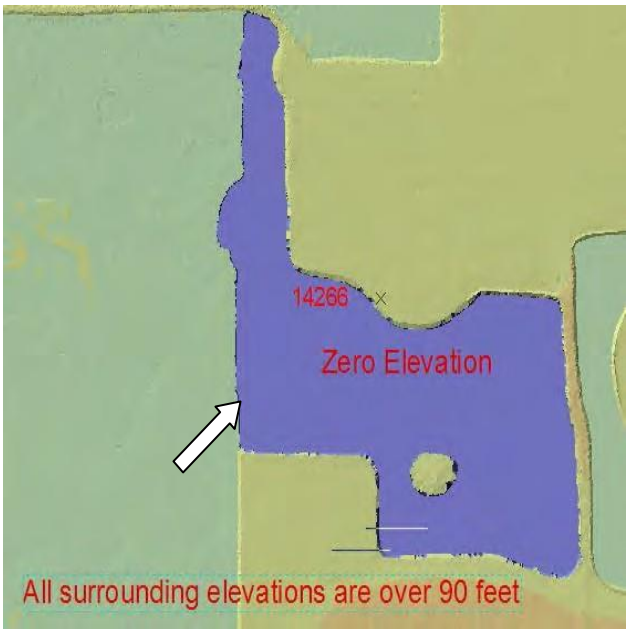
The image to the right shows the water body with a single elevation value assigned and with an elevation that is lower than the land.





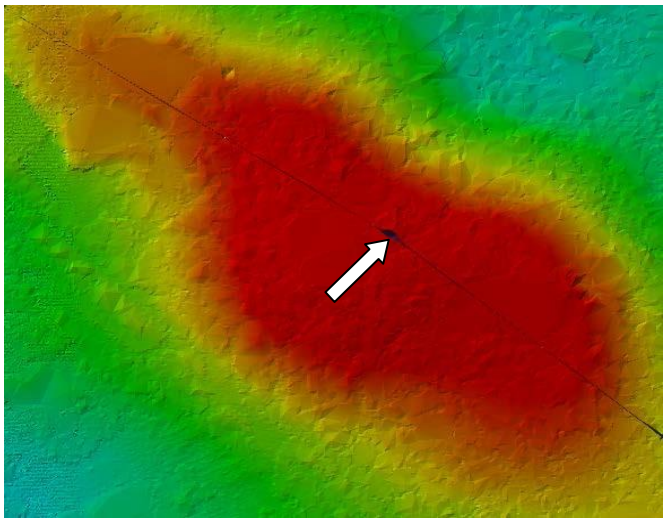
Example 13C – Zero Elevation Breakline

There are instances where the elevation of a feature is erroneously assigned to zero. The image below illustrates a breakline where the elevation is zero creating a 90-foot difference between the breakline and the surrounding land.



Example 13D – Digging Breakline

In some cases where the elevation of a feature is erroneously assigned an elevation that is significantly lower than the surrounding sloping land causing the breakline to dig into the surface. The dark, linear interpolation occurring along the surface indicates the error.



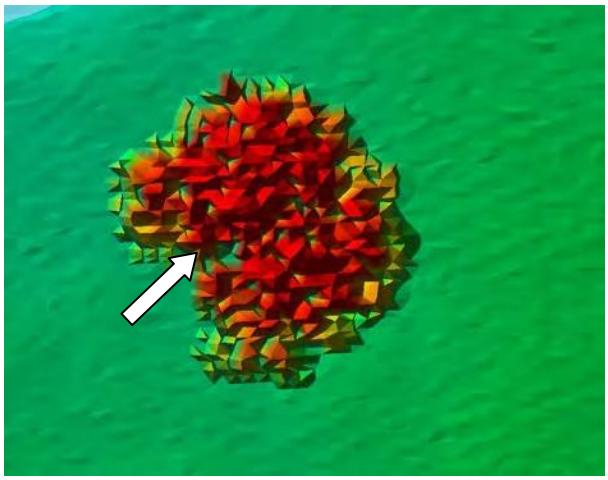
PART II – ELEVATION, FILTRATION, AND CALIBRATION SAMPLES

Compared to traditional methods, LiDAR surfaces are denser and more complicated than photogrammetrically derived Digital Terrain Models. As a result of this complexity, there are several issues that may arise when processing LiDAR data. The primary categories include failure to filter elevation outliers, vegetation, or other artifacts; sensor malfunction or improper flight planning causing topologic voids; and accuracy or calibration issues with the sensor. The following examples illustrate common issues encountered with digital terrain surfaces.

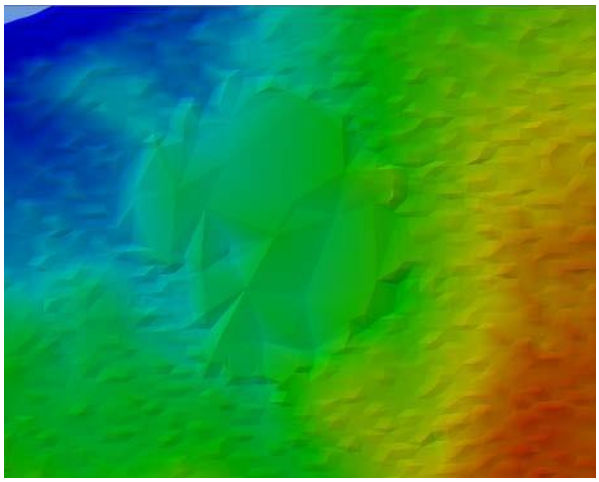
Example 1 – Elevation Spike

Elevations spikes are often seen within the surface where outliers, building rooftops, or vegetation has not been completely filtered out. The spikes may be one point or many.

In the image to the left there is a patch of trees not filtered to ground causing an abrupt change in the surface (from green to bright red).



The image to the right shows the corrected filtered surface.



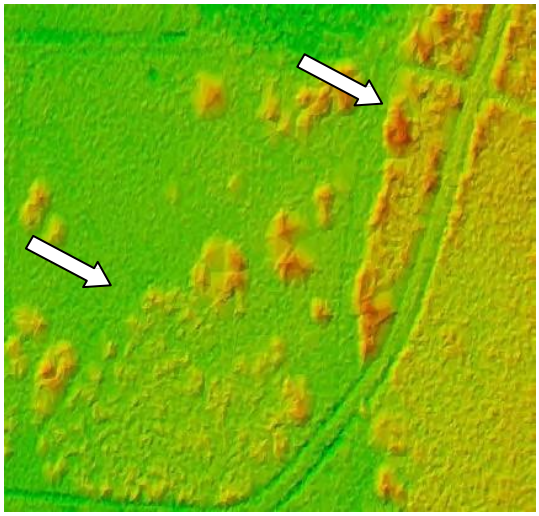
The images below illustrate inadequate filtering of buildings. Notice the building is clearly demarcated on the terrain depicted on the left. These images suggest values are not ground elevation.

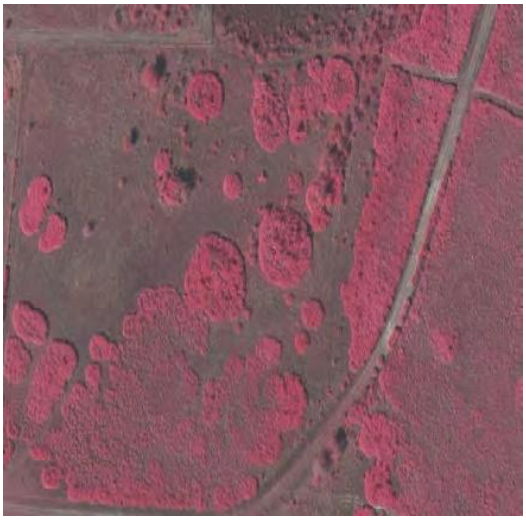
Example 2 –Vegetation Stands Not Filtered

In a project area where there exists a dense vegetative stand with few returns, the last return may be erroneously classified as ground but in actuality is low lying vegetation (e.g. palmettos, saw grass, cogon grass, etc.).

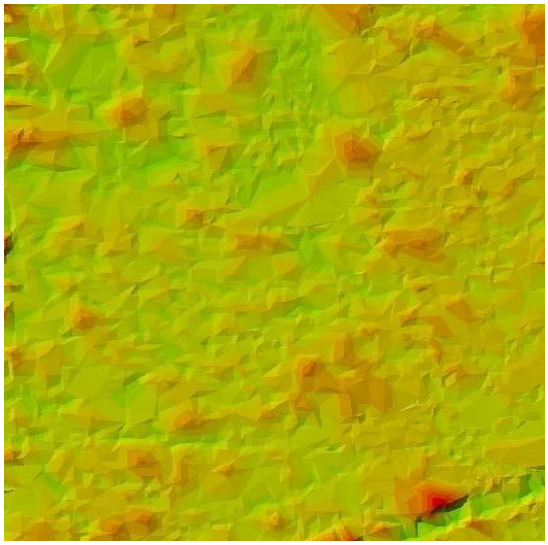
Example 2A – Upland Vegetation Stands

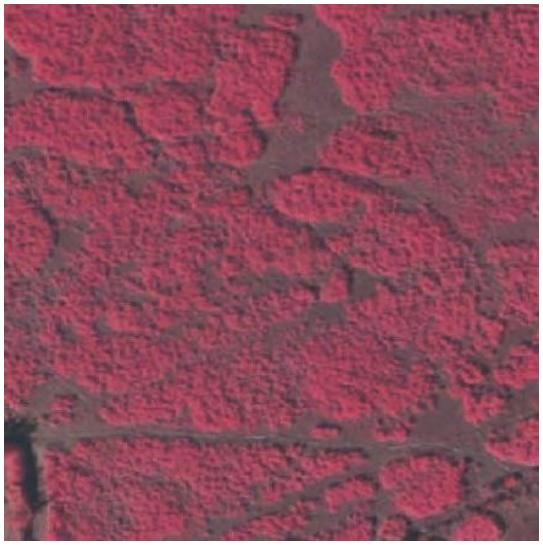
The images below illustrate inadequate filtering of palmettos. Notice vegetation is clearly demarcated on the terrain depicted on the left. The near infrared image on the right clearly shows the vegetation stands.





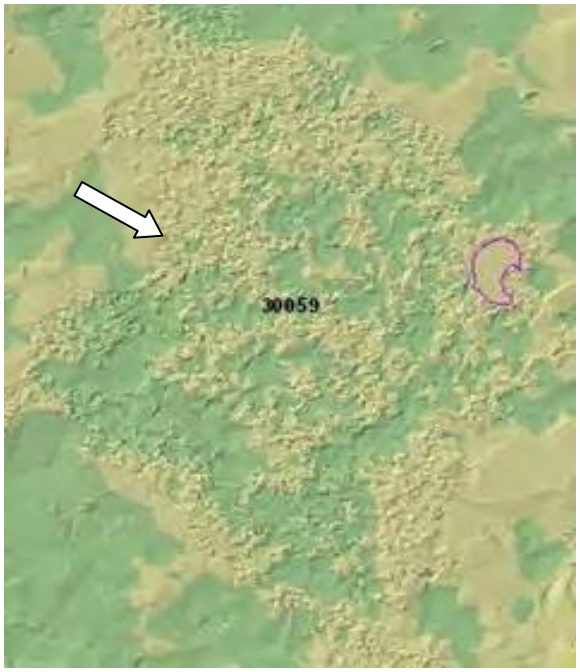
Some vegetation stands are not as clearly demarcated as the instance above. Although the image shows the palmetto stands, the terrain appears as a roughness in the surface.

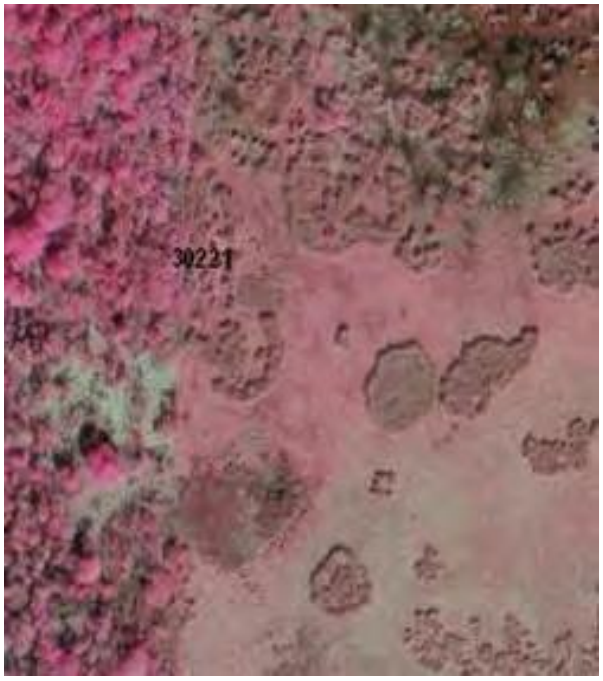




Example 2B –Wetland Vegetation Stands

The images below illustrate wetland areas (areas with dark, wet hydric soils). These depressional areas often have noise (points fluctuating up and down) due to the interaction of the LiDAR light wave with the soils, and is compounded further by low lying vegetation. The images below illustrate this phenomenon where by the surface is inadequately filtered and appears to be rougher than the surrounding ground.

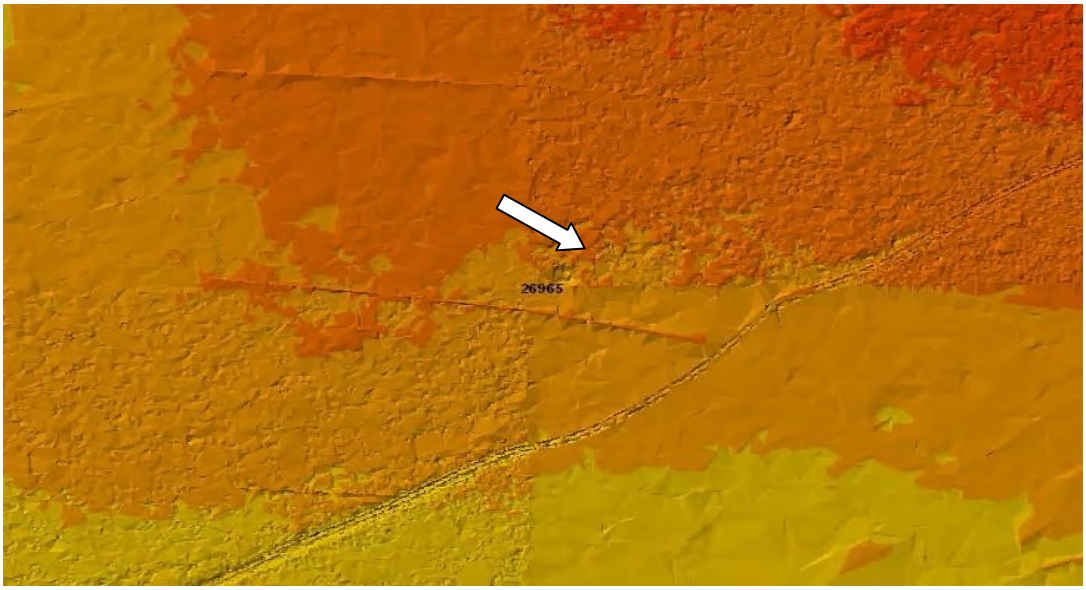




Example 3 – Inconsistent Filtering

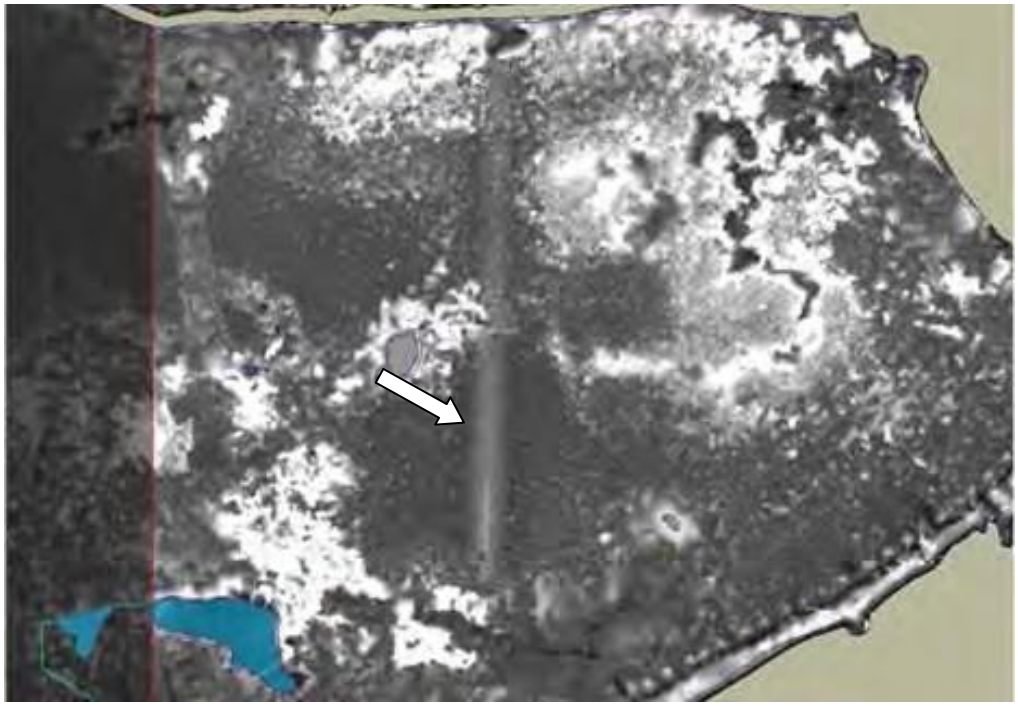
Inconsistent filtering often results when multiple operators apply different filters with differing tolerances and parameters.

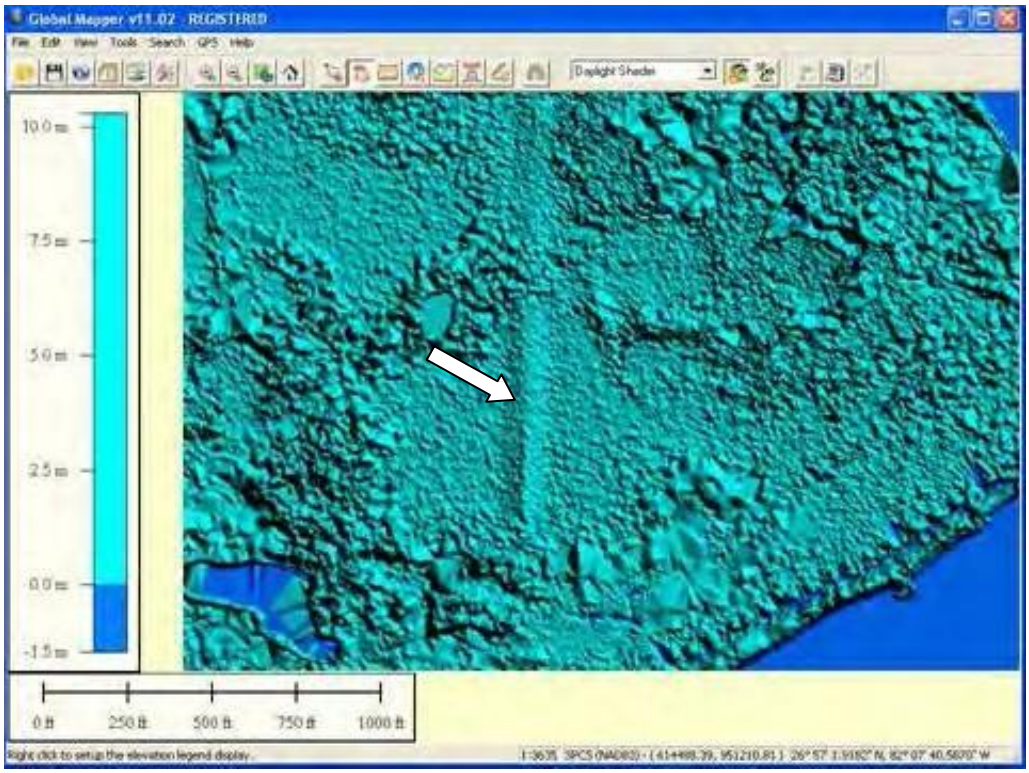
The images below illustrate inconsistencies in filtering. Some areas have an apparent rectangular filter applied creating a smooth to rough appearance within the same land cover type.



Example 4 – Artificial Ridge in Wetland

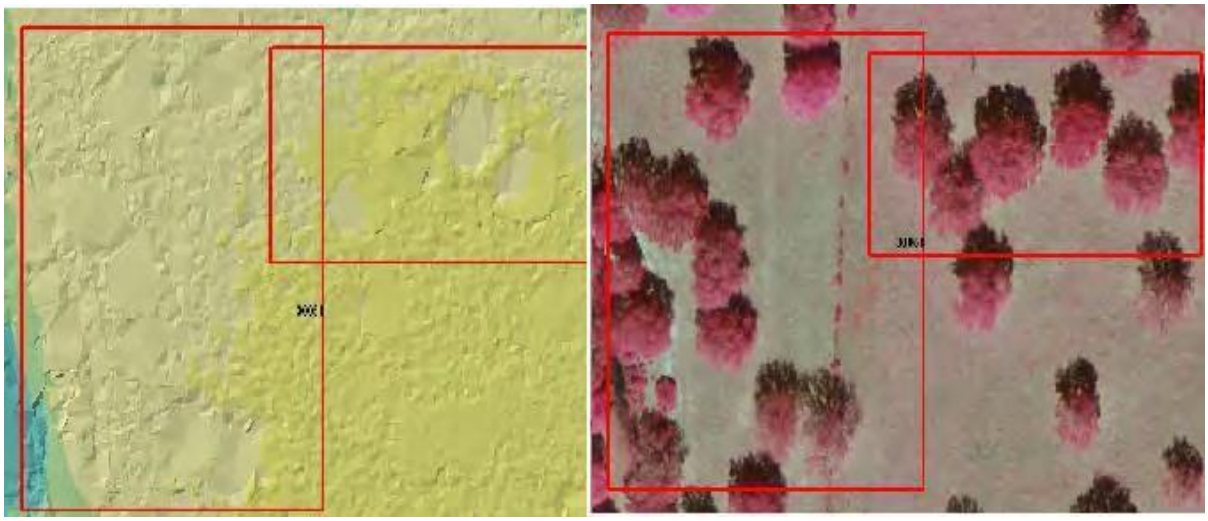
The images below illustrate a filtering error in wetland area where thin, low lying water creates an artificial ridge as a result of sharp angles to the sensor.





Example 5 – Artificial Depressions Under Oak Trees

The images below illustrate 1 to 2-foot depression areas corresponding under oak tree canopies. Notice smoother, depressed areas indicated in areas within the red box.

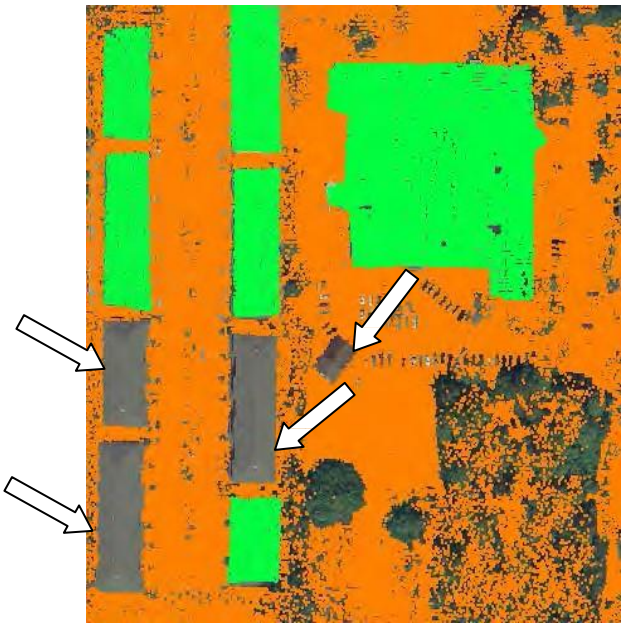


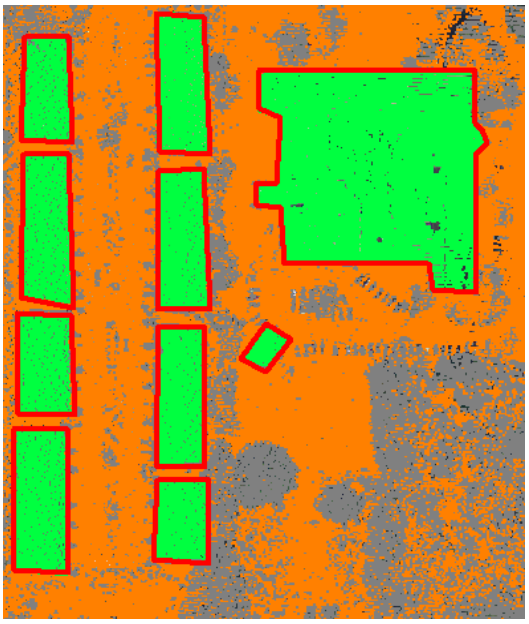
Example 6 – Impervious Surface Buildings Not in Class 6

When impervious surfaces are required to be collected, the building rooftops need to be in Class 6.

In this example, the image to the left depicts only selected building rooftops are classified to Class 6.

The image to the right shows the correct delineation where all rooftops are breaklined.





Example 7 – Overpass Filtering Issues

As stated in Part I – Example 5, there are two types of bridges: floating and non-floating span. Classification errors can occur for both types of bridges. In non-floating span bridges, the most common error is classifying the span as Class 23 or Unclassified rather than ground. For floating spans, the most common error is the span not being classified or only partially classifying the points along the span. The images below illustrate common floating span errors.

*Note to find these issues quickly, zoom to each overpass breakline.

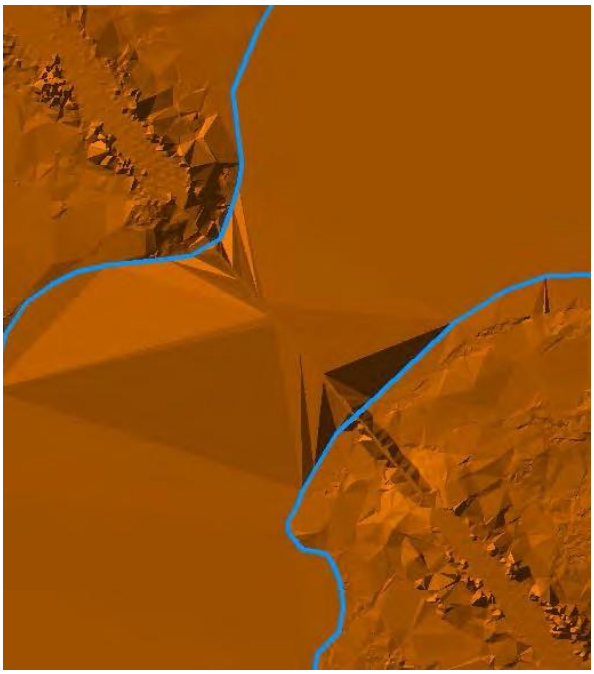
Example 7A – Floating Span Unclassified (Class 1)

The image to the left shows that the points on the span were not classified as Class 23.

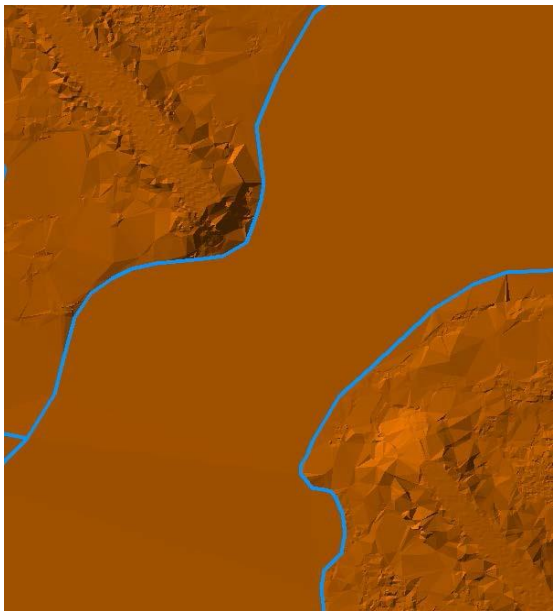
The image to the right shows the correct depiction where the points are classified as Class 23.

Example 7B – Floating Span Classified as Ground (Class 2)

There are some instances where the floating span is misclassified as ground (Class 2). The images below show the laser points and the triangulated surface depicting this error. The centerline of the bridge span has been misclassified as Class 2 – ground and the dam resulting shown clearly in the interpolation indicates there is an in the surface error.



These images below show the laser points and the triangulated surface properly classified.



Example 7C – Floating Span Ramp Classified as Class 23

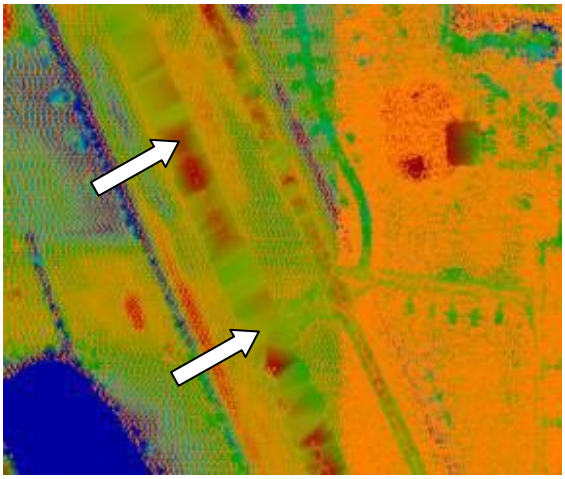
The image to the left shows that the points on the ramp leading up to the span are erroneously classified as part of the span (Class 23).

The image to the right illustrates the proper classification of points into Class 2

Example 8 – Reflectance from Road Paint

The intensity of the LiDAR often varies depending on the material being measured. For example, dark, new asphalt is often returned a few tenths of a foot lower than the feature's true elevation. Likewise, paint stripes on roads and airports can cause the LiDAR points to be reflected and results in a higher recorded elevation.

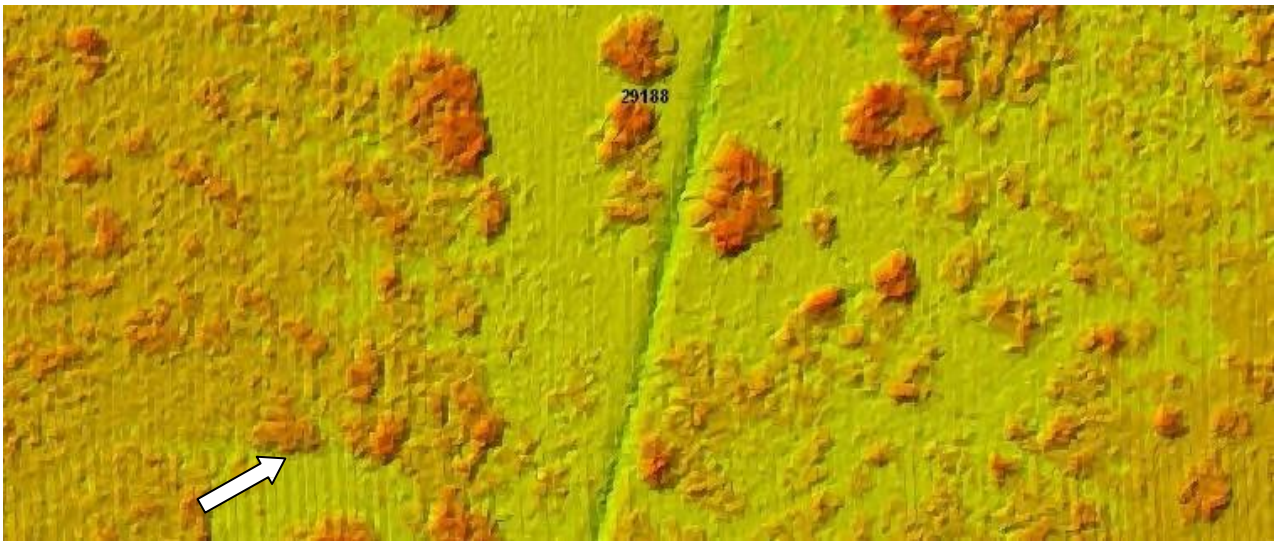
The image below shows an airport runway with reflective paint, note the dark red peaks along the paint.



Example 9 – Corn Row Effects

Improper calibration of the LiDAR sensor can create distinct corn row effects in the surface. The corn row effects are exhibited in the surface as systematic straight lined ridges along the direction of flight.

The images below illustrate the cornrow effect in an upland, heavily vegetated area.



Example 10 – Data Voids

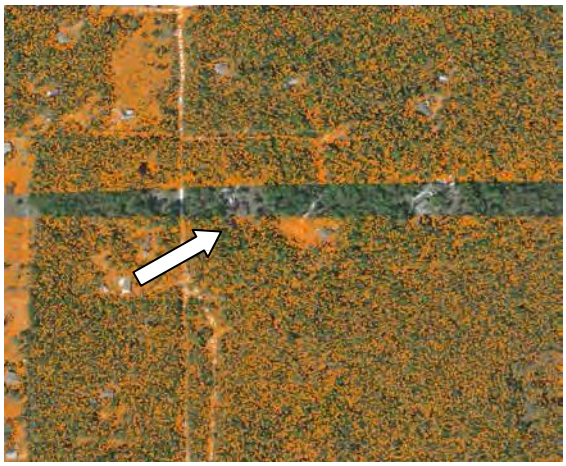
Data voids may be caused by sensor malfunctions where the sensor fails to acquire the data, inadequate filtering, or from improper flight planning where the amount of required overlap between flight lines has been miscalculated. This error excludes valid void areas caused by filtered out buildings, obstructions, and vegetation.

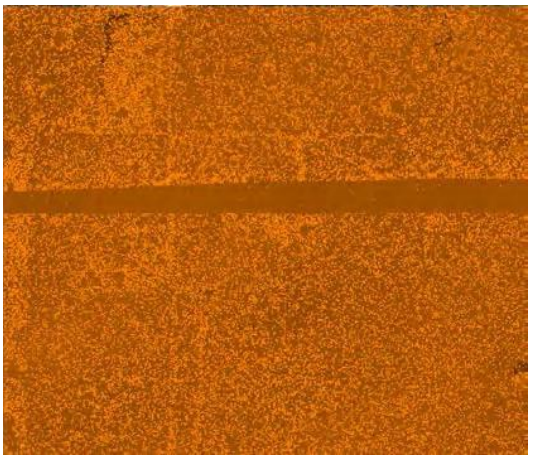
Example 10A – Inadequate Filtering

In the example below, the area (highlighted in red) was inadvertently filtered into the unclassified class. Notice that there are no land cover differences to explain the void. In this instance, the error is easily seen by reviewing all point classes and is recoverable.

Example 10B – Inadequate Planning or Sensor Malfunction

In the example below, there are large, elongated void areas following the direction of flight. The error appears the same regardless if the vendor miscalculated overlap area between flight lines or if the sensor malfunctions.

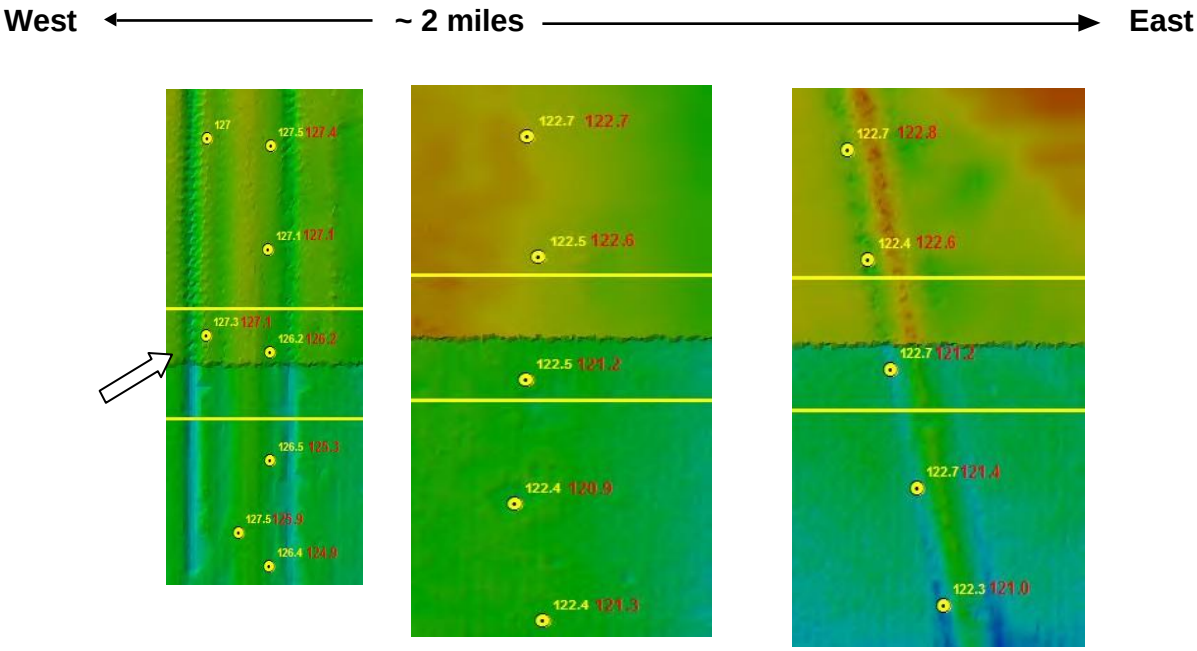




Example 11 – Vertical Accuracy Error in Tie Edges

Improper edge matching between two separate project areas or flight lines can occur when the surface is not adequately controlled and is not tied correctly to the datum. A stair step pattern becomes visible when viewing the triangulated surface or the digital elevation model.
* Note that using the profile tool to further investigate these tie edges is useful.

In the image below, a vertical discrepancy between two project areas are displayed. Within a two mile transect, the differences exceed the acceptable vertical accuracy of +/- 0.60 feet.



Author: Cheryl Glenn
Date: 9/2/2015
Revision # Original
Date Last Reviewed: 9/2/2015

District Structures Survey Report Updates

Purpose

The purpose of this document is to provide instructions on how to update the District Structures feature class, with an emphasis on adding Survey Reports to the structures.

Scope

The District Structures feature class has file attachment functionality, and this needs to be maintained during editing. It consists of a polygon feature class, table, and relationship. The table holds the survey reports, and is maintained using the file attachment functionality.

Procedures

Receipt of Survey Reports

1. When a survey of a District structure has been completed, the survey report is attached to the structure in the GIS database. The Survey Section will notify GIS via e-mail.
2. Save the PDF attachment of the survey report (do not need the spreadsheet that is also attached to the email).
   a. If a revision of the report has been done, there will be a "Revised Date Section" on the report directly following the surveyor's signature and seal.


1 in = 60 ft

04/10/2014
Samuel Mark Beach, PSM Date of Signature
Florida Professional Surveyor and Mapper No. 6261
Southwest Florida Water Management District
2379 Broad Street (U.S. 41 South)
Brooksville, Florida 34604-6899
(352) 796-7211 (800) 423-1476

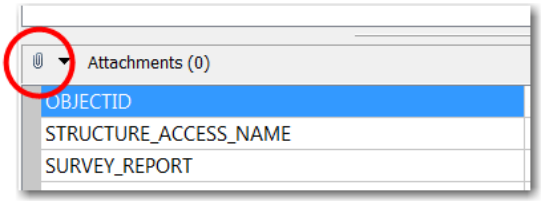
Revised March 31, 2014: Structure image updated and revised invert elevation.

   b. The most recent version of the survey report is the only one to be placed in the database. If one exists, remove it. Check for the revised date in the document for the most recent version if there have been duplicates sent.
3. Go to the GIS Functions below, skipping any that are not needed.

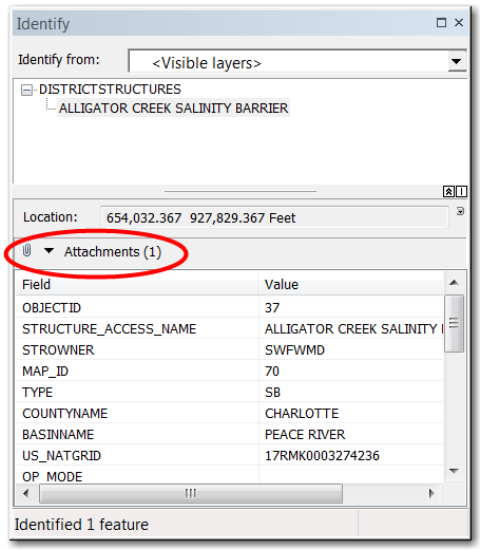
GIS Functions

1. Copy and paste feature class, table, and relationship into a new file geodatabase (this method will ensure that the file attachment functionality will remain intact)
   a. Use source: p:Layerfiles/DatabaseConnections/sdeview_entop_sdereg.sde
   b. Copy the following into a new file geodatabase
      DISTRICTSTRUCTURES
      DISTRICTSTRUCTURES_ATTACH
      DISTRICTRUCTURESATTACHREL

2. If an older version of a survey report exists, remove it.
   a. Have open edit session
   b. In the districtstructures_attach table, select and delete record for the pdf to be deleted. (can also use toolbox function of “remove attachment”
   c. Remove name from the field “survey_report” in the districtsturctures feature class.
3. To add survey report
   a. Have open edit session
   b. Open the Attributes dialog box for the districtstructures feature class
   c. Select the structure that the report will be added to. Make sure the select row is for the structure and not the access point.
   d. Enter report name in “survey_report” field. Leave off extension
   e. Select the “open attachment manager.” This is located on the “Attributes” dialog box under editor → editing windows → Attributes



   f. Click on “add” and navigate to the file to attach. The file should have been added to the list. Click OK.
4. To view the survey report.
   a. Identify the structure point
   b. Click on the Attachments section of Identify Dialog Box



GIS Applications Affected by Feature Classes

Purpose

This document defines the Southwest Florida Water Management District's (District) GIS applications that are affected by feature classes. These applications may need to be updated as feature classes are modified or created due to schema changes.

Scope

The District is using Esri's Spatial Data Engine (SDE) feature classes for its enterprise geographic information system (GIS) data. To help the District's Regulatory evaluation staff, Engineering staff, and Board Members, several applications have been created that utilize these feature classes. Whenever a feature class is updated or created, these applications will also be reviewed to determine if they need to be updated. Cooperation between the ITB Systems Administrator and the District's Web Master is needed to update these applications.

Procedures

Prior to loading into the Dissemination Database, Development and Acceptance Databases should be loaded with the data. Only some non-WMIS applications and all WMIS applications should be tested with development and acceptance data prior to promoting to Dissemination.

Add SWFWMD Data and Map Extent Tools

Adding layers to the 'Add SWFWMD Data' or 'Map Extent' tools is done using ArcMap. With ArcMap open, connect to the database with the feature class, as the account sdeview. Add the feature class and change the symbology, labels, and attribute aliases as needed. Do a Save as Layer File to P:\LayerFiles and into the correct category folder. Close ArcMap. The SDE Data Administrators can only do this.

Non-WMIS Map Viewers

These are either ArcGIS Online for Organizations (AGO) mapping applications or JavaScript mapping applications. In order to put a data layer into a mapping application, a GIS REST service is required. For a more detailed description of the procedures, refer to Standard Operating Procedure (SOP), ArcServer Map Services Standards. For both types of mapping applications, an AGO 'web map' is required. This is created by those staff with AGO accounts. Once the 'web map' is created, the web map identification number is used in the application.

Standard District ArcMap Projects

There are several standard District ArcMap projects. These are read-only projects (or MXDs) that contain layers with default symbology and scale dependencies. Internal staff use these MXDs to view the District's GIS data for permit evaluation, watershed modeling, and data display. Open the standard MXD in ArcMap. Add the layer using the sdeview account or use the 'Add SWFWMD Data' tool. Change the symbology, labels, and attribute aliases if needed. Save the map as <name>_2.mxd. Replace the original document found in P:\MapDocuments. Place the original version into the Archived_MXDs folder found in P:\MapDocuments. Remove the _2 from the name.

Data Distribution Internet FTP site
Data packages are created as self-executing zip files. They include shapefiles with projection files and metadata, both XML and HTML. It may also include any attachment files, such as PDFs, which correlate to the metadata, or other related attribute tables. The zip file suffix should be .EXE and not .exe. Only the GIS Database and Server Administrators have access to download data to the FTP site.

Data Distribution via Open Data Application
Esri's Open Data application is replacing the Internet FTP site for data distribution. The Open Data application uses REST services to distribute the data. Metadata, both FGDC and Esri's standard format, have been created for each dataset found in the REST service that has been shared to the Open Data application. Once the REST service has been created, the summary, description, and access constraints in AGO must be populated. The thumbnail must be updated to the proper format. The owner of the service is changed to the generic GIS publisher and the service is shared to the group designed for Open Data and the Public. Only AGO Administrators have the ability to share the service as Public.

WMIS Map Services
Any changes to the WMIS map services will be requested by the WMIS team.
On existing data, only schema deletions may affect WMIS maps. Communication with the WMIS developer is needed to remove any attributes from existing feature classes as these may be used in the spatial web services located on the WMIS servers. For schema changes and/or symbology changes on existing data, re-publish the map service and communicate with the WMIS developers that the changes have occurred.

For new data, once the data layer has been added to the WMIS map services communicate to the WMIS developers of the changes. If after testing no errors or issues are found, then the data can be moved to Acceptance and Dissemination with testing after each. If issues occur due to the changes in data (schema), a meeting should be called to review the changes and the effects on the WMIS application. During this meeting it will be determined if the changes will stay or if the older version will be used. This meeting should include staff from the GIS section and WMIS development team. Other staff may be invited due to the nature of the data as needed. If WMIS objects to the changes prior to moving to Development, then a meeting should be called to discuss to the reasons and determine an outcome. Also refer to SOP, ArcServer Map Services Standards.

References

ArcServer Map Services Standard

GIS Data Metadata

Purpose

This document defines the District's metadata standards that are associated with its enterprise geographic information system (GIS) data. It also defines the procedures used to create or edit metadata. Metadata is essentially data about the content, quality, condition, and other characteristics of the data. Metadata is that component of data that describes itself. For every enterprise GIS dataset at the District, a metadata document will accompany it. This document will cover vector, image and LiDAR and LiDAR datasets.

Scope

It has been estimated that over 80 percent of the cost of GIS is associated with developing and maintaining data. This being the case, it is critical that GIS developers and managers implement procedures designed to protect this investment in data. Metadata is used to describe how the geospatial and attribute data was collected and processed into its final form. The District has adopted the Federal Geospatial Data Committee (FGDC) standards on the content and format of geospatial metadata. The FGDC uses the Content Standard for Digital Geospatial Metadata (CSDGM), which specifies information content.

With the release of ArcGIS 10, Esri has incorporated significant changes to editing and creating metadata. The District currently uses the Federal Geographic Data Committee (FGDC) standard for metadata which is not natively supported by ArcGIS at this point. However, there are alternatives for maintaining existing District metadata and creating FGDC compliant metadata.

Standards

The CSDGM standard is organized into a series of sections, or chapters. There are seven main sections and three supporting sections. The main sections are: identification, data quality, spatial data organization, spatial reference, entity and attribute, distribution, and metadata reference. This document will only list those elements in the sections that are required by the District. The sub-headings (ex. 3.1.1) correlate to the tabs found in the sections when using the ArcCatalog FGDC Metadata Editor Add-In to edit the metadata. Use the **USGS Geospatial Metadata Validation Service** to check the metadata using the reference found in 5.3.

IDENTIFICATION TAB

General
The Abstract, Purpose, Access Constraints, and Use Constraints should be completed. Complete Supplemental Information if additional information will enhance the knowledge of the user to the data, such as special instructions on the use of relationship tables.

Contact
The Primary Contact should be the Organization. Complete the Person, Organization, Telephone, Hours of Service, and Address information.

Citation
Complete the Title, Originator, Publication Date, and Publication Information. Complete Other Citation Details if other information will enhance the citation information, such as telephone number for the originator. Remove the link to the data by removing the Online Linkage from the General tab.

Time Period
Complete the Currentness Reference, pick the date type, and enter a date in the format of YYYYMMDD.

Status
Complete the Progress and Update Frequency.

Spatial Domain
The Bounding Coordinates, North, South, East, and West need to be completed.

Keywords
Place the word ‘none’ in the Thesaurus field for Theme and Place. Enter in as many Keywords as necessary for both Theme and Place.

DATA QUALITY TAB

General
Complete the Logical Consistency Report and Completeness Report.

Attribute Accuracy
Complete the Accuracy Report with a description of how the accuracy of the attributes was determined and what that accuracy is. If the dataset was downloaded from another agency and used in its original format, then state “It is assumed that all attributes are correct and accurate. For more information, contact …”.

Positional Accuracy
Complete the Horizontal Accuracy Report with a description of how the positional accuracy of was determined and what that accuracy is. Complete the Vertical Accuracy Report for image and LiDAR data.

Source Information
Complete the Type of Source Media, Source Citation Abbreviation, and Source Contribution in the General Tab. Complete the Title of the source, Originator, and Publication Date in the General tab for the Source Citation. Complete the Other Citation Details and Online Linkage if applicable. Complete the Publication Information for the Source Citation. Complete the Currentness Reference, pick the date type, and enter a date in the format of YYYYMMDD for the Source Time Period of Content. Add and complete all sections required for all sources used to create the dataset. Sources may include temporary data that are used for intermediary process steps.

Process Step
Complete the Process Description, Process Software and Version (i.e. ArcMap 10.0), Process Date (may be range) in the format YYYYMMDD, Source Used Citation Abbreviation, and Source Produced Citation Abbreviation if applicable. For Process Contact, enter the Primary Contact as the Organization and complete the Person, Organization, Telephone, Hours of Service, and Address information. Add as many processes as is needed to fully describe the creation of the dataset.

DATA ORGANIZATION TAB

General
Direct Spatial Reference Method, SDTS Terms are used. The SDTS, Point and Vector Object Type and count are needed (not the Esri Terms Desc) to pass the FGDC Metadata parser.

SPATIAL REFERENCE TAB

General
Geographic Coordinate System Name: GCS_North_American_1983_HARN Projected Coordinate System Name:
NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet
Horizontal Datum Name: D_North_American_1983_HARN Ellipsoid Name: Geodetic Reference System 80
Semi-major Axis: 6378137.000000 Denominator of Flattening Ratio: 298.257222

Horizontal Coordinate System
Choose Planar. In the Planar Coordinate Information tab, choose Coordinate Pair and the following:
Abscissa Resolution: 0.001000
Ordinate Resolution: 0.001000 Planar Distance Units: survey feet

Vertical Coordinate System
Altitude System Definition
Datum Name: N/A
Distance Units: N/A

Encoding Method: Explicit elevation coordinate included with horizontal coordinates
Resolution: 1.000000

ENTITY AND ATTRIBUTE TAB

Entity Type
This section is not automatically populated using ArcCatalog. Populate the Label, Definition, and Definition Source.

Attribute
Complete the Definition and Source Definition in the General tab. Complete the Attribute Domain Values. This is done if the metadata had been originally created with ArcCatalog 9.3 Overview Description The Overview Description, does not need to be completed if this section is done.

Overview Description
Complete the Dataset Overview, Entity and Attribute Overview, and Entity and Attribute Detail Citation. This is done if the metadata is being created with either 10.0 or 10.1. in the Attribute Section. The Attribute does not need to be completed if this section is done.

DISTRIBUTION TAB

General
The Resource Description and Distribution Liability sections are required.

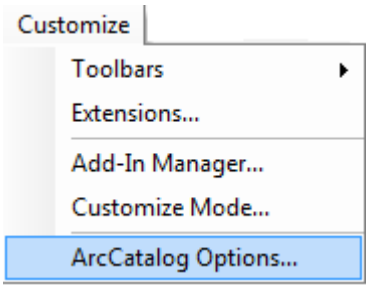
Distributor
The Primary Contact should be the Organization. Complete the Person, Organization, Telephone, Hours of Service, and Address information.

METADATA REFERENCE TAB

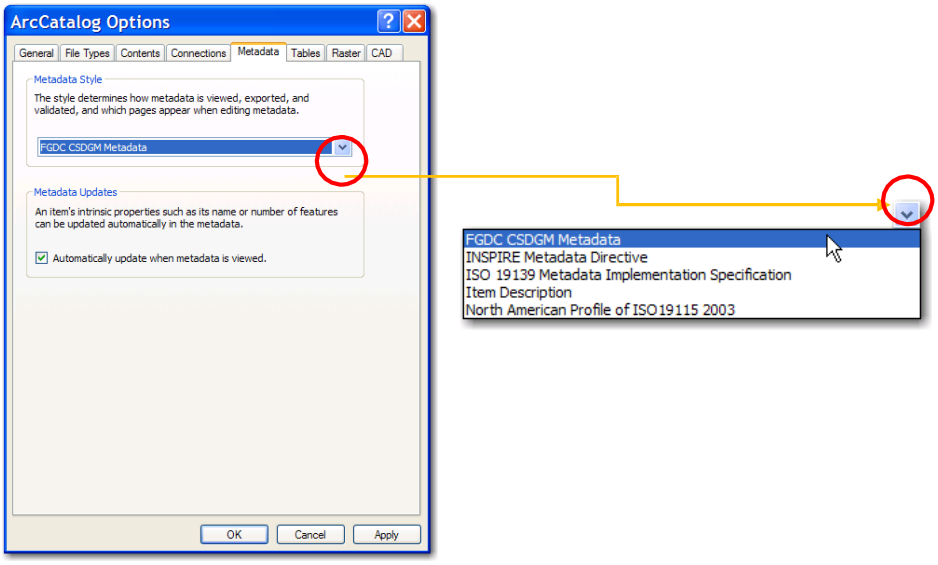
General
Enter the Metadata Date in the format YYYMMDD. For Contact, enter the Primary Contact as the Organization and complete the Person, Organization, Telephone, Hours of Service, and Address information.

PROCEDURES

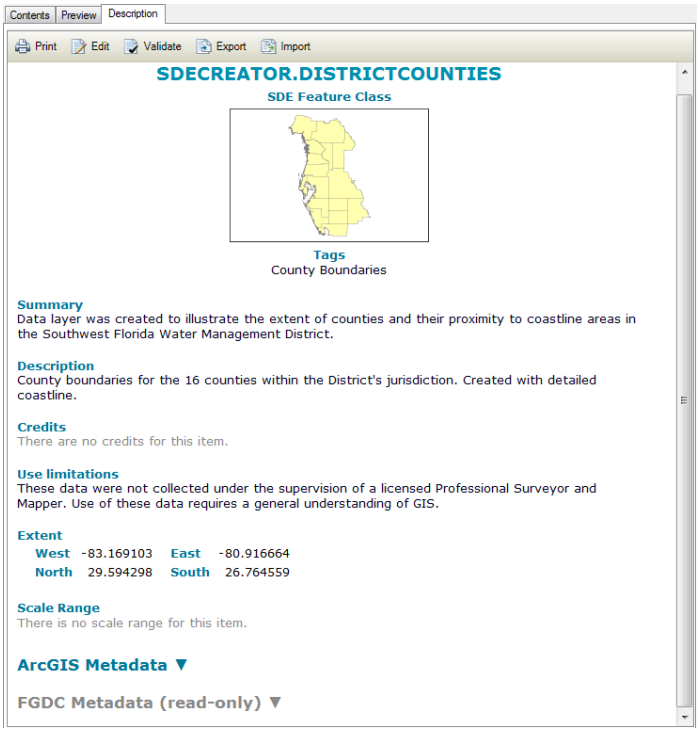
FGDC Style Sheet
To view the metadata with the FGDC-like style sheet, open ArcCatalog (not within ArcMap). Then click on Customize in the menu, and then ArcCatalog Options.



In the Options menu, open the Metadata Tab, press the select arrow and choose FGDC CSDGM Metadata (as below). Press Apply and then OK.



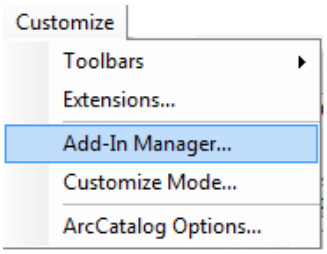
When you open the DESCRIPTION Tab in ArcCatalog of a Feature Class, you will have an option to open the FGDC Metadata.



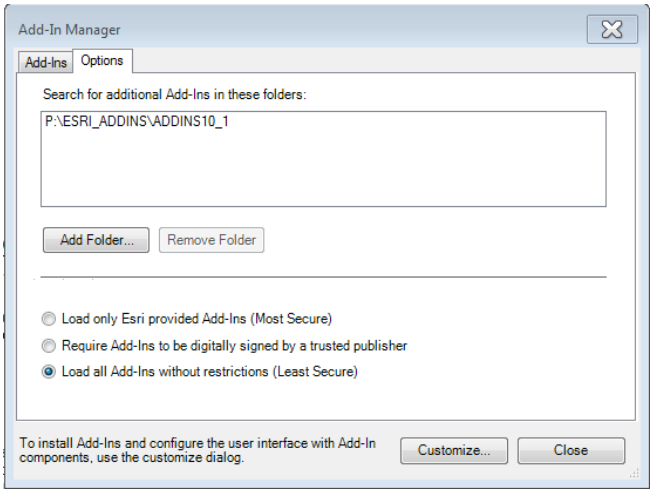
Open the FGDC Metadata view by clicking on the down arrow next to the FGDC Metadata name.

FGDC Metadata Editor Add-In

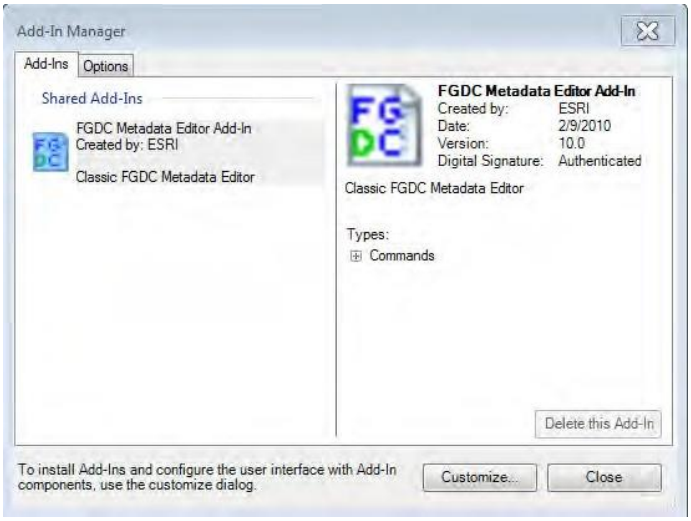
The FGDC Metadata Editor Add-In tool will need to be added to ArcCatalog. It is not a standard tool found in the Customize mode. Open ArcCatalog (not within ArcMap). Then click on Customize in the menu, and then ArcCatalog Options.



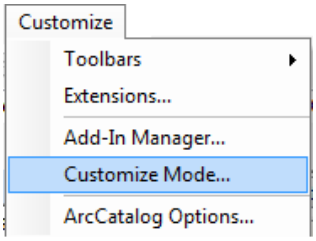
Open the Options Tab, click on Add Folder and navigate to the P:\ESRI_ADDINS\ADDINS10_1 folder. Choose the Load all Add-Ins without restrictions (Least Secure) radio button.



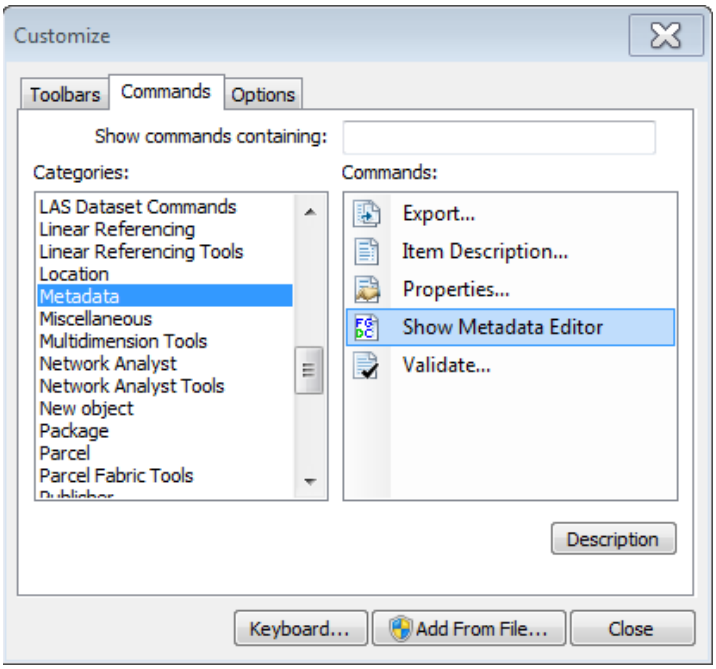
Before closing, tab back to the Add-Ins tab and the FGDC Add-In will be displayed.



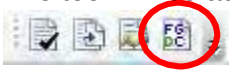
Close the Add-In Manager. Go to Customize, and then Customize Mode.



On the Customize Window, open the Commands Tab and scroll down to Metadata, drag the Show Metadata Editor button to any place on a toolbar, and press the Close button.



The tool will be added to the toolbar, such as this example.

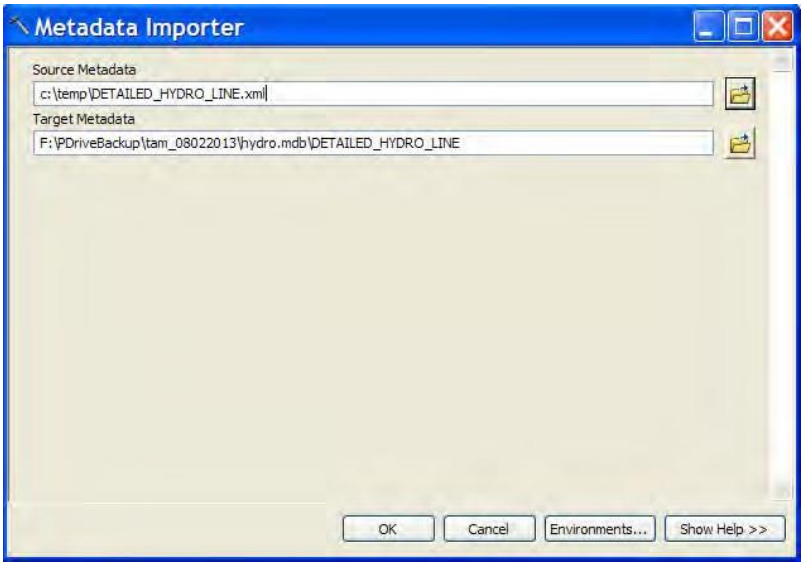


Creating New Metadata using ArcCatalog

Importing a Template

To increase the efficiency and consistency in writing metadata, a template with all of the redundant information (SWFWMD addresses, phone numbers, etc.) was created. Retrieve the template xml file named: swf_templateRev5.0MAKE_A_COPY_WITH_FC_NAME from the MGIS Section here: L:\Mapping-GIS\MGIS Standards\Metadata Documentation. Import this metadata template using the *'Metadata Importer'* tool found in the Conversion Tools Toolbox, Metadata.

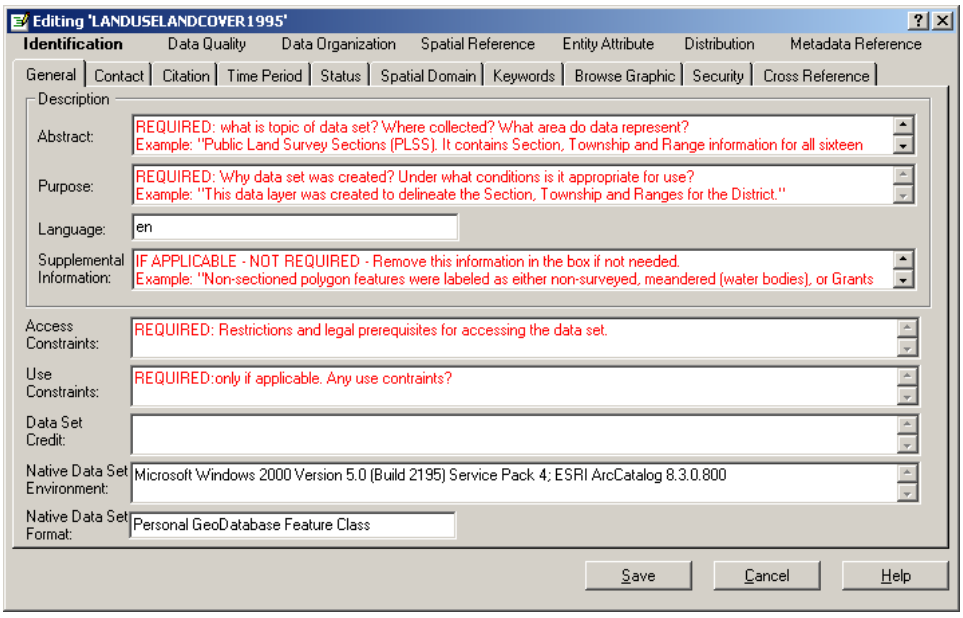
The *'Metadata Importer'* tool will ask where to find the metadata and what data it should be applied to.



After clicking *'OK'* the template will automatically add the information into the metadata.

Editing the Imported Template

Click the '*FGDC Metadata Editor'* button that was added in step FGDC Metadata Editor Add-In Section. The metadata Editing window, as seen below, will appear. It allows the users to step through the various sections required for FGDC compliant metadata. NOTE: Items in **red** are mandatory.



Identification

General Tab:

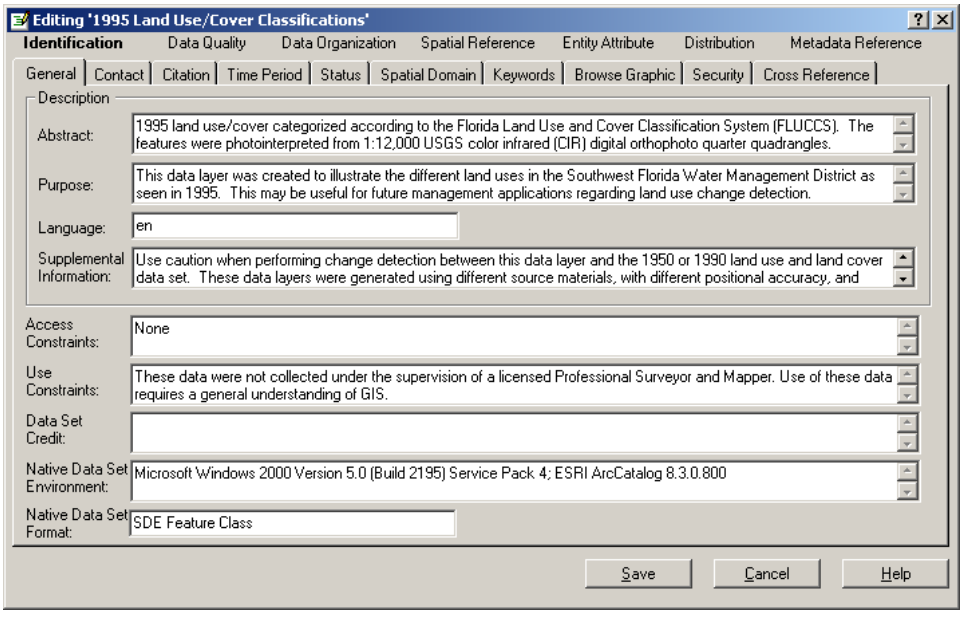
- The ***Abstract*** section describes the data very tersely. This is simply a summary of what the data is. For the Aerial Mapping Spot Elevations metadata the abstract would read something like this: "Photogrammetrically collected one and two foot topographic contours and spot elevations derived from the District's Topographic Aerial Mapping Program."

- The ***Purpose*** section describes why the dataset was created. Since the district created most of the data, a standardized citation could be used here, such as: "This data layer was created for resource management and cartographic purposes."

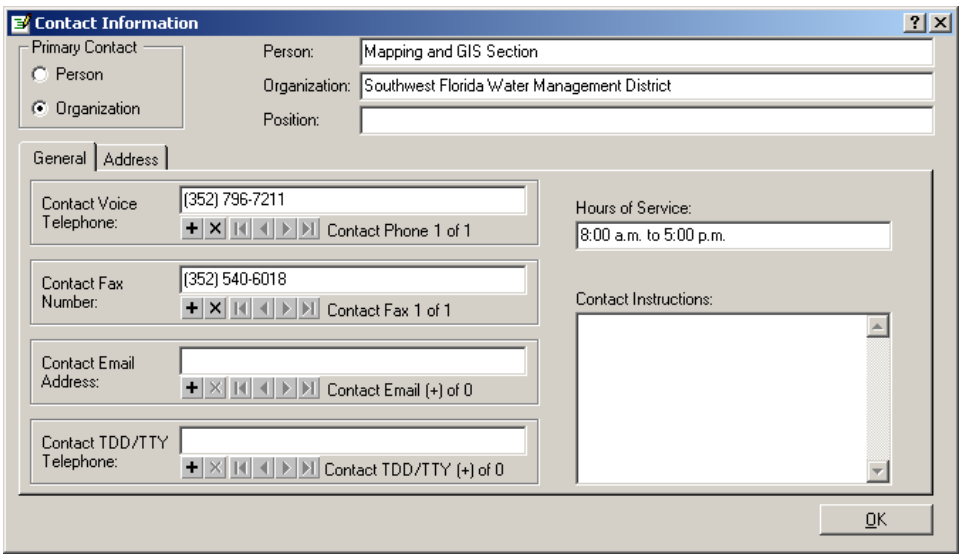
- The ***Supplemental Information*** section should be populated if there are additional details that are relevant to the identification and purpose of the dataset. Most often this is left blank.

- The ***Access Constraints*** section and ***Use Constraints*** section should be filled in if there are any restrictions regarding the access or use of the data. The template populates these fields. Change only if necessary.

The other elements will either be automatically completed by the District metadata template or not applicable.

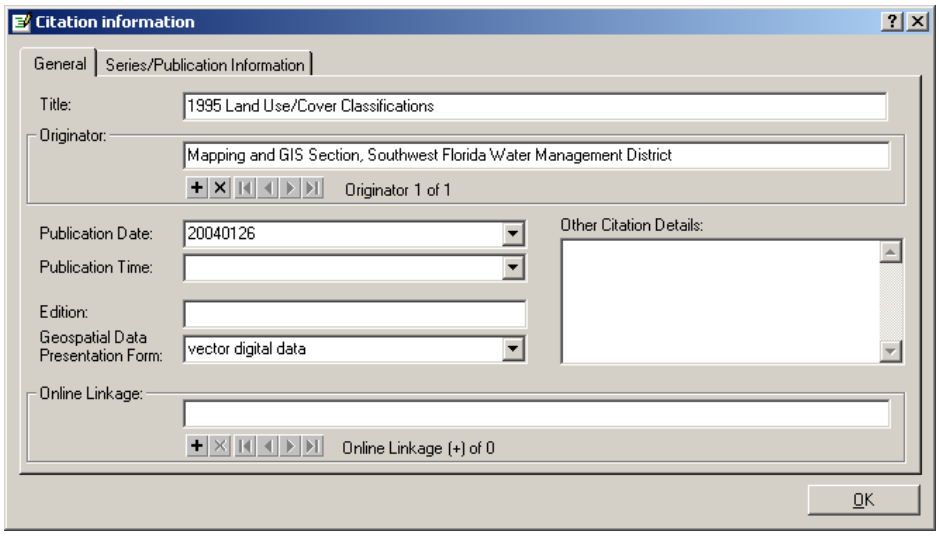


Contact Tab:
The District's template will automatically complete this section with the contact as the MGIS section. If the contact for the data set is not the Mapping and GIS Section, please change it and all other pertinent information, including the ***Address Tab***. Click the 'Details' button to change this information. Use the Appendix for common examples.

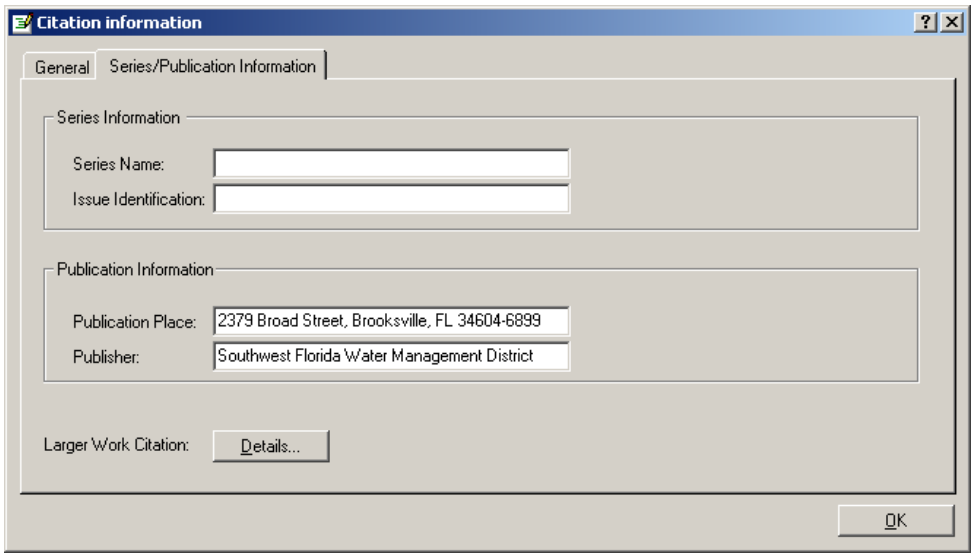


Citation Tab:
Click on the 'Details' button to bring up the ***Citation*** box.

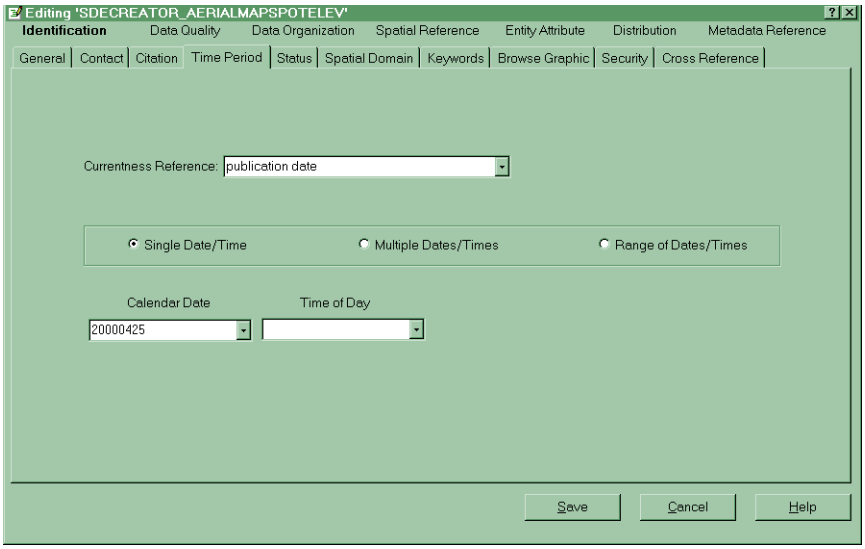
- In the ***General*** Tab: The title box will default to match the layer name. The ***Originator*** will default as the Mapping and GIS Section. It may need to be changed to Data and Records or Land Resources. Change the ***Publication Date*** to fit today's date. This should be in the form YYYYMMDD.
  (Example: 20020728). The ***Other Citation Details*** box should be used to describe anything else pertinent to the data layer citation.



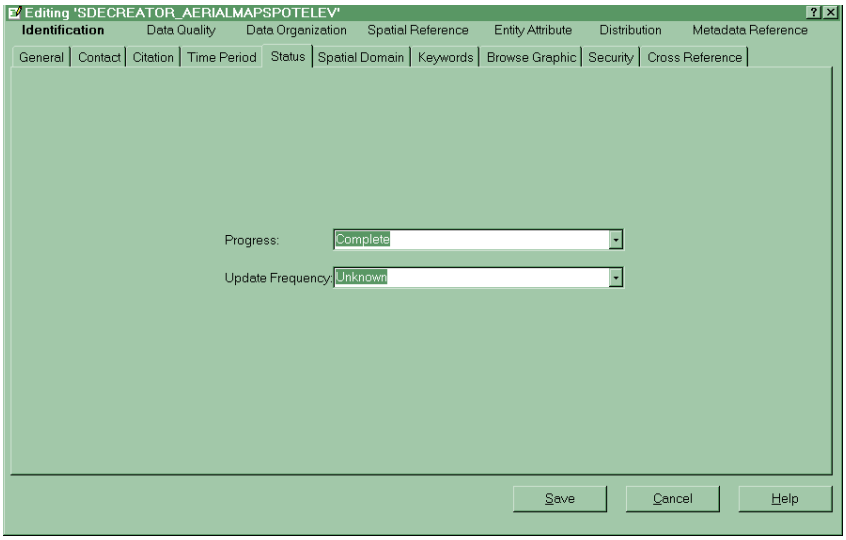
- In the ***Series/Publication Information*** Tab: Put the complete address and name of the Publisher. This maybe the same as the Originator.



Time Period Tab:
This section is used to document when the data was created. The time period is the date stamp or the date of the photography in the case of Land Use/Land Cover data layer, LiDAR, and Imagery. Under the ***Currentness Reference*** choose the appropriate time category, publication date or ground condition. If there are multiple dates or a range of dates select the appropriate classification. The format for dates are YYYYMMDD.

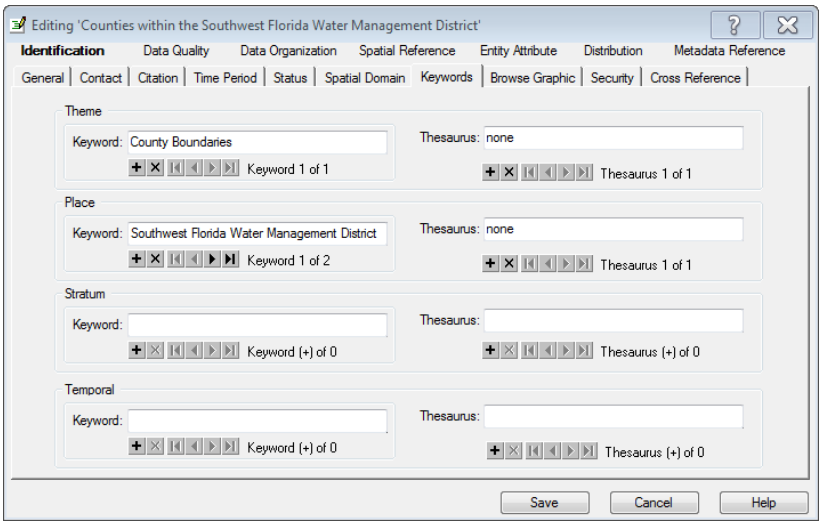


Status Tab:
Describe the progress of the data. Most often it should read ***Progress***: Complete.
Update Frequency: Irregular. Change if necessary.



Spatial Domain Tab:
This is automatically entered by the ESRI application. Refer to the FGDC handbook for further information.

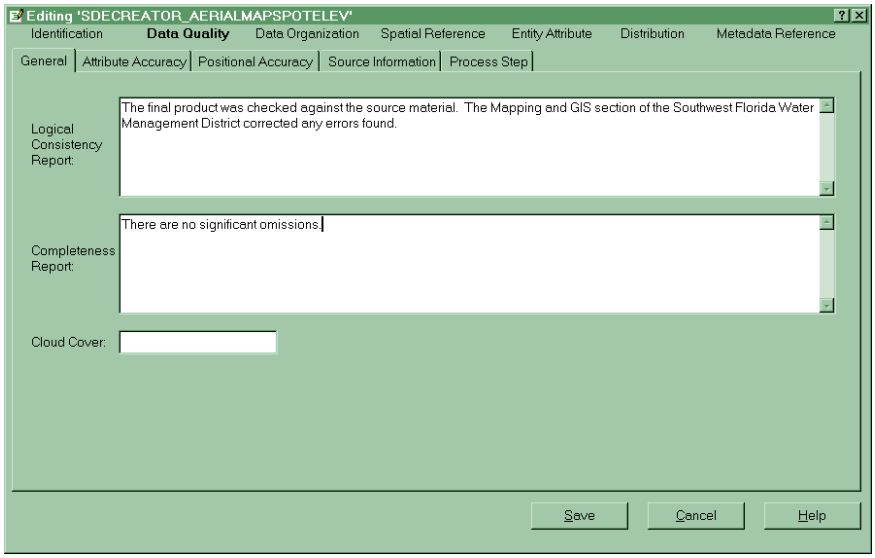
Keywords Tab:
Determine theme and place keywords that could be used in a search engine that describe the data layer and enter them here. Be specific. To the 'none' thesaurus, add theme keywords. There will be three keywords already entered. Replace these with real keywords. Use the ✕ to delete the keywords if three are not needed. Use the + to add more keywords. Southwest Florida Water Management District and SWFWMD will default into the place keyword. Add or delete to these if necessary.



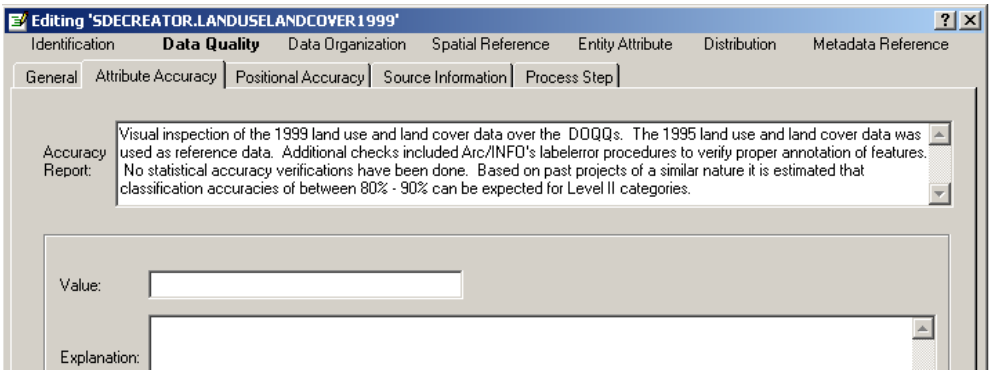
Data Quality

General Tab:

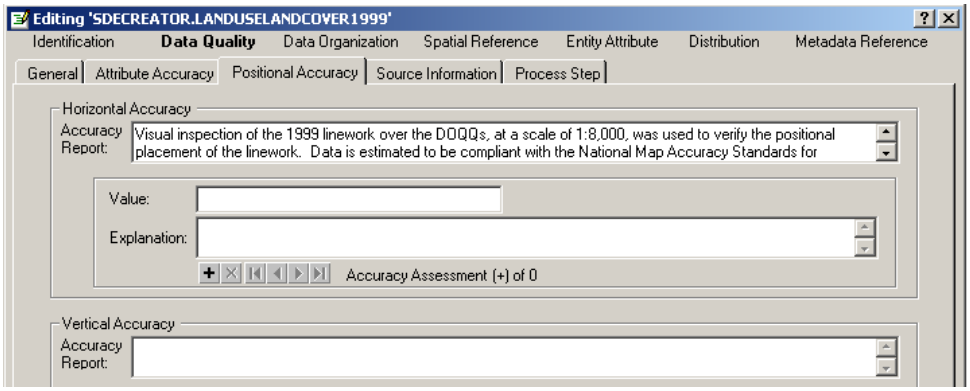
- The **Logical Consistency Report** section should explain how the data layer was validated or checked for errors, such as node errors or inconsistencies in the data. The template gives two examples for this section.
- The **Completeness Report** section details whether or not there were any significant omissions. The template also gives two examples for this section.



Attribute Accuracy Tab:
Describe how the attributes were validated in terms of accuracy. Was the data compared to the source material? How accurate are the attributes? Were all of the attributes brought over from the original source? For example, the Aerial Mapping Contour layer would have the following: "A visual inspection and a comparison to source materials was completed. Accuracy is approaching 100%. The large number of features in the coverage makes 100% attribution checks difficult and minor errors have been detected by District staff. Note that the accuracy for elevations is inspected more carefully than attribution for symbology purposes. Checks were completed within 24 months of the photography date for each project." Complete the Accuracy Report section only. Another example can be found below.



Positional Accuracy Tab:
Describe how the position of the data layer was validated in terms of accuracy. Does it meet the Map Accuracy Standards? What is the accuracy? For example, the Detailed Stream layer, created by the USGS, would have the following: " The District has completed no formal accuracy assessment. The geometry data are the same as those found in the USGS 1:100,000 DLG and are assumed to meet National Map Accuracy standards for 1:100,000 scale maps. Accuracy is estimated to be approximately +/- 50 meters." Complete the Accuracy Report section for the Horizontal Accuracy and Vertical Accuracy (if applicable).



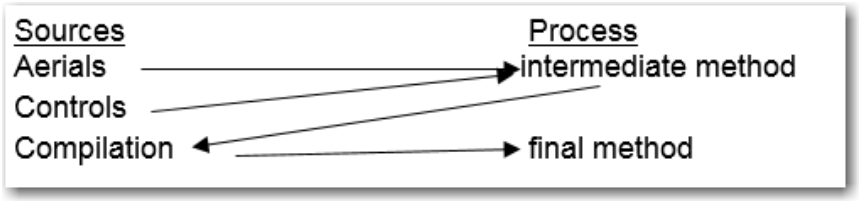
Source Information Tab:
Important Note: If more than one source was used, make sure that the source information is completed for all three tabs (General, Source Citation, Source Time Period of Content). The template will populate <u>three sources</u>. Use the ✕ to delete a source, or the ▶ to move to the next source. The required fields will have text already in it; just replace it with appropriate information.

The two main sections of the Data Quality section are the Source Information and Process Steps. These two sections are inextricably linked together. Each source is associated with a process, and each process uses or manipulates a source. Rather than having to exhaustively list each process when discussing sources or list each source when discussing processes, the two sections can be linked by abbreviations.

Before getting started:

It is easiest to understand the flow of the sources and processes if a simple flow chart showing the relationship between the sources and processes is created. On a piece of paper, write

'sources' on the left and 'processes' on the right. Under the sources, write the source abbreviations. Use arrows to point to the process it correlates to. This way if a process created a product that was used for another process, it can be seen here.
These intermediate products also need source information for them.

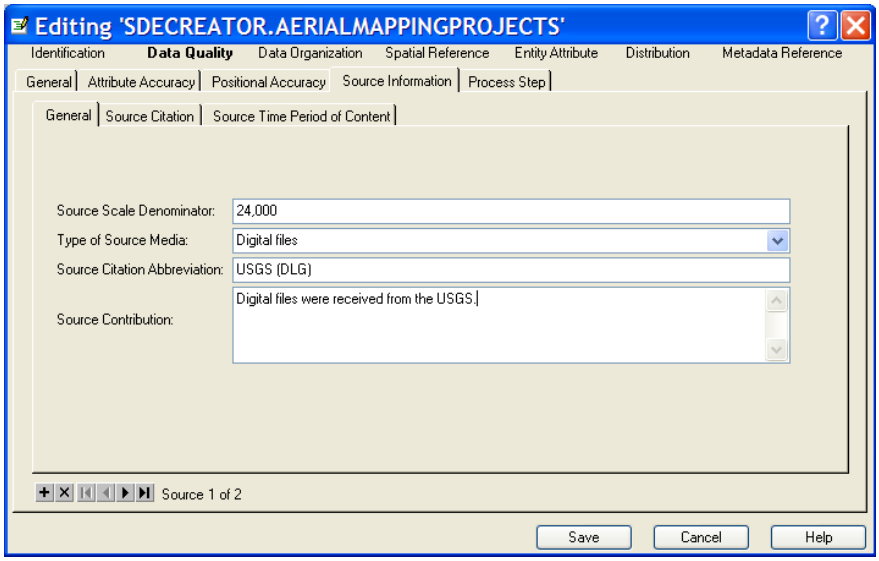


The abbreviations that link the source to the process step are: For the **Source Information** tab, the **Source Citation Abbreviation** box is used, while for the **Process Step** tab, the **Source Used Citation Abbreviation** box or **Source Produced Citation Abbreviation** box is used, depending on the circumstance. These abbreviations will be discussed more in the **Process Step** section.

See the section in this document called **Appendix A** for commonly used sources. Use this information to create consistent source information.

General tab:

- Enter the ***Source Scale Denominator***, for example 24,000 or 250,000 or leave blank. Next enter the type of media for the source in ***Type of Source Media***, i.e. 'paper', 'mylar', or 'digital, shapefile'. Finally enter the ***Source Citation Abbreviation***. This abbreviation will be used in the ***Process Step*** tab. Keep it simple but meaningful. Enter the **Source Contribution** information.

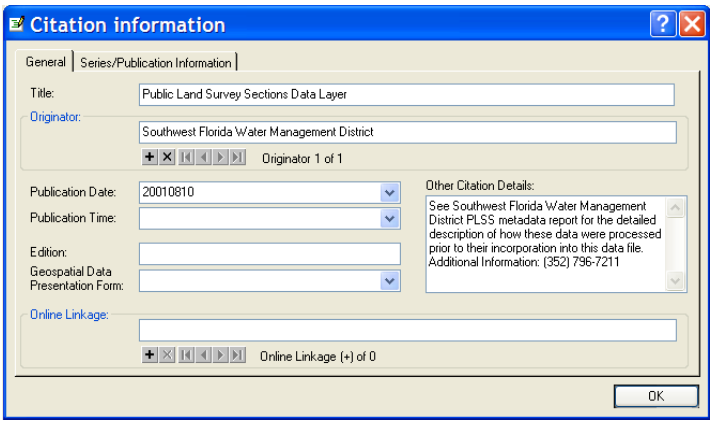


Source Citation Tab:

- Click the 'Details' button.
- In the ***General*** tab enter the **Title** of the source, **Originator**, and the **Publication Date**. If

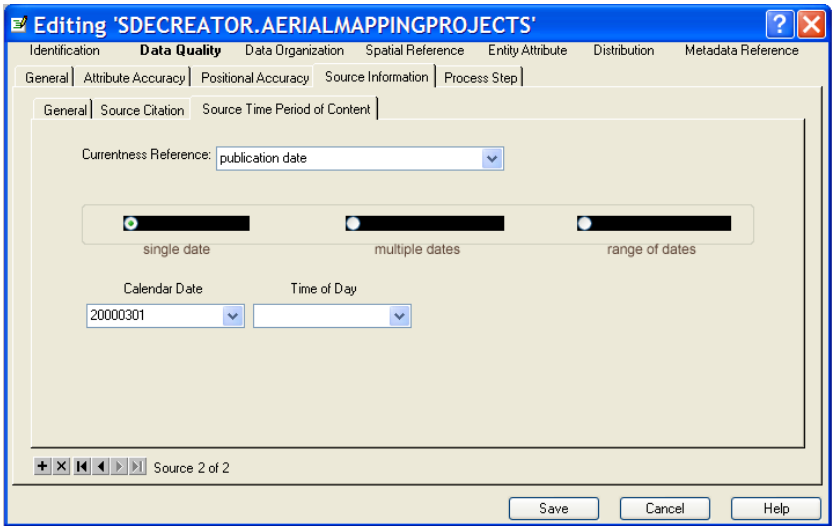
the source is an intermediate source, select 'Unpublished material' in the **Publication Date**. Enter comments (i.e. District metadata is available for source) and/or telephone numbers into the **Other Citation Details** box. If metadata for the source is available, use it in this section. View the Appendix for common examples.

- Click on the ***Series/Publication Information*** tab and enter the **Publication Place** and **Publisher**.



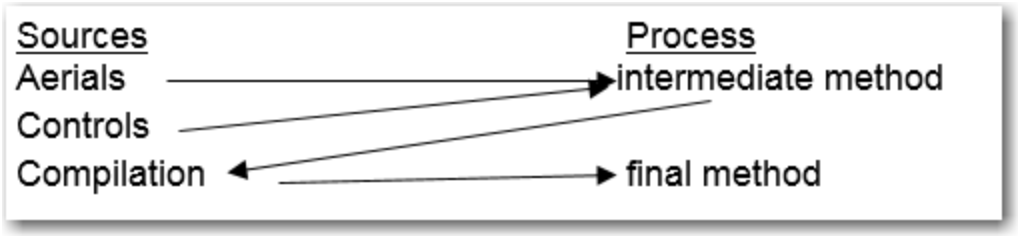
Source Time Period of Content Tab:

- For every source, enter when it was published and the **Currentness Reference**. If the source is unpublished, this section may be left blank.



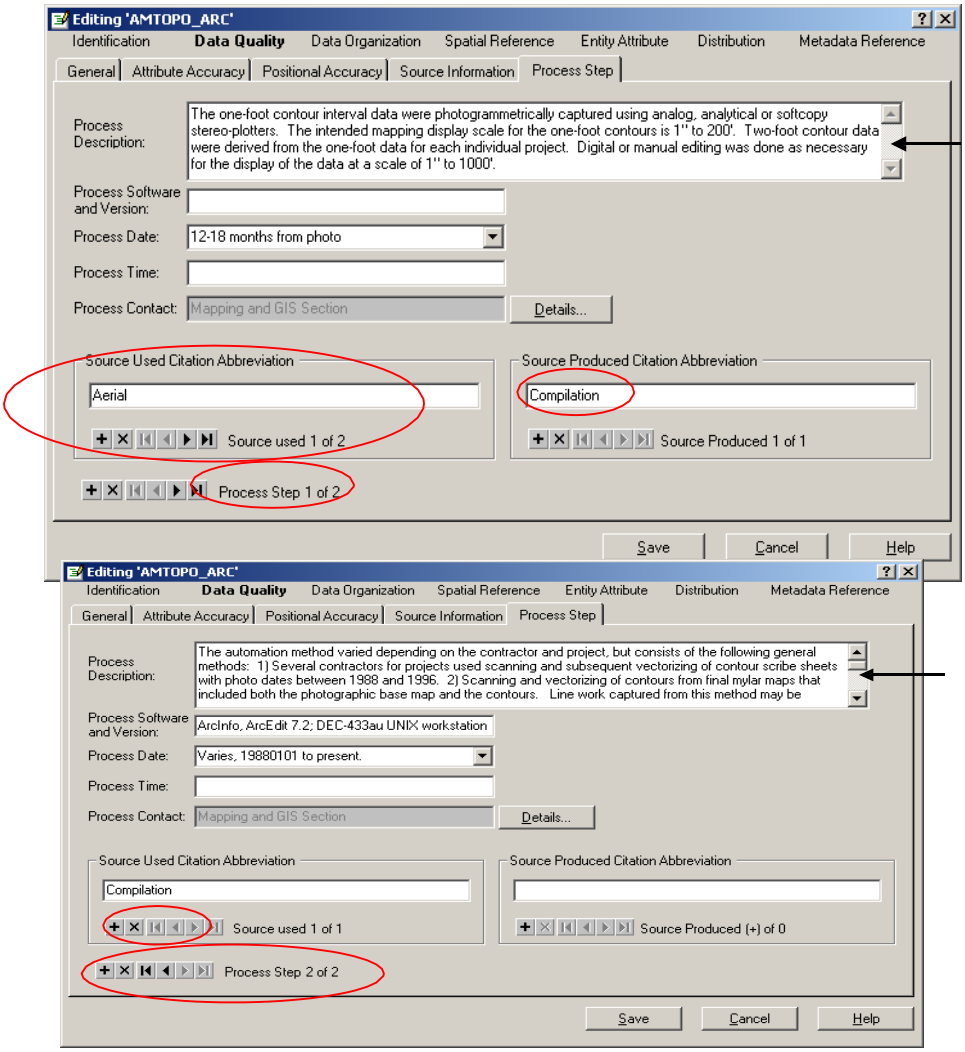
Process *Step* Tab:

Important Note: This is the most difficult part of creating metadata. It is also one of the most important to complete correctly.



In the above example, under the process 'intermediate method', the sources 'Aerials' and 'Controls' would be placed in separate **Source Used Citation Abbreviation** boxes, while the source 'Compilation' would be placed in the **Source Produced Citation Abbreviation** box. Under the process 'final method' the 'Compilation' source would be placed in the **Source Used Citation Abbreviation** box. This is the same abbreviation used in the **Source Citation Abbreviation** box of the **Source Information** tab.

- In the **Process Description** box describe how the data set was produced. Place the correct sources in the **Source Used Citation Abbreviation** box and any products in the **Source Produced Citation Abbreviation** box. Remember, if there is a product that is used in another process, there must be a correlating **Source Information** element for it. Be sure to match the sources with the process step correctly.



Intermediate method

There are two Sources Used and one Source Produced for Process Step 1

Final method

Source Produced from Process Step 1 is used as Source Used for Process Step 2.

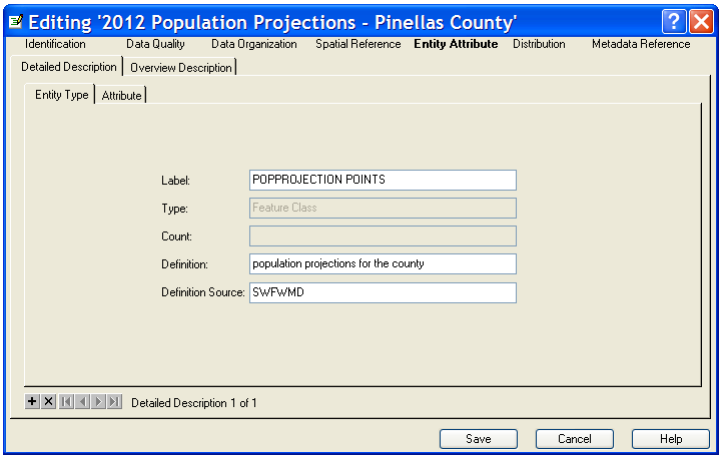
- The template will populate three sources and two processes. The process contact information for both is the MGIS. Modify this information if needed. Complete the **Process Date** and **Software and Version**.
- For the final process step, there is no need to place an entry into the **Source Produced Citation Abbreviation** box. This is because the final product is the data set that the metadata is being written for.

Entity Attribute

This section will vary depending on if the metadata is pre-existing or brand new with 10.0 or 10.1. Each tab will state if required for prior 10, 10 (including both 10.0 and 10.1), or any.

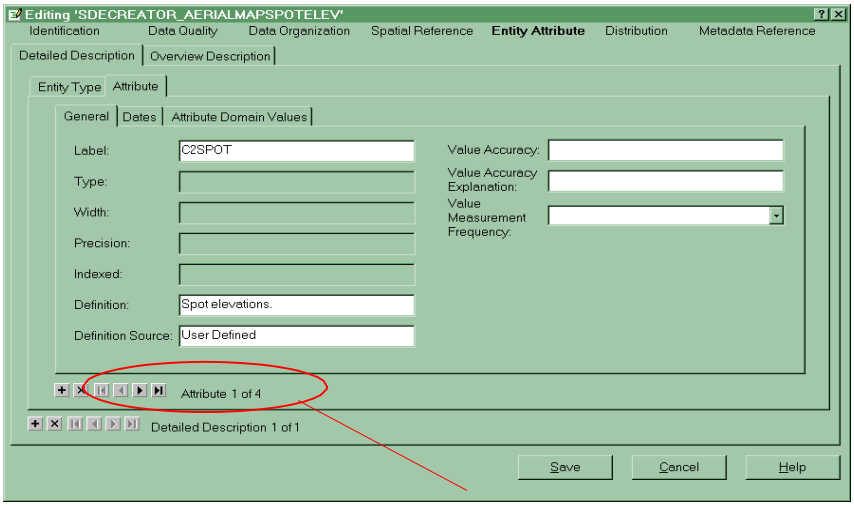
Entity Type Tab:

- Required for any metadata, whether 9.3, 10.0, or 10.1. Enter the Label, usually the feature class name, the Definition and the Definition Source. The definition source should read: *'SWFWMD'* unless it is not created by the District, i.e. FIPS or DEP.



Attribute Tab:

- This tab is only required if the metadata was created prior to 10.
- In the ***General*** tab, the Label field should be filled in. Enter the definition of the attribute. If the attribute is used in other data layers, use the same definition as found in the other layer. If the attribute doesn't mean the same thing, then the attribute name should be changed. The definition source should read: *'SWFWMD'* unless it is not created by the District, i.e. FIPS or DEP. The attributes that are automatically entered will have *ESRI* as the definition source. Do not leave the label, definition, or definition source unpopulated.

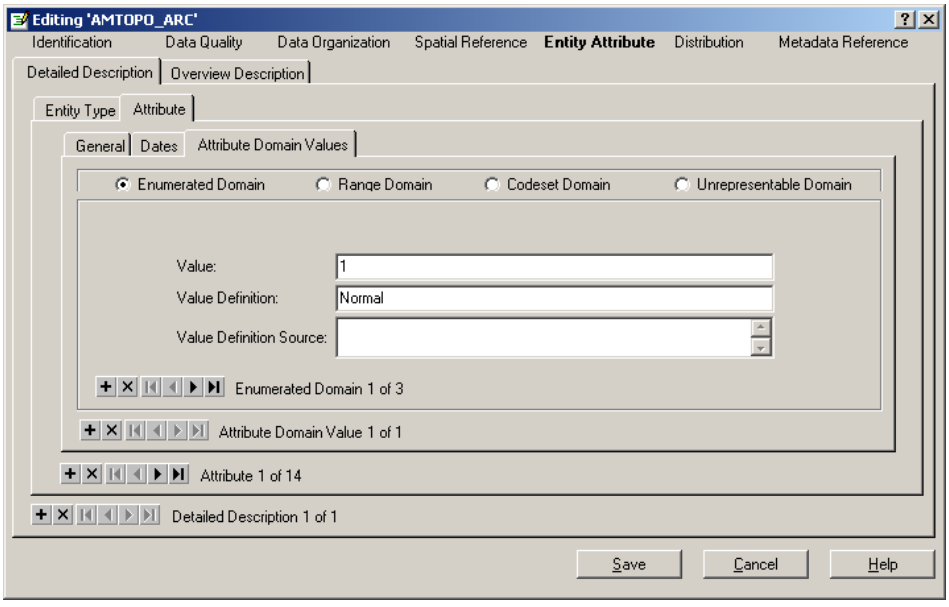


Attribute Domain Values Tab:

To populate the domain value for each attribute, use the arrow to navigate to the next attribute while in the **General** tab. Then click the **Attribute Domain Values** tab.

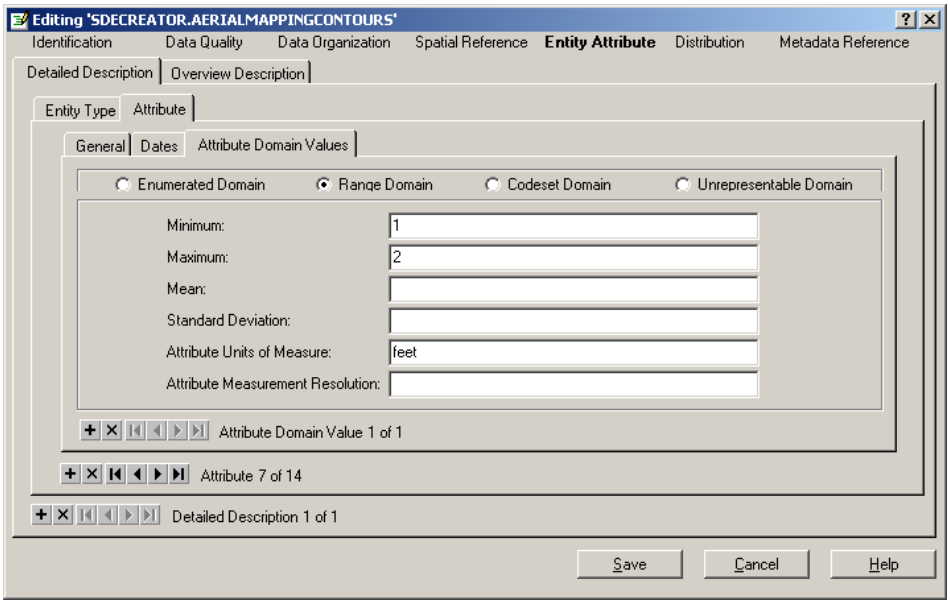
There are four types of domain values: Enumerated, Range, Codeset, and Unrepresentable. For each attribute label, select the domain value type most appropriate for the data.

An Enumerated Domain consists of the list of valid values for a particular attribute label. For each valid value, the definition of that value is required.

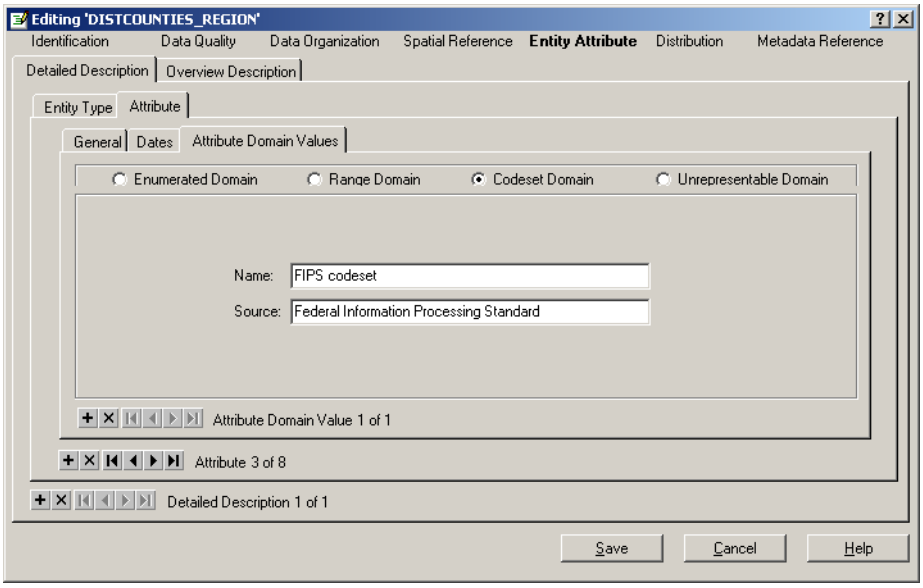


A Range Domain consists of a sequence, series, or scale of values between limits. When defining a range of possible values, the minimum and maximum values and the units of

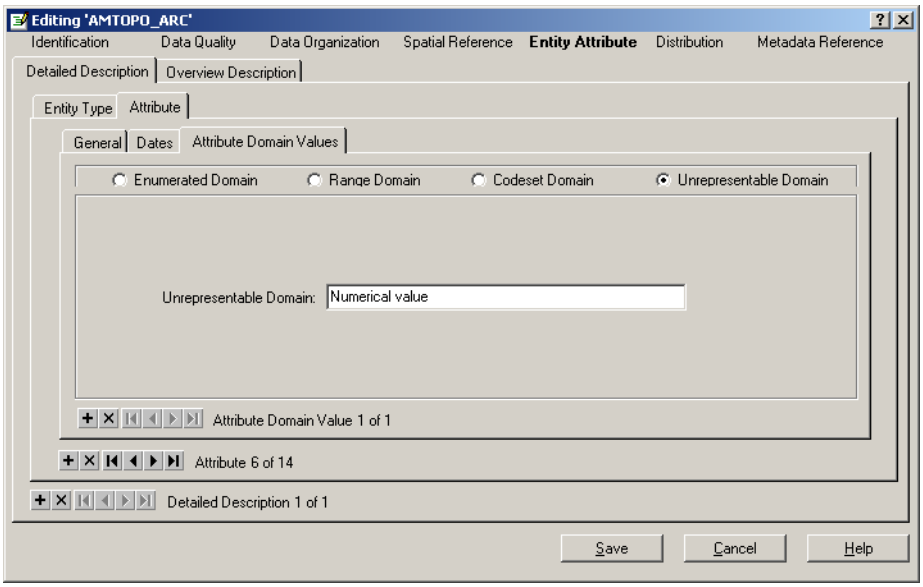
measurement for the range are required.



A Codeset Domain consists of values defined in a standardized set of codes. Document the name of the code and source for the code.

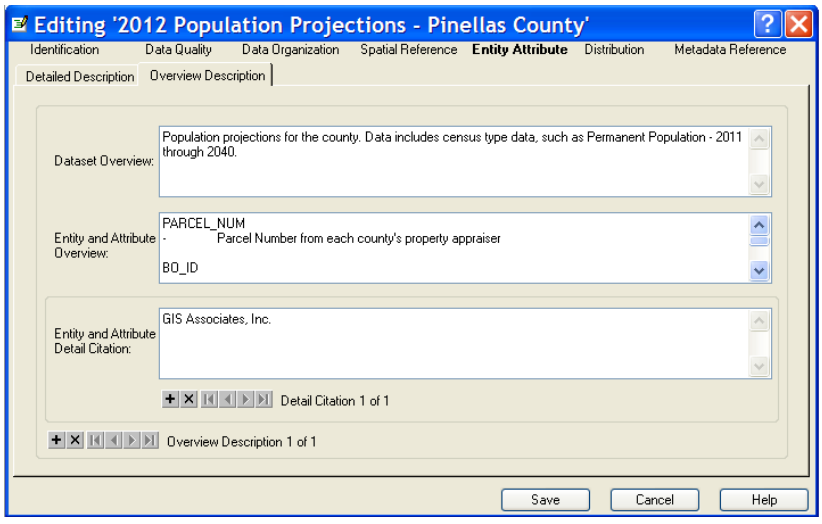


An Unrepresentable Domain is a set of values that cannot be represented in a standardized method. Give a reason why the domain cannot be represented, i.e. names, numerical values, text.



Overview Description

- This tab is required if the metadata was created with 10.0 or 10.1.
- Enter the Dataset Overview, which is the summary of the information content of the data set.
- Enter the Entity and Attribute Overview, which is a list of the attributes with their definitions and expected values.
- Enter the Entity and Attribute Detail Citation, which is a description of where the definitions were determined. For example, SWFWMD for permit attributes or NHD for the NHD water-body data.



Distribution and Metadata Reference

These sections should be filled in by the template.

Distribution Tab:

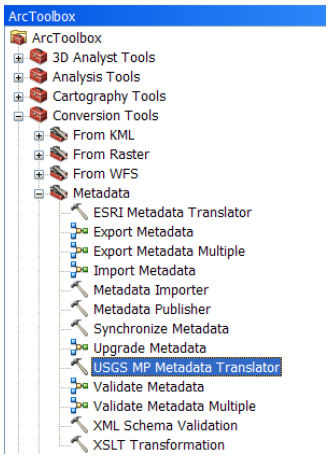
Enter the Resource Description and Distribution Liability sections under the General tab.

Enter the Contact Information under the Distributor tab.

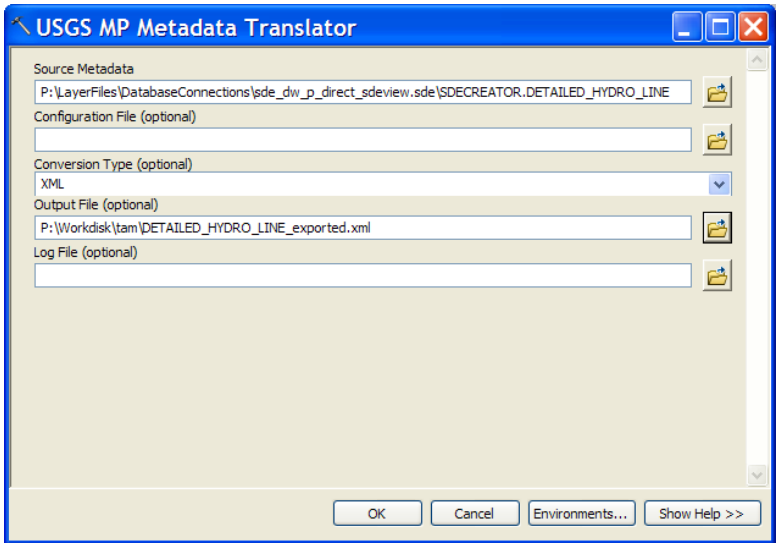
Metadata Reference Tab:
The Metadata Date should auto-populate, but if not enter date with YYYMMDD format.
Also enter the Contact Information.

Editing Pre-Existing Metadata using ArcCatalog
All pre-existing enterprise GIS datasets in SDE should have metadata that can be found.

- Open ArcToolbox, go to Conversion Tools, Metadata, USGS MP Metadata Translator



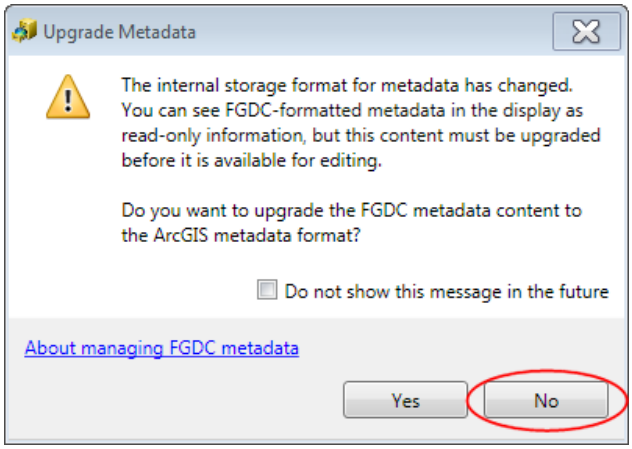
- Navigate to the SDE layer that is comparable to the data layer you are working on for the **Source Metadata**.
- Keep the **Conversion Type** as 'XML'.
- Change the Output File to the name and location for the metadata.



- Navigate to the exported <layer>.xml file(s) in ArcCatalog.
- '*FGDC Metadata Editor'* button that was added in step 4.2 to make any changes to the

metadata for each feature class. This includes the publication dates, sources, process steps, and attributes. See previous sections in this document for editing details. Sections 4.3.2.1 to 4.3.2.4 displays specific examples for each section of metadata required.

- Give datasets and <layer>.xml file(s) to Data Administrator.
- If while viewing metadata, a message window opens stating to 'Upgrade Metadata', click NO. The District does not want to upgrade the FGDC content to the ArcGIS metadata format.



REFERENCES

Federal Geospatial Data Committee's home page

http://www.fgdc.gov/metadata

ESRI Profile of the CSDGM

http://resources.arcgis.com/de/help/main/10.2/index.html#//003t00000037000000

USGS Metadata Validation Service

http://geo-nsdi.er.usgs.gov/validation/

APPENDICES

Common Information

District Citation Information
Mapping and GIS Section Citation:
Citation_Information:
Originator: Mapping and GIS Section, Southwest Florida Water Management District
Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899
Publisher: Southwest Florida Water Management District
Land Resources Citation:
Citation_Information:
Originator: Land Resources Department, Southwest Florida Water Management District
Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899
Publisher: Southwest Florida Water Management District

Resource Data Citation:
Citation_Information:
Originator: Resource Data Department, Southwest Florida Water Management District
Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899 Publisher:
Southwest Florida Water Management District

District Contact Information for Mapping and GIS Section
Point_of_Contact: Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Southwest Florida Water Management District Contact_Person:
Mapping and GIS Section
Contact_Address:
Address_Type: mailing and physical address
Address: 2379 Broad Street (U.S. 41 South) City:
Brooksville
State_or_Province: FL
Postal_Code: 34604-6899
Contact_Voice_Telephone: (352) 796-7211
Contact_Facsimile_Telephone: (352) 540-6018
Hours_of_Service: 8:00 a.m. to 5:00 p.m.

1999 DOQQ Source Information
Source_Information: Source_Citation:
Citation_Information:
Originator: United States Geological Survey
Publication_Date: Unknown
Title: 1999 USGS Digital Orthophoto Quarter Quadrangles Publication_Information:
Publication_Place: Sioux Falls, SD 57198
Publisher: USGS
Other_Citation_Details: Additional Information: 1-888-ASK-USGS
Source_Scale_Denominator: 12,000
Type_of_Source_Media: Digital imagery
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19990101
Ending_Date: 20000101
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: 99DOQQ

1995 DOQQ Source Information
Source_Information: Source_Citation:
Citation_Information:
Originator: United States Geological Survey
Publication_Date: Unknown
Title: 1995 USGS Digital Orthophoto Quarter Quadrangles Publication_Information:
Publication_Place: Sioux Falls, SD 57198
Publisher: USGS
Other_Citation_Details: Additional Information: 1-888-ASK-USGS
Source_Scale_Denominator: 12,000

Type_of_Source_Media: Digital imagery
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19940101
Ending_Date: 19950101
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: 95DOQQ

1:24,000 DRG Source Information

Source_Information: Source_Citation:
Citation_Information:
Originator: United States Geological Survey
Publication_Date: Unknown
Title: USGS 7.5' Topographic Quadrangles
Publication_Information:
Publication_Place: Reston, VA 22092
Publisher: USGS
Other_Citation_Details: Additional Information: 1-888-ASK-USGS
Source_Scale_Denominator: 24,000
Type_of_Source_Media: Paper, Mylar, or Digital (choose one)
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19550101
Ending_Date: 19930101
} (may change if necessary)
May change if necessary
Source_Currentness_Reference: publication date Source_Citation_Abbreviation:
24DRG

1:250,000 DRG Source Information

Source_Information: Source_Citation:
Citation_Information:

Originator: United States Geological Survey
Publication_Date: Unknown
Title: 1:250,000 USGS Quadrangles
Publication_Information: Publication_Place:
Reston, VA 22092 Publisher: USGS
Other_Citation_Details: Additional Information: 1-888-ASK-USGS
Source_Scale_Denominator: 250,000
Type_of_Source_Media: Paper, Mylar, or Digital (choose one)
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19720101
Ending_Date: 19880101
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: 250DRG

1:100,000 DRG Source Information

Source_Information: Source_Citation:
Citation_Information:
Originator: United States Geological Survey
Publication_Date: 1972 - 1988
Title: 1:100,000 USGS Topographic Quadrangle Publication_Information:
Publication_Place: Reston, VA 22092
Publisher: USGS
Other_Citation_Details: Additional Information: 1-888-ASK-USGS
Source_Scale_Denominator: 100,000
Type_of_Source_Media: paper
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19720101
Ending_Date: 19880101
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: 100DRG

DBASINS (District's) Data Layer Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Southwest Florida Water Management District Publication_Date:
19960101
Title: District's USGS Drainage Basins Data Layer Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899 Publisher:
Southwest Florida Water Management District Other_Citation_Details:
Refer to the District's Drainagebasins (DBASINS) data layer metadata document for additional information on the source material. Also refer to the attached FDEP metadata for more information on the original data.
Additional Information: (352) 796-7211
Source_Scale_Denominator: 24,000
Type_of_Source_Media: Digital, ArcInfo Coverage
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 19960101
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: DBASINS

Public Land Survey Sections Data Layer Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Southwest Florida Water Management District
Publication_Date: 20010810
Title: Public Land Survey Sections Data Layer
Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899
Publisher: Southwest Florida Water Management District

Other_Citation_Details: See Southwest Florida Water Management District PLSS metadata report for the detailed description of how these data were processed prior to their incorporation into this data file. Additional Information: (352) 796-7211
Source_Scale_Denominator: 24,000
Type_of_Source_Media: Digital, ArcInfo Coverage
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 20000301
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: PLSS

1995 Land Use and Land Cover Data Layer Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Southwest Florida Water Management District
Publication_Date: 19980701
Title: 1995 Land Use and Land Cover Data Layer
Publication_Information:

Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899 Publisher: Southwest Florida Water Management District Other_Citation_Details:
See the District's 1995 Land Use and Land Cover datalayer metadata regarding source production. Additional Information: (352) 796-7211
Source_Scale_Denominator: 12,000
Type_of_Source_Media: Digital, ArcInfo Coverage
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19940101
Ending_Date: 19950101
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: LU95

1990 Land Use and Land Cover Data Layer Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Southwest Florida Water Management District Publication_Date: 19900901 - 19911101
Title: 1990 Land Use and Land Cover Data Layer Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899
Publisher: Southwest Florida Water Management District
Other_Citation_Details:
See the District's 1990 Land Use and Land Cover metadata regarding source production. Additional Information: (352) 796-7211
Source_Scale_Denominator: 24,000
Type_of_Source_Media: Digital, ArcInfo Coverages
Source_Time_Period_of_Content:
Time_Period_Information:

Range_of_Dates/Times:
Beginning_Date: 19900101
Ending_Date: 19910101
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: LU90

Resource Data 'Various' Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Resource Data Department, Southwest Florida Water Management District
Publication_Date: Unpublished Material

Title: Legal Descriptions, Aerial Photographs, USGS Quadrangle Maps, and other Assorted Map Products
Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6689
Publisher: Southwest Florida Water Management District
Other_Citation_Details: Additional Information: (352) 796-7211
Source_Scale_Denominator: Not Applicable
Type_of_Source_Media: Various
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: varies
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: Various

1:24,000 Quarter Quadrangle Index Data Layer Source Information

Source_Information:
Source_Citation:
Citation_Information:
Originator: Southwest Florida Water Management District Publication_Date: 19960201
Title: 1:24000 Quarter Quadrangle Index Data Layer Publication_Information:
Publication_Place: 2379 Broad Street, Brooksville, FL 34604-6899
Publisher: Southwest Florida Water Management District
Other_Citation_Details:
See the 1:24000 Quarter Quadrangle Index Data Layer (QUADINDEXQTRQUAD) metadata report for more information on the source material.
Additional Information: (352) 796-7211
Source_Scale_Denominator: 24,000
Type_of_Source_Media: Digital, ArcInfo Coverage
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 19960201
Source_Currentness_Reference: publication date
Source_Citation_Abbreviation: qqbnds

Creator: J. Hendrix
Date 08/06/13
Revision # Original
Date of last Review: 2/7/2014

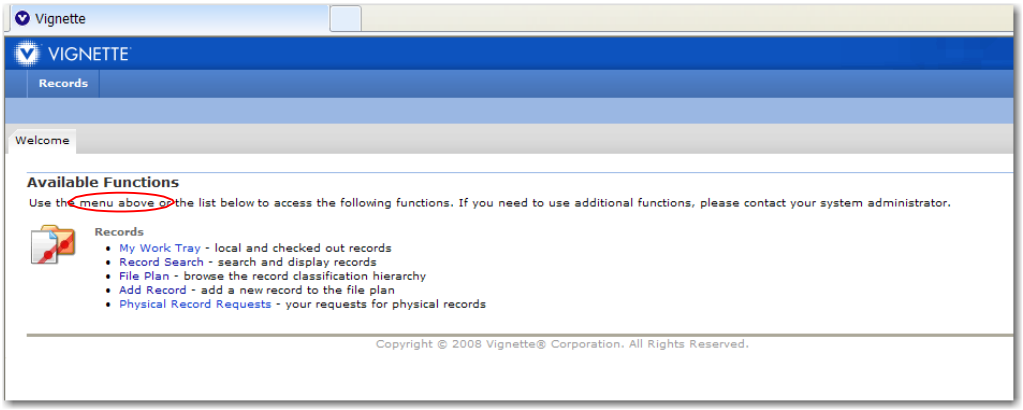
GIS WCP Location Processing

Purpose
District staff conduct random well inspections, groutings and abandonments that could ultimately change the permitted location. REG GIS staff routinely make updates to remain consistent in ensuring that all well locations are up to date.

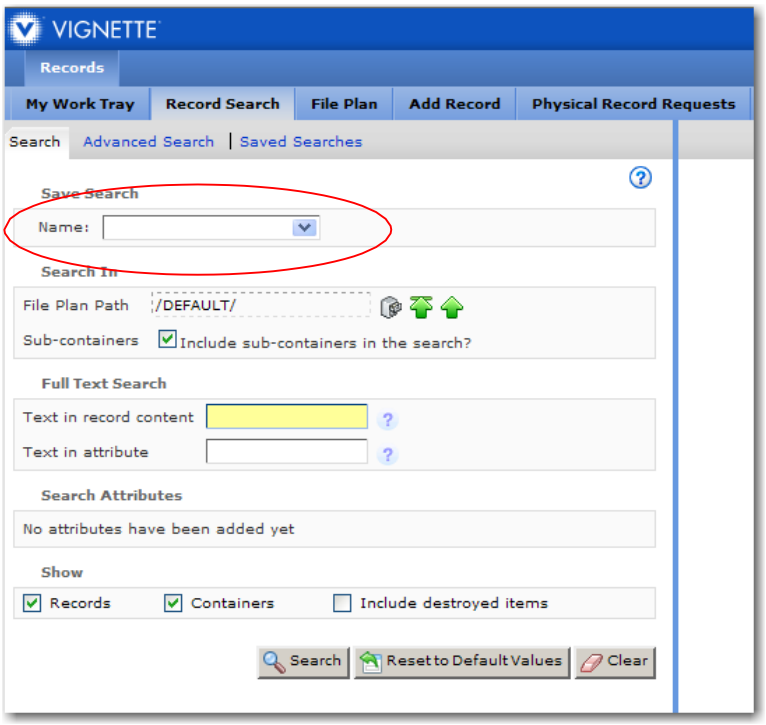
Scope
In an effort to ensure consistency, this section defines the actions needed to review and update the GIS layers association with Well Construction Permit locations.

Procedure
1. Login to VRD in the appropriate environment
2. Staging = http://bkvvmecm02s:7001
3. Acceptance = http://ecmvmacc02:7001
4. Production = http://ecmvmprod02:7001
5. Username = WMISVRDViewer
6. Password = ********

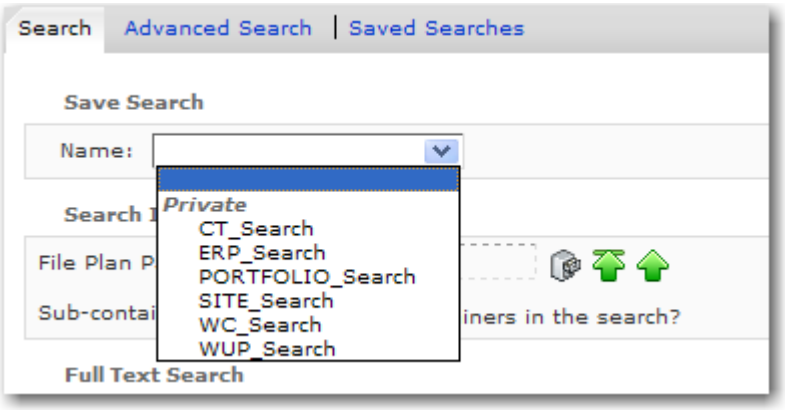
Select Record Search



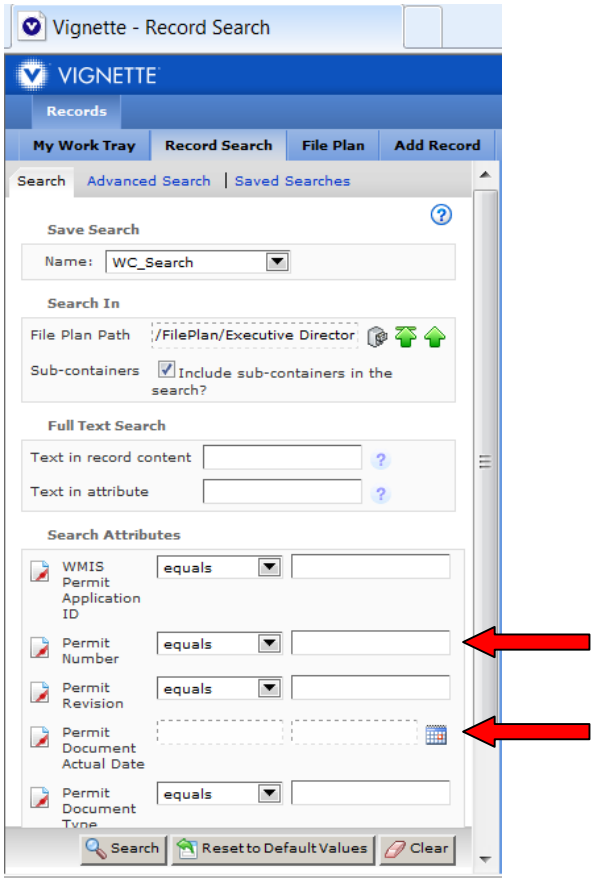
The Search Page will open, select the Saved Search from the dropdown option.



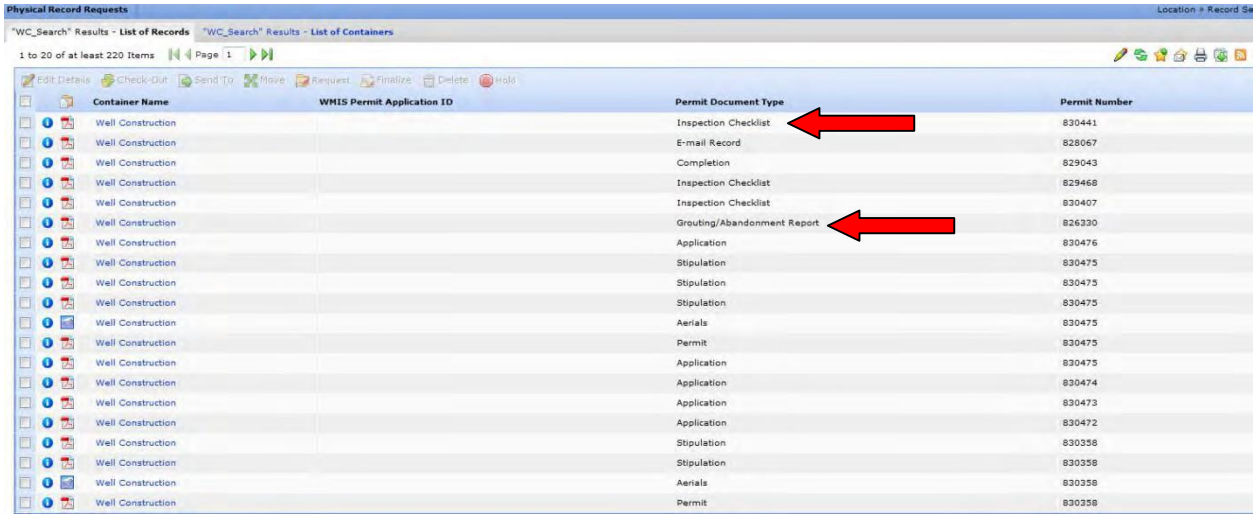
The following saved searches will show. Select WC_Search.



Search by the Permit Number or Permit Document Actual Date range.

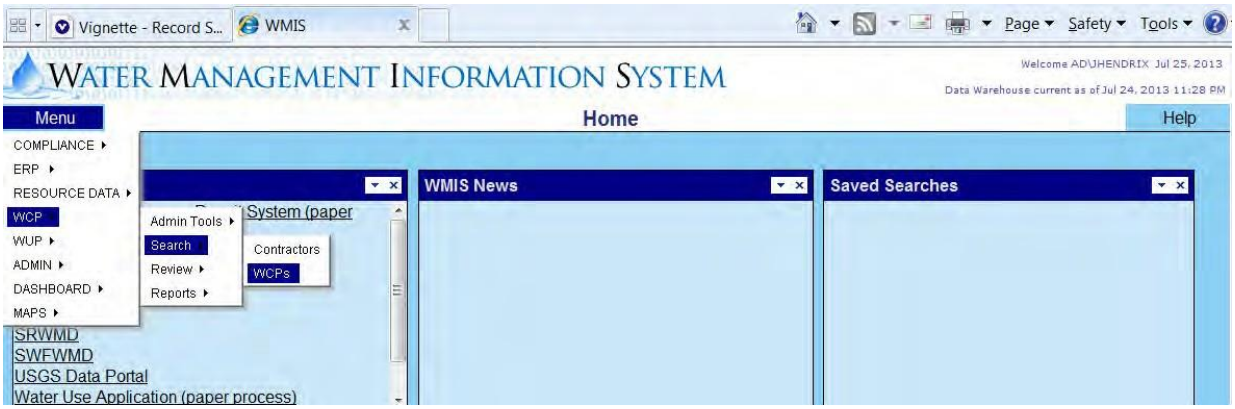


Results will display in the right-hand screen, click on the document icon to display the image. For Well Construction Permits, the documents that you will need to view will have permit document types of Grouting/Abandonment Report and Inspection Checklist.

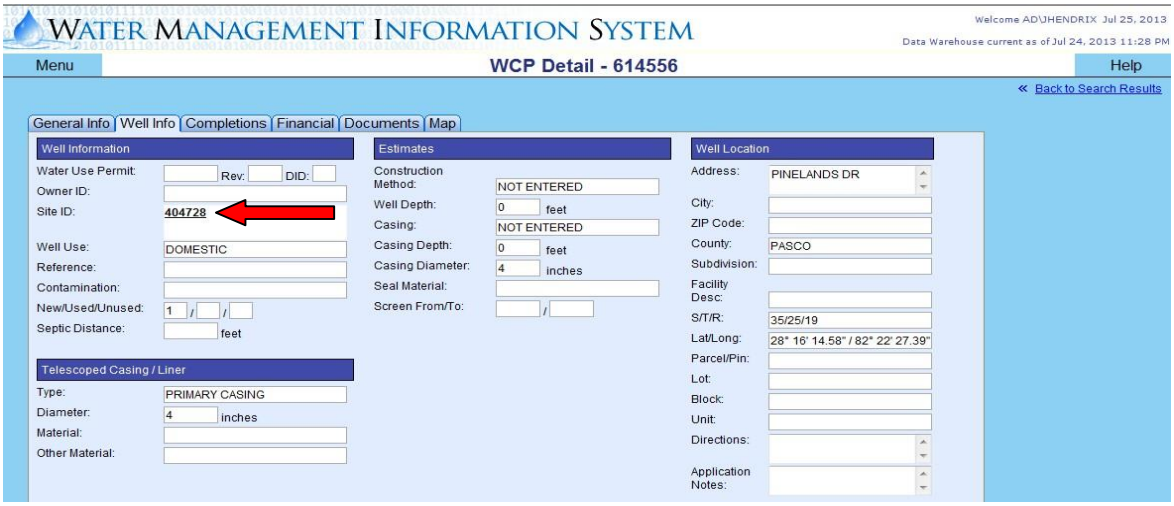


Once you have opened the image, verify that the permit number in the search matches the permit number written on the document. Then, verify that there is a latitude and longitude written. This latitude and longitude is the new location of the well site.

For the permit in which you are moving the well to the new location, you will need to search in WMIS to find the site identification number(s).

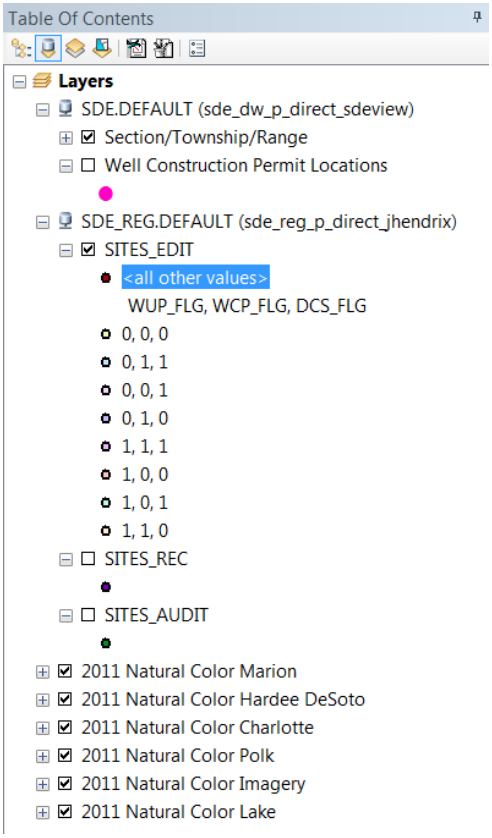


Search by the permit number, view its details, and then click on the Well Info tab to see the Site Identification number(s):

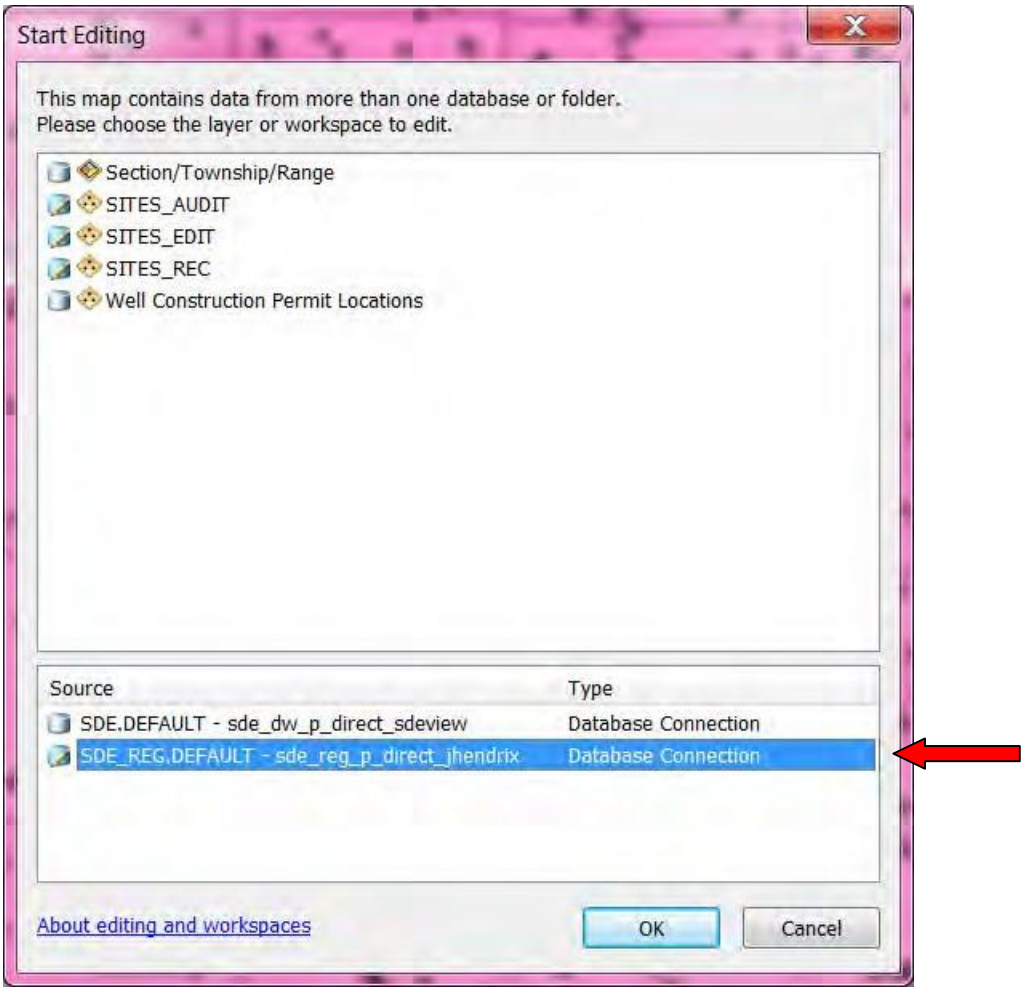


Once you have identified the Site ID(s), you will then move them in ArcMap.

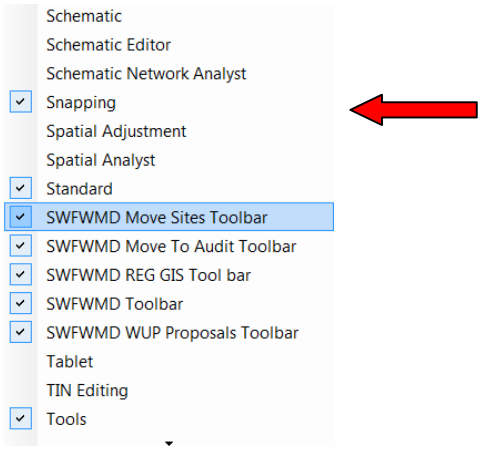
In ArcMap, add the following layers from SDE_DW_P_DIRECT_SDEVIEW and SDE_REG_P_DIRECT.
Make sure that the SITES_EDIT layer is turned on as this is the layer that you are editing. All other layers can be used as references.



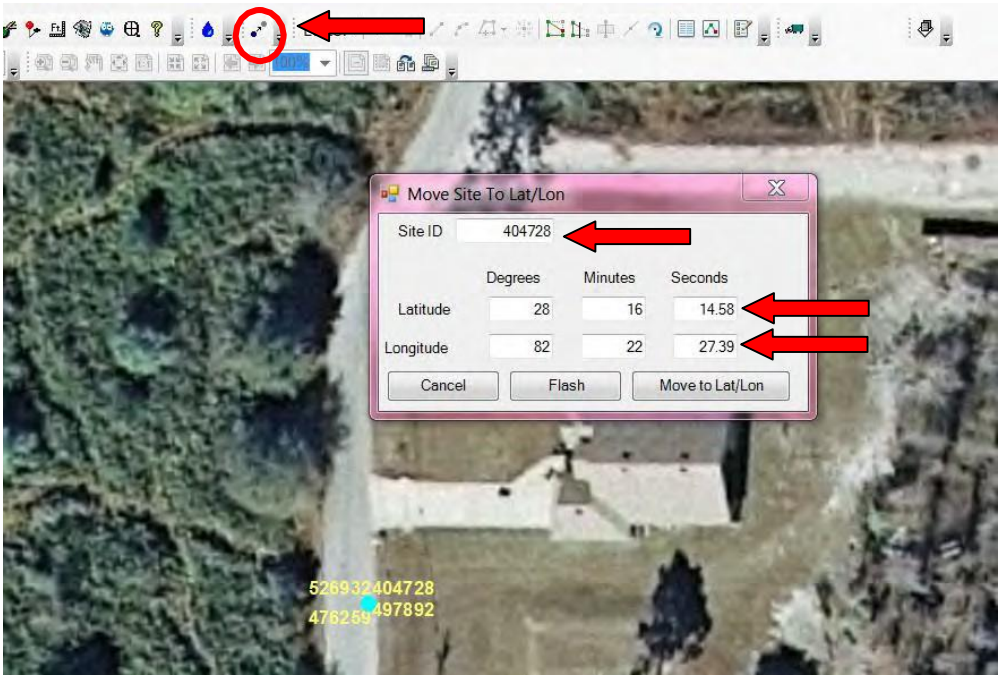
Start an edit session, selecting the following source. Click OK.



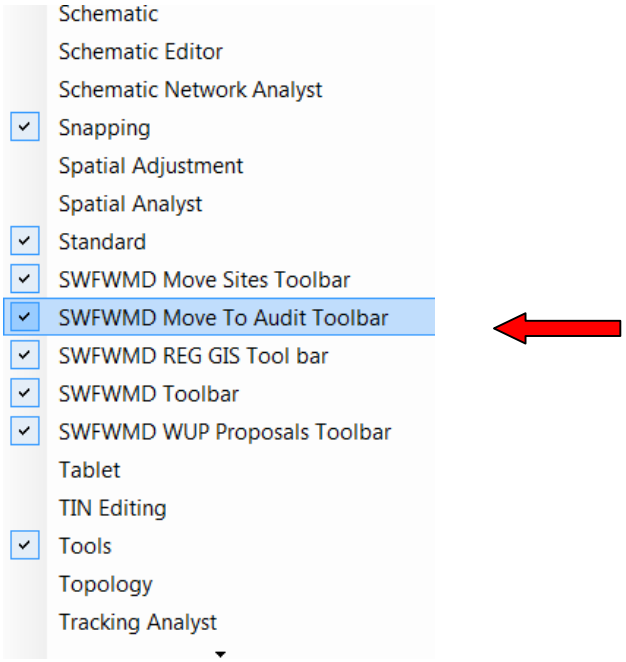
Add the SWFWMD Move Sites Tool from the toolbar menu:



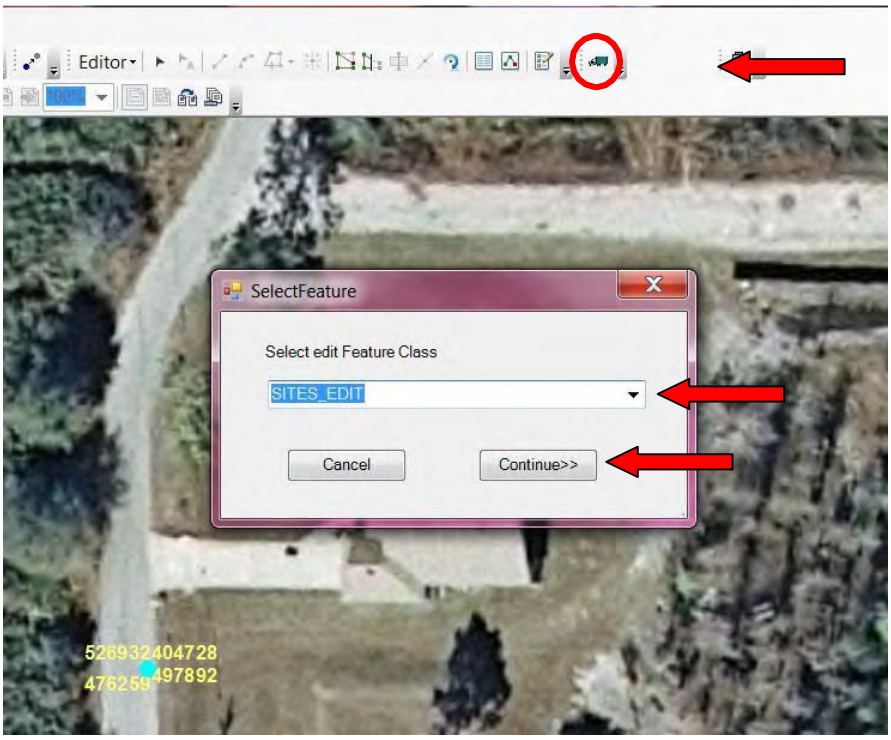
Once the tool has been added to ArcMap, click on the Move Sites Toolbar. Then, enter the SITE ID (from the Well Info tab in WMIS) and the new latitude and longitude location. Click on Move to Lat/Lon. You will then see the selection and the new location of the well.



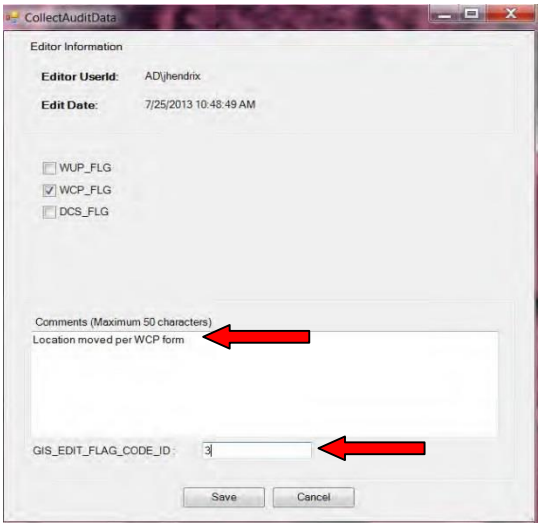
Next, move the selected location to audit. You will need to add the Move to Audit tool from the toolbar menu:



Once the tool has been added to ArcMap, click on the Move to Audit tool. Select SITES_EDIT from the dropdown menu for the Select Edit Feature Class. Click continue. Select Continue on the Please confirm your selection for SDECREATOR.SITES_AUDIT.



In the Collect Audit Data screen, in the comment section type Location moved per WCP form. The GIS_EDIT_FLAG_CODE_ID will always be three. Click save.



Creator: Corey Denninger
Date: 9/23/2014
Revision # 2
Date Last Review: 6/9/2016

Identifying Parcels for the Watershed Evaluation Notification List

Purpose

To document the procedures used for creating a mailing list of those parcels, and their respective homeowners, who reside in the watershed which is scheduled to be evaluated and updated as part of the Federal Emergency Management Agency's (FEMA) Map Modernization Program. From this analysis, a mailing list is created and letters sent to those parcel-owners notifying them of the pending work and requesting any information they might have that could be helpful in studying and verifying model results.

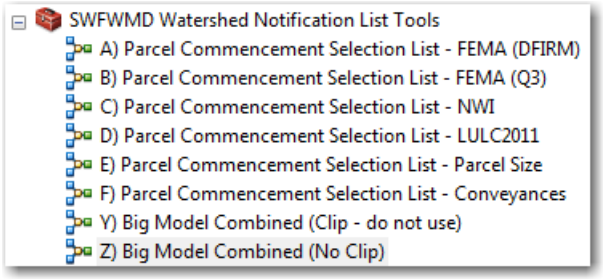
Scope

The following procedures are used when the District identifies a watershed for which the floodplain GIS data are going to be evaluated and updated as part of our cooperative effort with the Federal Emergency Management Agency's (FEMA) Map Modernization Program. The objective of this process is to develop a mailing list of property owners within the watershed that will be evaluated. This procedure is used at the beginning of a watershed study, prior to the Watershed Management Plan being executed and new/revised floodplain being created. The GIS models discussed below are used to select a subset of parcels that meet certain predetermined criteria. These criteria are given to the GIS analyst by the watershed project manager from Engineering (ENG) section. These criteria may also be outlined in the contract with the consultant.

Guidelines

The SWFWMD Watershed Notification List Toolbox consists of 8 models, however only model ***Z) Big Model Combined (No Clip)*** is to be used; the other models are sub-models within the big model and are retained for reference.

SWFWMD Watershed Notification List Toolbox:



Procedures:

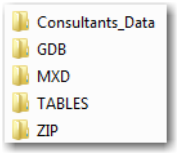
Projects file location:

As of now the project folders are set-up in the DCB/Mapping-GIS drive, however, in the future these projects may be saved to Engineering's (ENG) directory so all project related files are located in the same general location. The following location is currently used:

\\bkvshare\bkvDCB\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Watershed_Eval_Notification_List

Once the models have been run and the final draft Excel table mailing list has been created, ask the ENG project manager where they would like the files saved and simply perform a copy/paste to that location.

Within the project folder, the structure should contain at least the following folders:



Note: The 'ZIP' folder may not be used if that file type is not originally included and is optional in those cases.

Step 1 – Copy and Rename the Folder Template

The file folder template is located here: \\bkvshare\bkvDCB\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Watershed_Eval_Notification_List**_Folder_Template_Copy_and_Rename_**

Copy/Paste the folder listed above to the same file directory location where it currently resides and rename it to the watershed being evaluated. (e.g. 'Squirrel_Prairie_WMP')

Step 2 – Copy/Paste Feature Classes being evaluated (if applicable)

Eventually all notification lists will be created in-house by a SWFMWD GIS analyst; however, if evaluating (QA/QC) a consultant's work, use the following methods for storing a copy of their data.

Using ArcCatalog, navigate to the folder(s) containing the feature classes you will be evaluating and copy/paste these feature classes to the "Consultants_Data" folder or the GDB folder. The location of this information is provided by ENG staff. At a minimum, these files will contain the parcel level feature class which identifies, in the attribute table, those parcels which should be notified.

Step 3 – Rename and Open the MXD, Add Data

Navigate to the MXD folder within the newly copied template folder and rename the mxd; for example 'Bushnell_Parcel_Notification_List.mxd'. Once the file is renamed, open the mxd, add

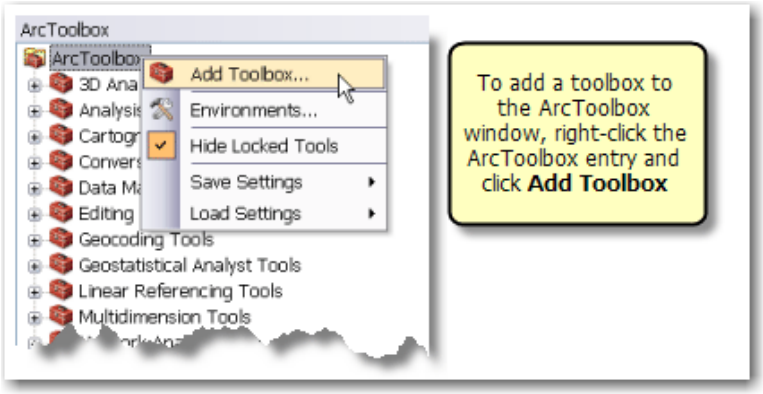
the newly copied feature classes being evaluated (from Step 2) using the Add Data button , and save the mxd. Keep ArcMap open.

Step 4 – Add the *SWFWMD Watershed Notification List Tools* toolbox

With the mxd open, add the '*SWFWMD Watershed Notification List Tools*' toolbox (if not already pre-loaded) located in the following location:

L:\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Toolboxes

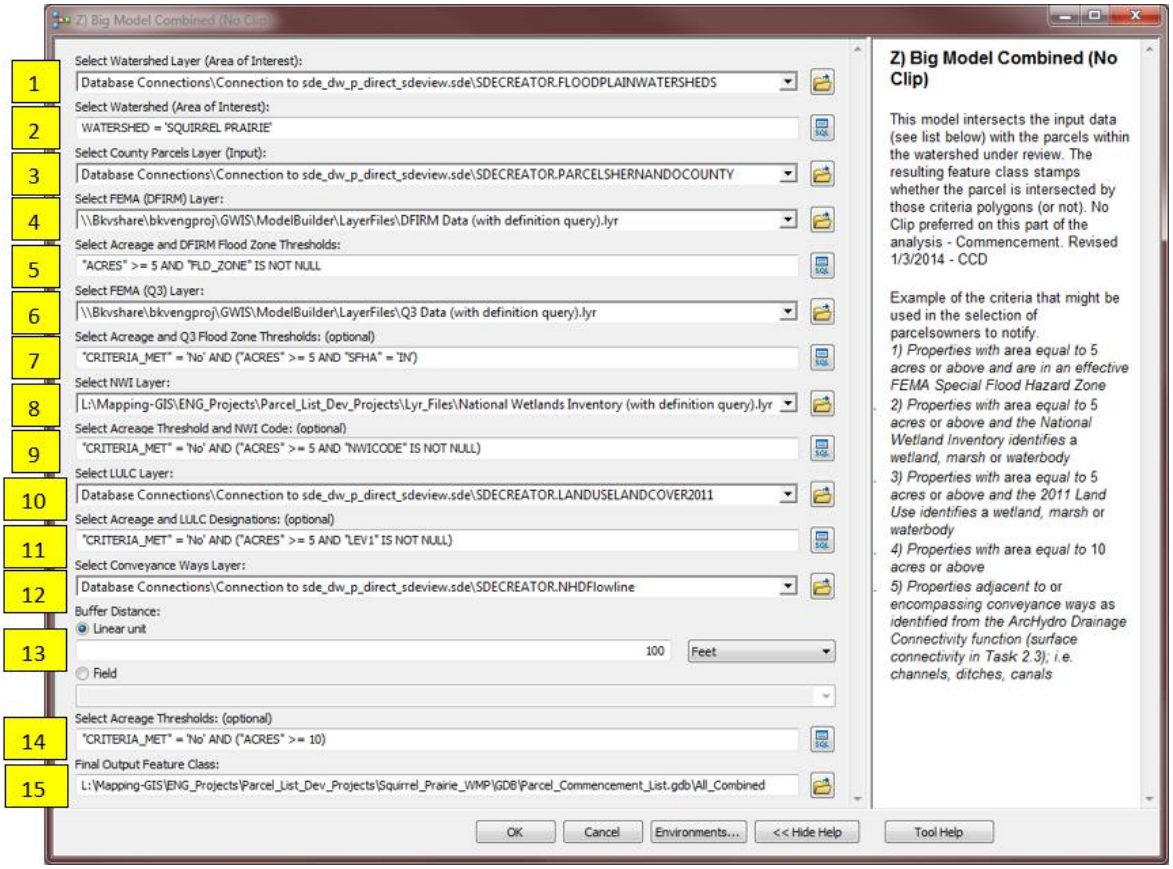
To add any toolbox to the ArcToolbox window, right-click inside the empty space area or on the '*ArcToolbox*' at the top and click Add Toolbox as illustrated below. Browse to the location containing the toolbox you want to add, select the toolbox, and click 'Open'.



Adding the NIR Model Toolbox

Step 5 – Run model *Z) Big Model Combined (No Clip)*

This toolbox contains 8 models, however only model ***Z) Big Model Combined (No Clip)*** is to be used; the other models are sub-models within the big model and are retained for reference.



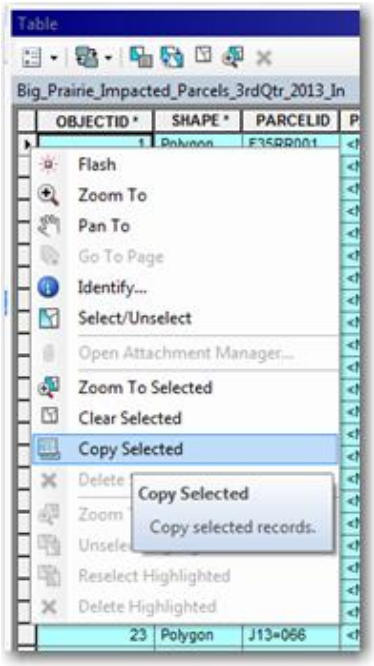
1. Select the Watershed layer. This can either be the version on the District's server or the copy provided in the consultant's deliverable; preferably the layer provided by the consultant so we can compare 'apples to apples'. If one is not provided use the version on SDE 'FLOODPLAINWATERSHEDS'.
2. Select the name of the watershed under review (e.g. WATERSHED = 'SQUIRREL PRAIRIE').
3. Select the location of the most current parcel layer that will be used to compare the old and new floodplain. Check with the parcel contract manager to determine if a newer version is available, if not, use the consultants parcel feature class.
4. Select the location of the FEMA DFIRM feature class. In this model a pre-defined .lyr file must be used. That layer is located on Engineering's drive in the following location: \\bkvshare\bkvengproj\GWIS\ModelBuilder\LayerFiles**DFIRM Data (with definition query).lyr.**
5. Select the acreage threshold and "FLD_ZONE" IS NOT NULL". Should be provided by the District's project manager.
6. Select the FEMA (Q3) Layer. That layer is located on Engineering's drive in the following location: \\bkvshare\bkvengproj\GWIS\ModelBuilder\LayerFiles**Q3 Data (with definition query).lyr.**
7. Select the acreage and Q3 flood zone thresholds. The acreage value will usually be the only modification to this query.
8. Select location of NWI (National Wetlands Inventory) layer.
9. Select acreage threshold and NWI code(s) to create the subset selection from the NWI layer. NOTE: The acreage value will usually be the only modification to this query.

10. Select the latest LULC (land use land cover) layer.
11. Select acreage threshold and LULC designations. The acreage value will usually be the only modification to this query.
12. Select Conveyance layer. This is usually provided to the District by the Consultant who has been hired to create a new floodplain model.
13. Select buffer distance to apply to the Conveyance layer. This distance should be provided by the District's project manager.
14. Select the acreage threshold to apply to the parcels. This acreage size should be provided by the District's project manager.
15. Select the output location and name of the final parcel layer. This output feature class will contain the 'CRITERIA_MET' field populated with "Yes" or "No", identifying those parcels from which a mailing list will be created and the owners will be contacted.

The output feature class project files should be placed in the geodatabase contained in the project folder from Step 1, above herein.

Step 6 – Copy/Paste Attribute Table into Macro-enabled Excel file

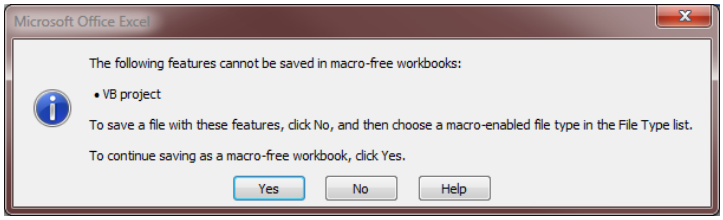
In this section, we will leave the ArcGIS environment and enter MS Office Excel. In this step all the records must be copied from the final output Parcels feature class attribute table (Step 5, #15 above) and pasted into Excel after which the macro needs to be run.



Copy selected records from attribute table

1. Open the macro-enabled spreadsheet titled '*WMP_Owner_Address_Filter.xlsm'*. To do so, navigate to the file located here: L:\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Macros\...
2. Back in the ArcMap mxd you've been working from, open the output parcels feature class attribute table created in Step 5, #15.
3. Select all the records in the table. There are a number of ways to do this; one method is after you've clicked inside the table, press the 'Ctrl' + 'A' keys at the same time.

4. Right-click on one of the gray boxes on the left-hand side of the table → *Copy Selected* (see figure above).
5. In the Excel file, left-click cell A1 inside the tab titled 'Raw_Data', and then paste the copied data ('Ctrl' + 'V').
6. Prior to running the macro, see the APPENDICES to determine if this potential issue applies to the current effort. In the View tab within Excel, select Macros → View Macros → Run (select on the macro titled '*FilteredMacro_v3*').
7. Save as file type '.xlsx' to the TABLES folder in the project directory. Do **NOT** save or overwrite the original '.xlsm' file. Answer '*Yes*' to the below message to save as a macro-free workbook.



Click 'Yes' to save as a macro-free workbook.

Once the macro finishes running, the tab titled 'Filtered' will contain all the parcels within the final output 'Parcels' feature class, but will be temporarily filtered using columns N (DUPLICATE_ROWS) and R (DUPLICATES PRESENT IN ROW). Using columns L-Q, column R (DUPLICATES PRESENT IN ROW) identifies rows where there are potentially subsequent duplicates; meaning column R will only identify (Duplicates Present) those rows that are the 2nd, 3rd, nth duplicates and not the first record which technically is not a duplicate for the purposes of this analysis.

After saving the Excel file and performing all appropriate QA/QC, the effort is complete. Send an email to the ENG project manager of the watershed directing them to where you've saved the files (tables, mxds, gdb, feature classes, etc.). The files will need to be copied/pasted to a location on ENG's drive. Check with the project manager on where they would like the files pasted.

Appendices

There are occasions when the input parcel layer from a consultant will not be in the correct attribute table schema to successfully run the Excel macro. There are a few options in these cases. One option is to use ArcCatalog to import the data from the consultant's parcel layer into the empty parcel feature class (Parcel_Schema_Template) that is located in the template geodatabase that was copied in Step 1. The other option would be to copy/paste/move the appropriate fields to their proper location for the tool to run correctly. What is important here is the location of the appropriate fields, not necessarily the name of the fields themselves. The macro will run no matter the order, name, etc. of the fields, but in order to get the correct output, these fields (or their equivalents) must be placed in the correct locations within the 'Raw_Data' tab. Those field locations within the 'Raw_Data' tab are as follows:

C	R	S	T	U	V	W	X	AC	AD	AE
PARCEL_NO	OWNER_NAME	OWNR_AD1	OWNR_AD2	OWNR_AD3	OWNR_CITY	OWNR_ST	OWNR_ZIP	ACREAGE	GE_10ACRES	NHD_Flow

Proper Excel Fields for the Field Names Listed Below

Column **C** – **PARCELID** (or equivalent)

Column **R** – **OWNERNAME** (or equivalent)

Column **S** – **OWNERADD1** (or equivalent)

Column **T** – **OWNERADD2** (or equivalent)

Column **U** – **OWNERADD3** (or equivalent; often this field is not available, but place an empty field here with this field name; it will act as a placeholder.)

Column **V** – **OWNERCITY** (or equivalent)

Column **W** – **OWNERST** (or equivalent)

Column **X** – **OWNERZIP** (or equivalent)

Column **AC** – (Any field can be here. Specific field not important for the macro but should be useful to the final reviewer.)

Column **AD** – (Any field can be here. Specific field not important for the macro but should be useful to the final reviewer.)

Column **AE** – (Any field can be here. Specific field not important for the macro but should be useful to the final reviewer.)

Creator: C. Denninger

Date 04/29/14
Revision # Original
Date Last Review: 6/9/2016

Identifying Potentially Impacted Parcels using Updated Floodplain

Purpose

To document the procedures used to identify potentially impacted parcels using the most recent floodplain polygons, from which a mailing list is created and letters sent to those parcel-owners.

Scope

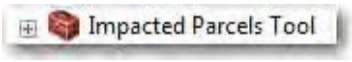
The following procedures are used when the District receives recently mapped preliminary floodplain GIS data as part of our cooperative effort with the Federal Emergency Management Agency's (FEMA) Map Modernization Program, which update the 100-year floodplain areas for the federal digital flood insurance rate (DFIRM) maps. These series of GIS models compare the old FEMA floodplain with the updated, preliminary floodplain results and subsequently identify parcels as being in one of four 'Status' codes: *Added* to the floodplain, *Removed* from the floodplain, *No Change (In)* the floodplain, and *No Change (Out)* of the floodplain. This information is then used to create a mailing list to which letters are sent notifying property owners that their parcel(s) may be impacted by the new floodplain and that they may wish to attend a District-facilitated public meeting where comments can be heard regarding the new map data. Those letters are sent to property owners who have been identified as being in at least one of the categories, except *No Change (Out)* since these parcels are identified as being out of the floodplain in both the old and the new updated data. The list of potentially impacted parcel owners is then copied from a feature class attribute table into a macro-enabled Excel spreadsheet where possible duplicate owners and addresses are identified. After the spreadsheet has been cleaned, and duplicates removed by Engineering (ENG) staff, it is then used by the Printshop to create mailing labels.

Guidelines

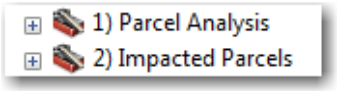
These tools are designed to be run using SWFWMD parcel GIS feature classes and the field schema that are contained within. If using a consultant's parcel layer deliverable (i.e. performing QA/QC of their work) or a parcel layer downloaded specifically for this effort then the fields pasted into the macro-enabled Excel table will need to be modified so the order matches SWFWMD's field order; at least for the pertinent fields or the new parcel layer needs to be imported into the empty parcel feature class within the template gdb which has the correct field names and order. This is explained in more detail later in this document's APPENDICES.

The Impacted Parcels Toolbox consists of two toolsets and a total of nine models. Not all of these models will be run when analyzing a preliminarily updated floodplain. Only one model from the **1) Parcel Analysis** Toolset is run based upon the criteria it meets; however, all of the models in **2) Impacted Parcels** Toolset are run, in sequential order.

Toolbox:

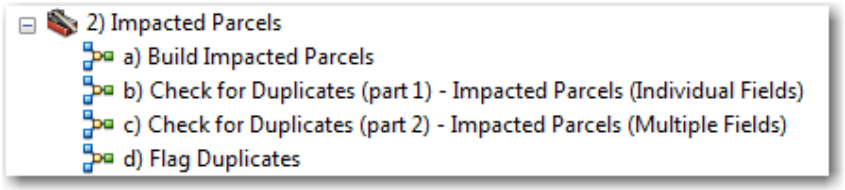


Toolsets:



Compare old to preliminary floodplain and identify impacted parcels: (only 1 model run)

Select Impacted Parcels and identify duplicates: (<u>all models run</u> in sequential order, a-d)

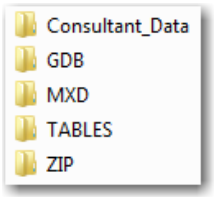


Procedures

<u>Projects file location</u>
As of now the project folders are set-up in the DCB/Mapping-GIS drive, however, in the future these projects may be saved to Engineering's (ENG) directory so all project related files are located in the same general location. The following location is used:

\\bkvshare\bkvDCB\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Impacted_Parcels_Projects

Once the models have been run and the final draft Excel table mailing list has been created, ask the ENG project manager where they would like the files saved to and simply perform a copy/paste to that location. Within the project folder, the structure should be as follows:



The ‘Consultant_Data’ and ‘ZIP’ folders may not be used if those file types are not originally included and are optional in those cases.

Step 1 – Copy and Rename the Folder Template

The file folder template is located here: L:\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Impacted_Parcels_Projects_**Folder_Template_Copy_and_Rename_**

Copy/Paste the folder listed above to the same file directory location where it currently resides and rename it to the watershed being evaluated. (e.g. ‘Squirrel_Prairie_WMP’)

Step 2 – Copy/Paste Feature Classes being Evaluated

Using ArcCatalog, navigate to the folder(s) containing the feature classes you will be evaluating and copy/paste these feature classes to the “Consultants_Data” folder or the GDB folder. The location of this information is provided by ENG staff. At a minimum, these files will contain the new preliminary floodplain and the watershed boundary.

Step 3 – Rename and Open the MXD, Add Data

Navigate to the MXD folder within the newly copied template folder and rename the mxd; for example ‘Pithlachascotee_BearCreek_Impacted_Parcel_List.mxd’. Once the file is renamed, open the mxd, add the newly copied feature classes being evaluated (from Step 2) using the Add Data button , and save the mxd. Keep ArcMap open.

Step 4 – Add the *Impacted Parcels Tool* toolbox

With the mxd open, add the ‘*Impacted Parcels Tool*’ toolbox (if not already pre-loaded) located in the following location:

L:\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Toolboxes

To add any toolbox to the ArcToolbox window, right-click inside the empty space area or on the ‘*ArcToolbox*’ at the top and click Add Toolbox as illustrated below. Browse to the location containing the toolbox you want to add, select the toolbox, and click ‘Open’.

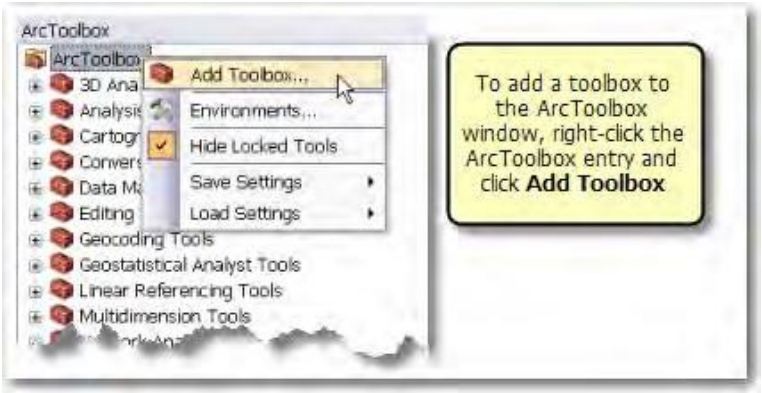


Figure 1 - Adding the NIR Model Toolbox

Step 5 - Using toolset *1) Parcel Analysis* – Running Model *2a)* **or** *2b)*

This toolset contains five different models, of which model 2a) and 2b) are the most commonly used. All of the models contained in this toolset compare various floodplains to each other and stamp parcels accordingly. For the updated preliminary floodplain impacted parcels analyses, models 2a) and 2b) will be used most of the time and therefore will be covered in this section. The other models are used much less frequently and on an ad-hoc basis. Model 2a) is used where DFIRM data exists and 2b) where Q3 data exists within the study area. There are two separate features classes where these features can be found and they should not contain any overlap; however there needs to be overlap between the watershed under review and either the DFIRM *or* the Q3 layers which is how a spatial comparison is accomplished.

With the same mxd open, add the following features to ArcMap and compare the watershed boundary under review to these areas to ensure the correct feature class is chosen for the model. It will either be DFIRM *or* Q3, not both, that the new floodplain will be compared to within the models.

DFIRM feature class: *SDECREATOR.SWFWMD_DFIRM_MOSAIC*

Q3 feature class: *SDECREATOR.Q3FLOODDATA_ERASE*

Model Parcel Analysis (2a) – New Floodplains vs. FEMA (DFIRM)

This model should be used to compare areas within the SWFWMD boundaries where DFIRM GIS data exists and compare that to the new preliminary floodplains within the watershed under review.

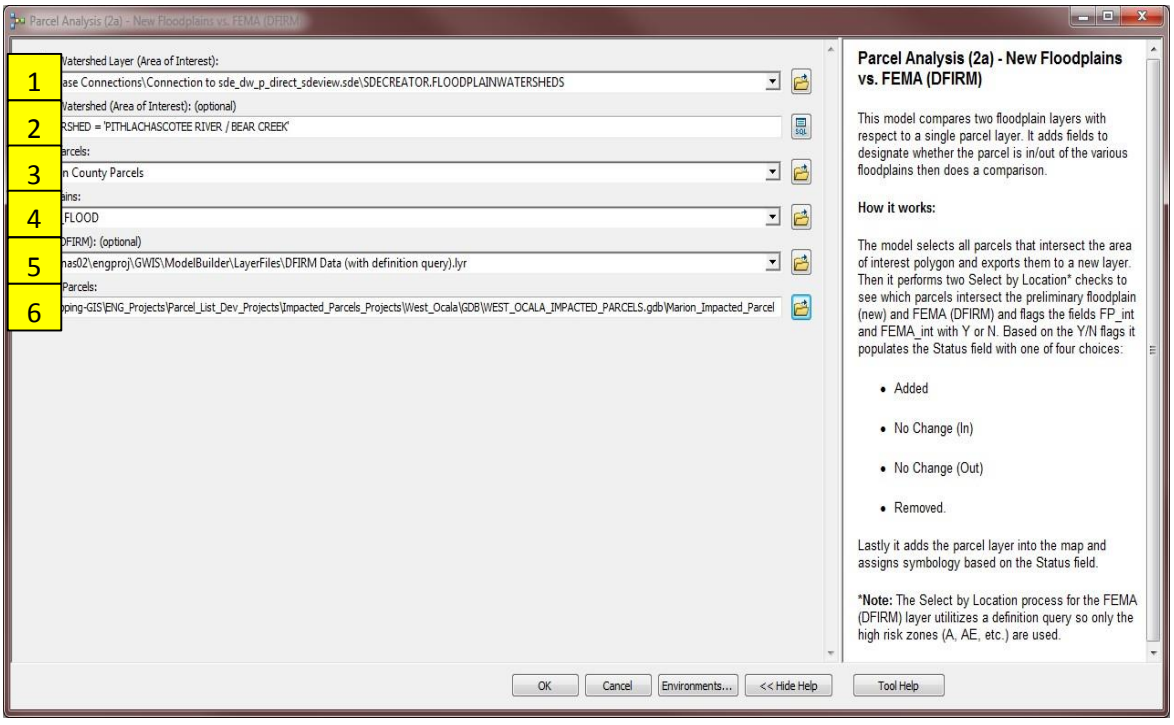


Figure 13 - Model 2a) New Floodplains vs. FEMA (DFIRM)

1. Select the Watershed layer. This can either be the version on the District's server or the copy provided in the consultant's deliverable; preferably the layer provided by the consultant so we can compare 'apples to apples'. If one is not provided use the version on SDE 'FLOODPLAINWATERSHEDS'.
2. Select the name of the watershed under review (e.g. WATERSHED = 'SQUIRREL PRAIRIE').
3. Select the location of the most current parcel layer that will used to compare the old and new floodplain against. Check with the parcel contract manager (S. Clardy) to determine if a newer version is available, if not, use the consultants parcel feature class.
4. Select the updated, preliminary floodplain provided in the consultant's deliverable.
5. Select the location of the FEMA DFIRM feature class. In this model a predefined .lyr file must be used. That layer is located on Engineering's drive in the following location: \\bkvnas02\engproj\GWIS\ModelBuilder\LayerFiles**DFIRM Data (with definition query).lyr.**
6. Select the output location and name of the final parcel layer. This output feature class will contain the 'Status' field populated with the codes identifying those parcels that may be impacted by the updated preliminary floodplain.
7. The output feature class project files should be placed in the geodatabase contained in the project folder from Step 1, above herein.

Model Parcel Analysis (2b) – New Floodplains vs. FEMA (Q3)

This model should be used to compare areas within the SWFWMD boundaries where Q3 GIS data exists and compare that to the new preliminary floodplains within the watershed under review.

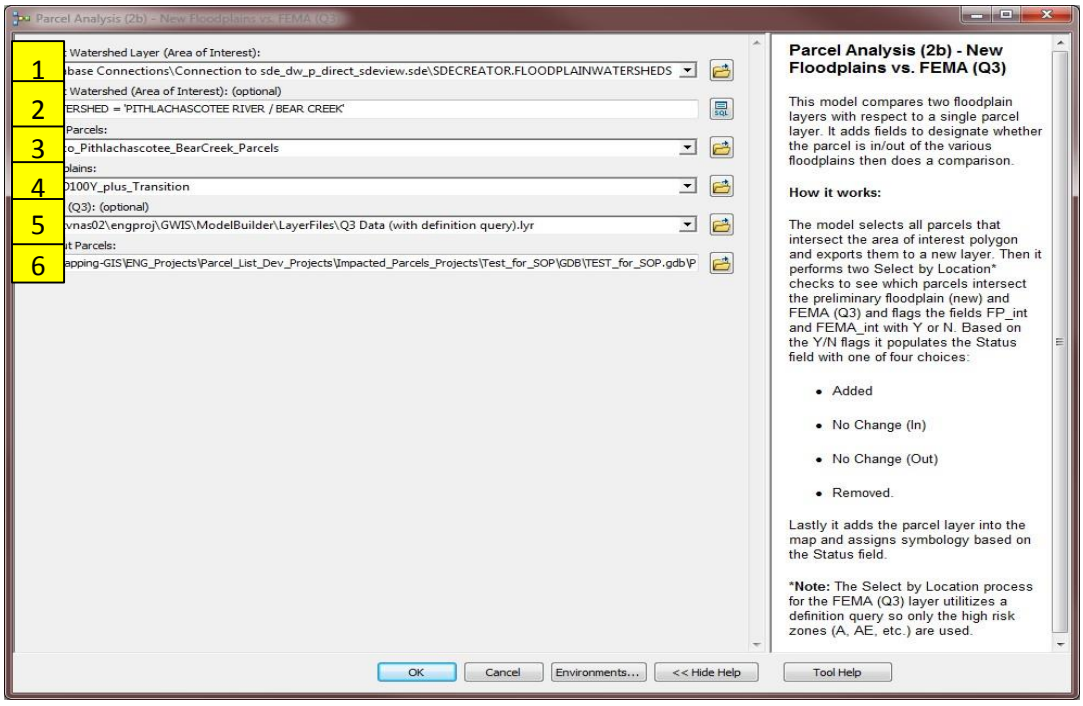


Figure 14 - Model 2b) New Floodplains vs. FEMA (Q3)

1. Select the Watershed layer. This can either be the version on the District's server or the copy provided in the consultant's deliverable; preferably the layer provided by the consultant so we can compare apples to apples if you will.
2. Select the name of the watershed under review (e.g. WATERSHED = 'SQUIRREL PRAIRIE')
3. Select the location of the most current parcel layer that will used to compare the old and new floodplain against. Check with the parcel contract manager to determine if a newer version is available, if not, use the consultants parcel feature class.
4. Select the updated, preliminary floodplain provided in the consultant's deliverable.
5. Select the location of the FEMA Q3 feature class. In this model a predefined .lyr file must be used. That layer is located on Engineering's drive in the following location: \\bkvnas02\engproj\GWIS\ModelBuilder\LayerFiles\Q3 Data (with definition query).lyr
6. Select the output location and name of the final parcel layer. This output feature class will contain the 'Status' field populated with the codes identifying those parcels that may be impacted by the preliminary floodplain. The output feature class project files should be placed in the geodatabase contained in the project folder from Step 1, above herein.

Step 6 - Using toolset *2) Impacted Parcels* – a) Build Impacted Parcels

This model is used to create a feature class of a subset of parcels that have been impacted, one way or another, by the new floodplain data. Each parcel receives one of 4 'Status' codes based on how the new floodplain data applies. Those 'Status' codes are as follows:

1. Added
2. No Change (In)
3. Removed
4. No Change (Out)

This tool selects 'Status' codes 1-3 above and outputs those records into a feature class and adds it to the mxd's Table of Contents (TOC) complete with symbology to differentiate the 3 groups. This output feature class is used as input into the next model (b) in Step 7.

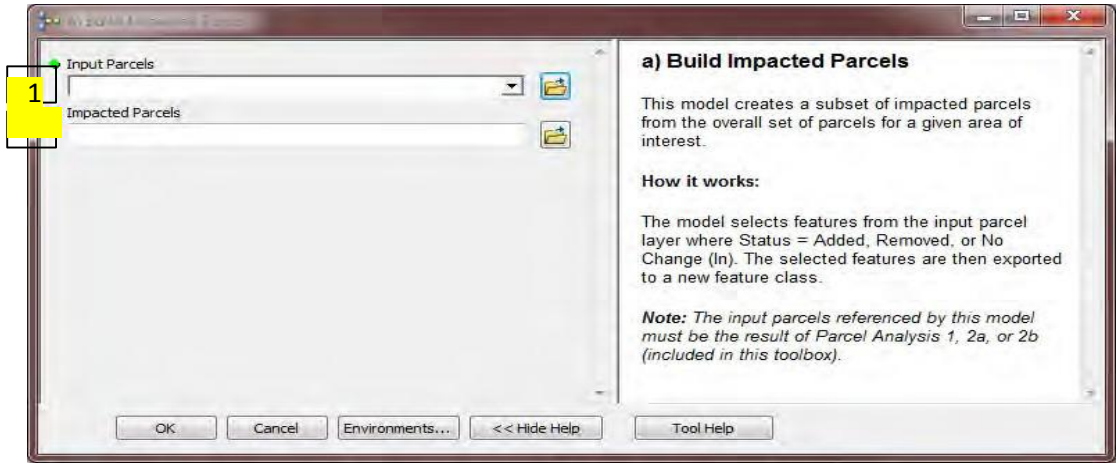


Figure 15 - Model a) Build Impacted Parcels

1. Select the output from the previous model (#6 from 2a *or* 2b).
2. Navigate to the location where you will save the output feature class and name it. This output feature class is simply a subset of the previous model and will be used as an input into tool b) and d) below. The output name should include the words 'Impacted_Parcels' (e.g. '*NewRiver_UpperHills_ImpactedParcels*').

Step 7 - Using toolset *2) Impacted Parcels* – b) Check for Duplicates (part 1) – Impacted Parcels (Individual Fields)

Using the feature class from the previous model's output, this tool examines the layer for duplicate records. Since the goal of this entire effort is to notify property owners that their parcel may be affected by the updated floodplains, only one notification letter needs to be mailed to each owner, regardless of the total number of parcels they own in the area. This reduces resource waste and project cost through the reduction in unnecessary printing of duplicate letters to property owners. This tool outputs four separate tables that are used as inputs into the next two models.

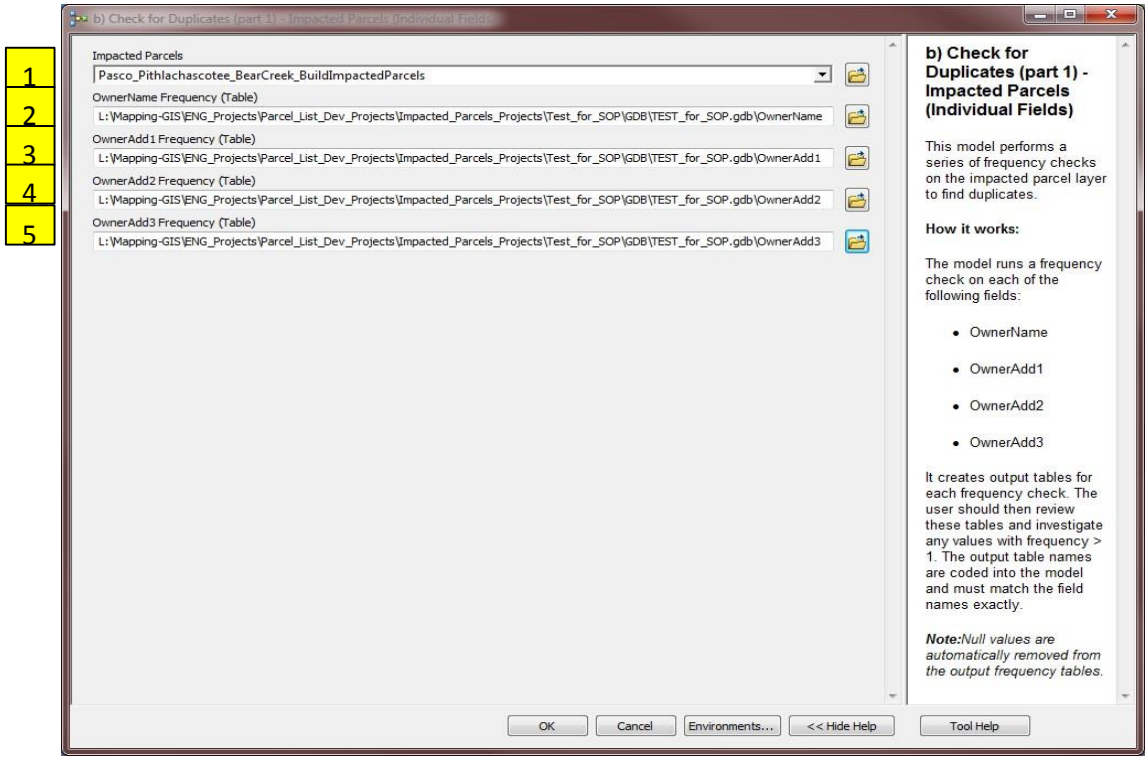


Figure 16 - Model b) Check for Duplicates (part 1) – Impacted Parcels (Individual Fields)

1. Select the output feature class from the previous model, as the input here
2. Table must be named *OwnerName* and output to the project gdb set-up earlier
3. Table must be named *OwnerAdd1* and output to the project gdb set-up earlier
4. Table must be named *OwnerAdd2* and output to the project gdb set-up earlier
5. Table must be named *OwnerAdd3* and output to the project gdb set-up earlier

Step 8 - Using toolset *2) Impacted Parcels* – c) Check for Duplicates (part 2) – Impacted Parcels (Multiple Fields)

Using the 4 output tables from the previous model, this tool outputs another table that determines whether or not a duplicate value exists in separate fields (not just separate rows). This output, along with the other four tables created previously, is used as inputs into the final tool d).

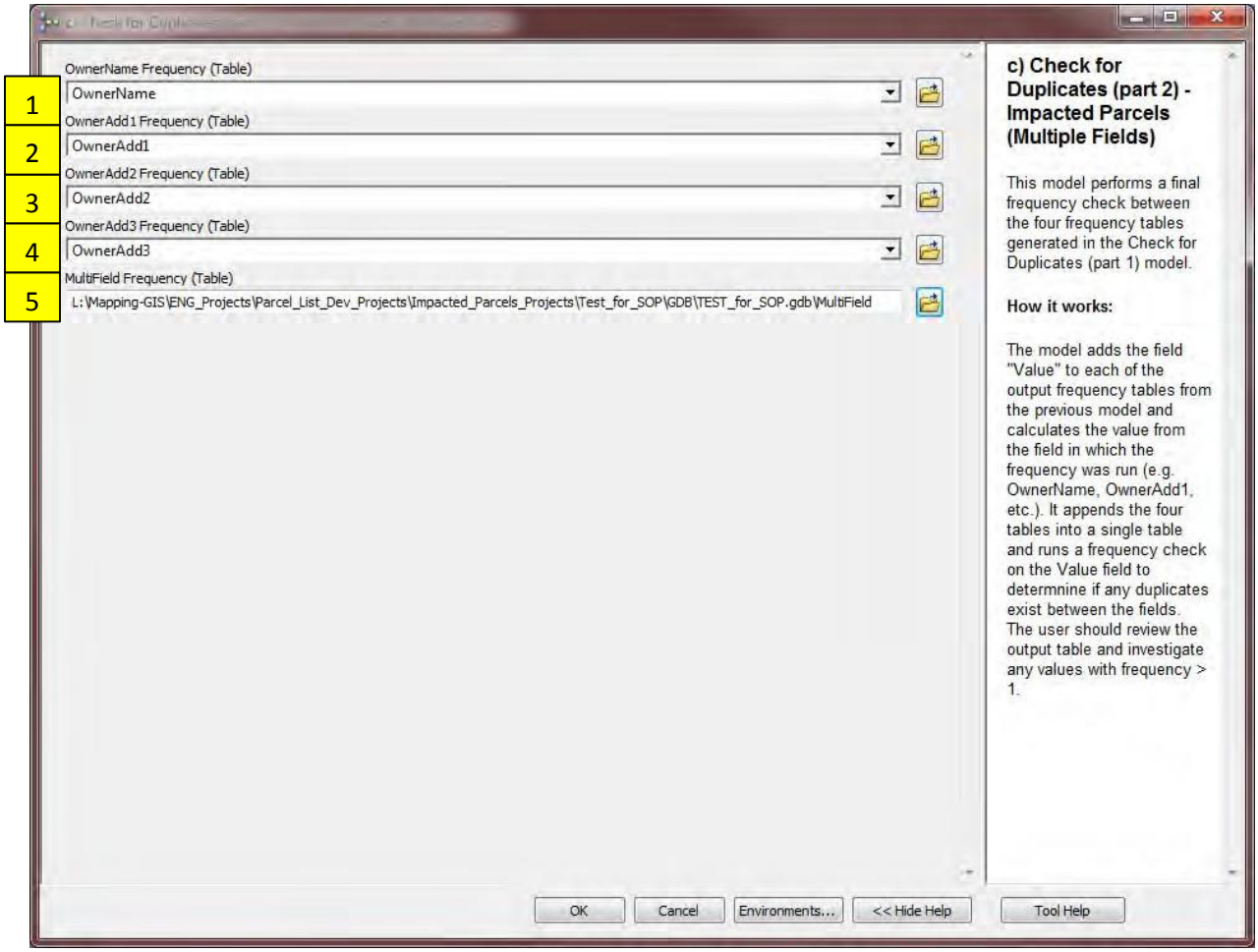


Figure 17 - Model c) Check for Duplicates (part 2) –Impacted Parcels (Multiple Fields)

1. Select the OwnerName table
2. Select the OwnerAdd1 table
3. Select the OwnerAdd2 table
4. Select the OwnerAdd3 table
5. Table must be named *MultipleField* and output to the project gdb set-up earlier

Step 9 – Flag Duplicates

This model adds a field titled 'Duplicate_Flg' to the Impacted Parcels feature class from the model in Step 6 – model 2a above and determines which records contain duplicates. The output to this model is an updated version of the Impacted Parcels feature class created earlier in Step 6, and whose attribute table will be used in the macro-enabled Excel spreadsheet discussed in Step 10. The resulting output from Step 10 is what ultimately is used to create the final property owner notification/mailing list from. That macro-enabled spreadsheet will duplicate some of the effort that is performed by models b-d here.

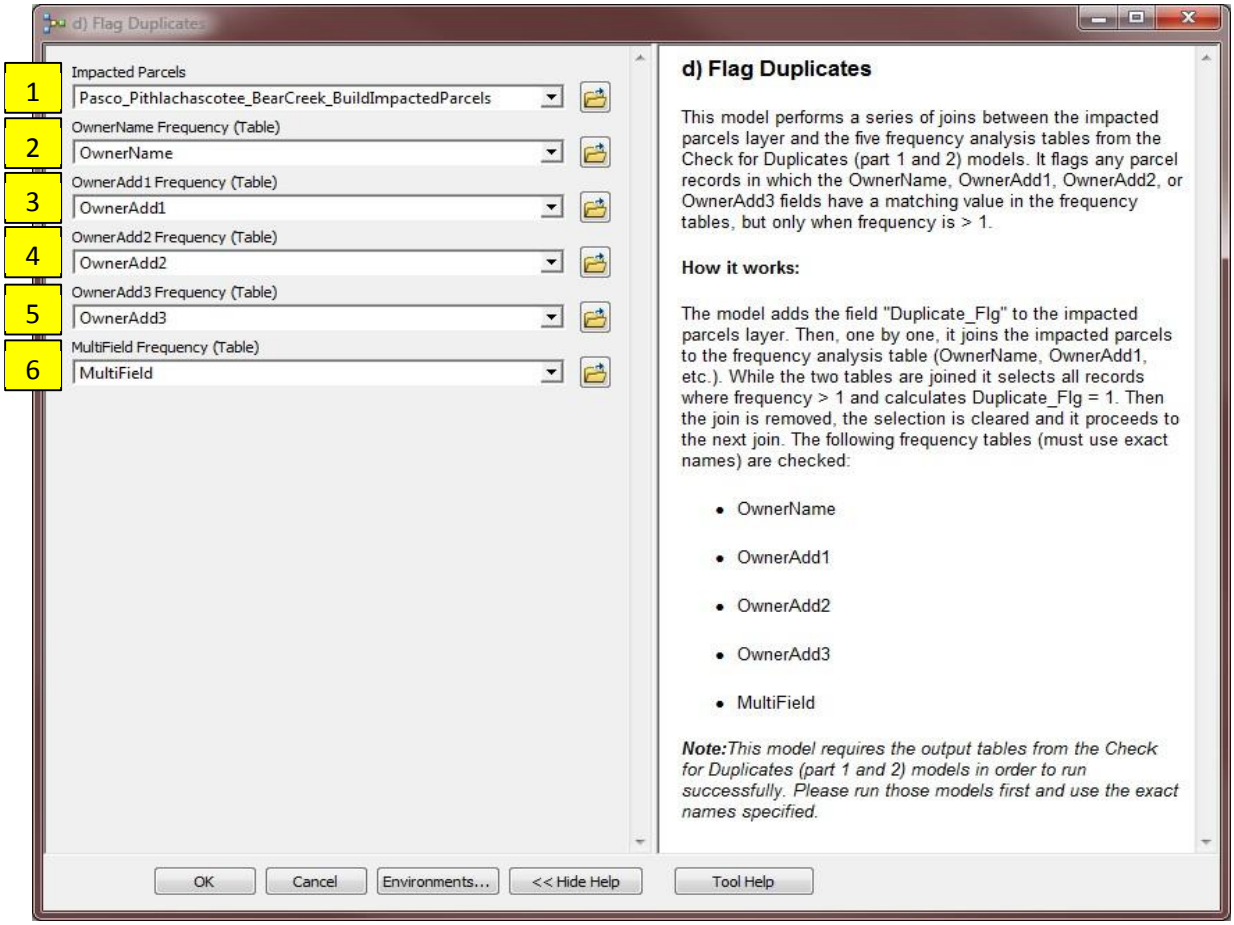


Figure 18 - Model d) Flag Duplicates

1. Select the Impacted Parcels feature class from Step 6 above
2. Select the OwnerName table
3. Select the OwnerAdd1 table
4. Select the OwnerAdd2 table
5. Select the OwnerAdd3 table
6. Select the MultipleField table

Step 10 – Copy/Paste Attribute Table into Macro-enabled Excel file

In this section, we will leave the ArcGIS environment and enter MS Office Excel. In this step all the records must be copied from the final output Impacted Parcels feature class attribute table and pasted into Excel after which the macro needs to be run.

Figure 19 - Copy Selected records from attribute table

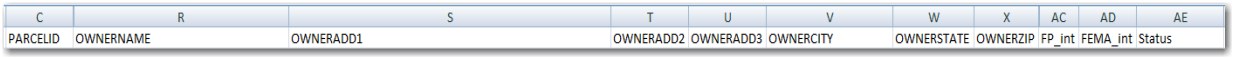
1. Open the macro-enabled spreadsheet titled '*WMP_Owner_Address_Filter.xlsm'*. To do so, navigate to the file located here: L:\Mapping-GIS\ENG_Projects\Parcel_List_Dev_Projects\Macros\...
2. Back in the ArcMap mxd you've been working from, open the Impacted Parcels attribute table used in Step 9.
3. Select all the records in the table. There are a number of ways to do this; one method is after you've clicked inside the table, press the 'Ctrl' + 'A' keys at the same time.
4. Right-click on one of the gray boxes on the left-hand side of the table →*Copy Selected* (see Figure 8 above).
5. In the Excel file, left-click cell A1 inside the tab titled 'Raw_Data', and then paste the copied data ('Ctrl' + 'V').
6. Prior to running the macro, see the APPENDICES to determine if this potential issue applies to the current effort. In the View tab within Excel, select Macros → View Macros → Run (should be selected on the macro titled '*FilteredMacro_v3*').
7. Save as file type '.xlsx' to the TABLES folder in the project directory. Do **NOT** save or overwrite the original '.xlsm' file. Answer 'Yes' to the below message to save as a macro-free workbook.

Figure 20 - Click 'Yes' to save as a macro-free workbook.

Once the macro completes running, the tab titled 'Filtered' will contain all the parcels within the final output Impacted Parcels feature class, but will be temporarily filtered using columns N (DUPLICATE_ROWS) and R (DUPLICATES PRESENT IN ROW). Using columns L-Q, column R (DUPLICATES PRESENT IN ROW) identifies rows where there are potentially subsequent duplicates; meaning column R will only identify (Duplicates Present) those rows that are the 2nd, 3rd, nth duplicates and not the first record which technically is not a duplicate for the purposes of this analysis.

After saving the Excel file and performing all appropriate QA/QC, the effort is complete. Send an email to the ENG project manager of the watershed directing them to where you've saved the files (tables, mxds, gdb, feature classes, etc.). The files will need to be copied/pasted to a location on ENG's drive. Check with the project manager on where they would like the files pasted to.

Appendices:
There are occasions when the input parcel layer from a consultant will not be in the correct attribute table schema to successfully run the Excel macro. There are a few options in these cases. One option is to use ArcCatalog to import the data from the consultant's parcel layer into the empty parcel feature class (Parcel_Schema_Template) that is located in the template geodatabase that was copied in Step 1. The other option would be to copy/paste/move the appropriate fields to their proper location for the tool to run correctly. What is important here is the location of the appropriate fields, not necessarily the name of the field itself. The macro will run no matter the order, name, etc. of the fields, but in order to get the correct output, these fields (or their equivalents) must be placed in the correct locations within the 'Raw_Data' tab. Those field locations within the 'Raw_Data' tab are as follows:



C	R	S	T	U	V	W	X	AC	AD	AE
PARCELID	OWNERNAME	OWNERADD1	OWNERADD2	OWNERADD3	OWNERCITY	OWNERSTATE	OWNERZIP	FP_int	FEMA_int	Status

Figure 21 - Proper Excel Fields for the Field Names Listed Below.

Column **C – PARCELID** (or equivalent)
Column **R – OWNERNAME** (or equivalent)
Column **S – OWNERADD1** (or equivalent)
Column **T – OWNERADD2** (or equivalent)
Column **U – OWNERADD3** (or equivalent)
Column **V – OWNERCITY** (or equivalent)
Column **W – OWNERST** (or equivalent)
Column **X – OWNERZIP** (or equivalent)
Column **AC – FP_INT** (Any field can be here, however this is a useful option.)
Column **AD – FEMA_INT** (Any field can be here, however this is a useful option.)
Column **AE – STATUS** (No equivalent field; must be present. Not important for the macro but useful to the final reviewer.)

Creating Final Mailing List and Deleting Duplicates:

Guidelines

There are two methods for identifying duplicates within the Excel file and removing, or deleting, the duplicates. This first method discussed will only work efficiently with smaller files where the total records are ~5,000 rows or less. If any larger, then the removal or deletion of records can tax the computers processors and either freeze the program or simply take too long to perform simple procedures (e.g. save, delete a record, scroll down, etc.). The second procedure will work for any number of records and may be the preferred method for slower computers.

After Step 10 has been completed above, you now have an Excel file that contains all the raw data from the final output feature class, as well as the data contained in filtered columns, with macros that have identified those records that contain duplicates. Using columns N and R, you can easily investigate the macro-identified duplicates contained in the list and delete the appropriate records accordingly. The formula contained in column N, uses the output from the formulae contained in columns L and M; where the duplicate Owner Names and/or Address1s are identified and labeled as '*Duplicate Exists'*. As Figure 11 shows below, column N identifies and labels those rows that have a duplicate in the Owner Name and/or Address1 columns with '*Duplicates Present*'. To begin deleting the duplicates, column N should be filtered by '*Duplicates Present*'; displaying only those records where a duplicate exists in either Owner Name (L) and/or Address1 (M).

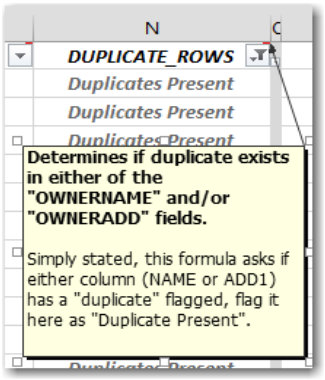


Figure 11 – Column N definition

As Figure 12 shows below, column R identifies and labels those rows that have a subsequent duplicate (2nd or more) in the Owner Name and/or Address1 columns with '*Duplicates Present*'. To begin deleting the duplicates, column N should be filtered by '*Duplicates Present*' and column R should be filtered by '*Duplicates Present*'; displaying only those records where a subsequent duplicate (2nd or more) exists in either Owner Name and/or Address1. The procedures will be discussed in more detail below.

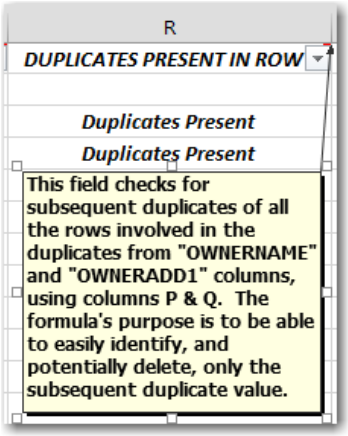


Figure 3 - Column R definition

Procedures

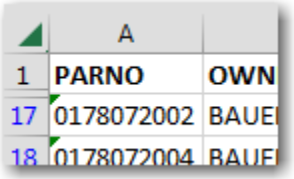
Method 1 – Standard Process

Note: (for use w/ ~5,000 records or less; depending on the computer)

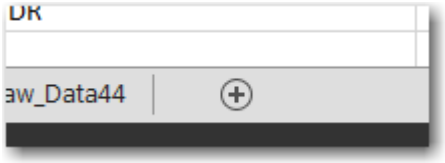
1. Ensure Column N (DUPLICATE_ROWS) is filtered by '*Duplicates Present*'
2. Filter Column R (DUPLICATES PRESENT IN ROW) by '*Duplicates Present*'; which essentially reveals only the subsequent duplicates (2nd or more)
3. Delete rows at will
4. When you are finished deleting the duplicate, unnecessary records, copy and paste columns B-H into the '*Addresses*' tab by highlighting columns B-H → right click → copy → go to the *Addresses* tab → paste into cell A1.
5. Remove any empty, unnecessary columns (if there are any). Often OWNERADD3, and sometimes OWNERADD2 are empty, if so delete them from the *Addresses* tab.
6. Add a new column by selecting the entire OWNERCITY column by clicking on the letter (often "C") at the top of the spreadsheet → Right Click → Insert
7. Add the following formula to the new column =CONCATENATE(D2,","," ",E2," ", F2) This formula will combine the OWNERCITY, OWNERSTATE, and OWNERZIP into one field for the conveyance of the print shop when creating the address labels for the mail-outs.
8. Click the cell with the new formula, then double-click the small square in the bottom right hand corner to force the formula to be copied into all the rows in the new column.
9. Save file. The file is now complete.

Method 2 – Faster Processing

1. Unfilter Column N (make **all** records visible)
2. Left-click top left corner arrow to highlight **all** records



3. Right click, copy
4. Click plus to add a new tab worksheet



5. In new worksheet, left click in cell A1 "Paste" → "Paste Special" (*Values* and *None*)

6. Expand columns to see all
7. Add Filter to Columns L → R (Select columns L through R, → Sort & Filter → Filter)
8. Check **on** Column N filter "Duplicate Present"
9. Check **on** Column R filter "Duplicates Present" (to reveal only these records)
10. Delete rows at will
11. When you are finished deleting the duplicate, unnecessary records, copy and paste columns B-H into the '*Addresses*' tab by highlighting columns B-H → right click → copy → go to the *Addresses* tab → paste into cell A1.
12. Remove any empty, unnecessary columns (if there are any). Often OWNERADD3, and sometimes OWNERADD2 are empty, if so delete them from the *Addresses* tab.
13. Add a new column by selecting the entire OWNERCITY column by clicking on the letter (often "C") at the top of the spreadsheet → Right Click → Insert
14. Add the following formula to the new column =CONCATENATE(D2,","," ",E2," ", F2) This formula will combine the OWNERCITY, OWNERSTATE, and OWNERZIP into one field for the conveyance of the print shop when creating the address labels for the mail-outs.
15. Click the cell with the new formula, then double-click the small square in the bottom right hand corner to force the formula to be copied into all the rows in the new column.
16. Save file. The file is now complete.

Creator: D. Gillett
Date 08/15/13
Revision # Original
Date last review: 3/24/2014

Land Management Real Estate Layers Update Procedure

PURPOSE
The purpose of this document is to outline the procedure for updating the Land Management Real Estate layers: Acquired District Lands; Areas Surplused by the District; District Land Parcels; and Proposed District Owned Lands.

SCOPE
These feature classes are currently located in SDE. They are exported locally to a file geodatabase and updated within an edit session within ArcMap.

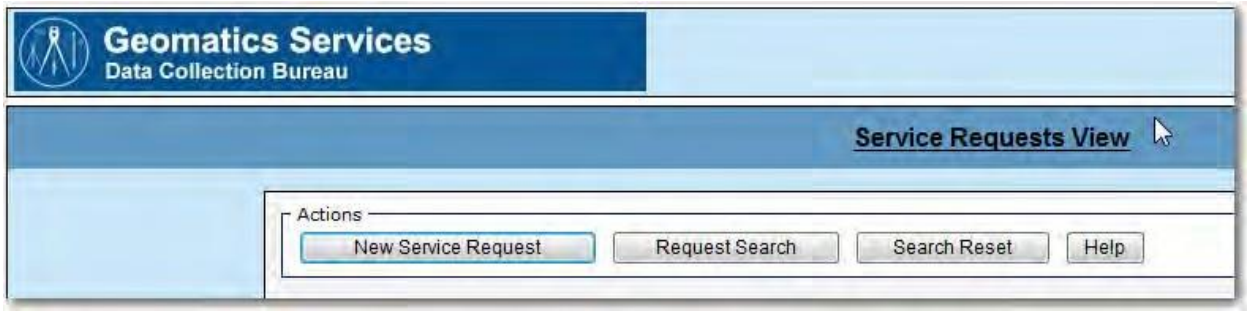
PROCEDURES
1. A closing notice is provided by the Real Estate section that provides general information for the parcel.

Closing Notice

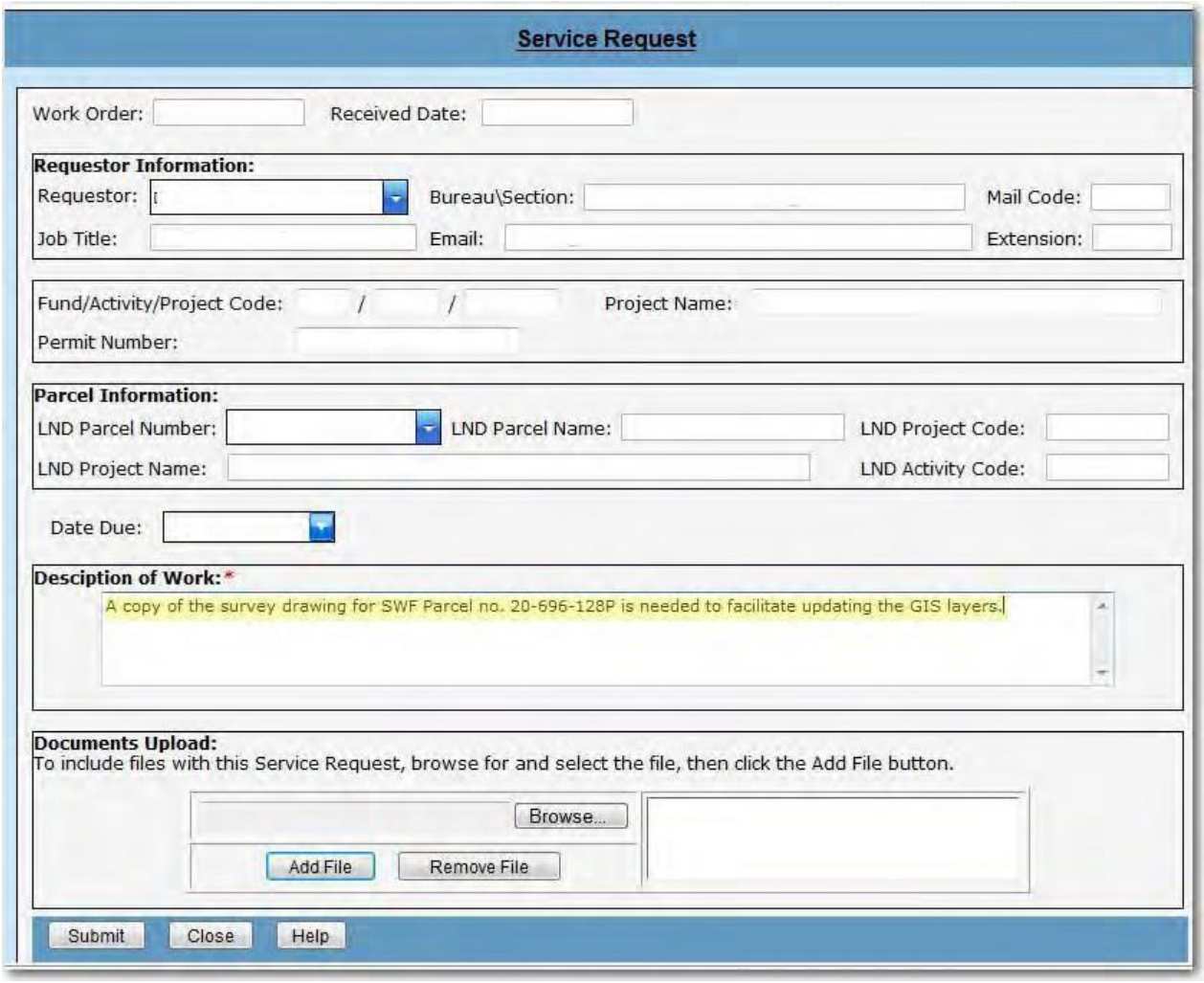
The District **has closed** on a parcel of land in Polk County. This is an easement interest in the property. The details follow:

Closing Date:	January 31, 2013 (instrument filed)
SWF Parcel #:	20-696-128P
Project:	Peace Creek Canal, S064
Owner:	City of Lake Wales
Parcel Size:	5.98 acres
County:	Polk
Purchase Price:	donation – title insurance purchased for $17,300
Tax I.D. No(s).:	273003000000043010

2. Request a copy of the AutoCAD drawing file from the Survey section using Geomatics Request from Currents.

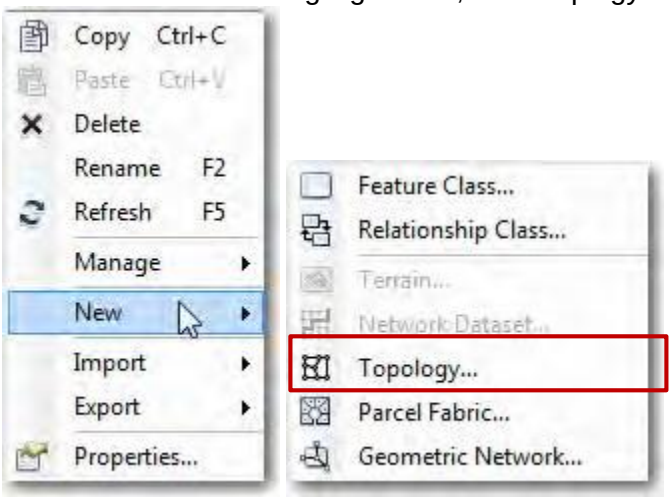


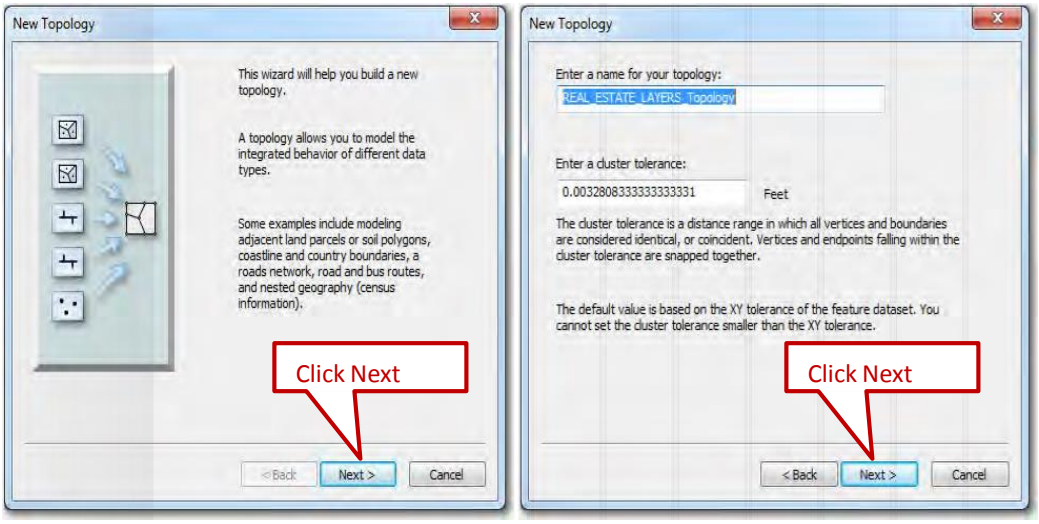
Click New Service Request button.

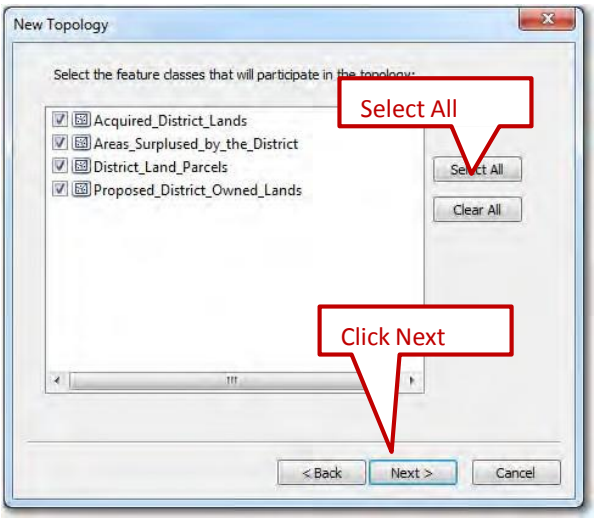


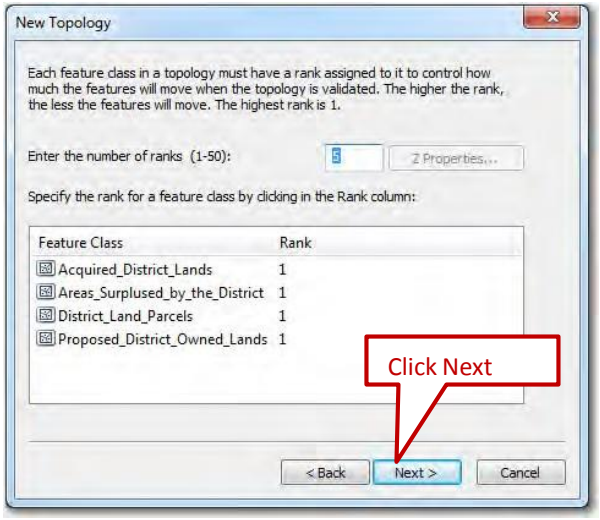
Enter in a brief description of the request in the Description of Work box, and then click the Submit button.

3. Create a file geodatabase with a feature dataset using NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet as the XY coordinate system.
4. Import the following layers from P:\LayerFiles\Environmental_Conservation to the feature dataset in newly created file geodatabase:
   a. Acquired District Lands.lyr
   b. Areas Surplused by the District.lyr
   c. District Land Parcels.lyr
   d. Proposed District Owned Lands.lyr
5. Create Topology
   a. Right-click feature dataset highlight New, click Topolgy



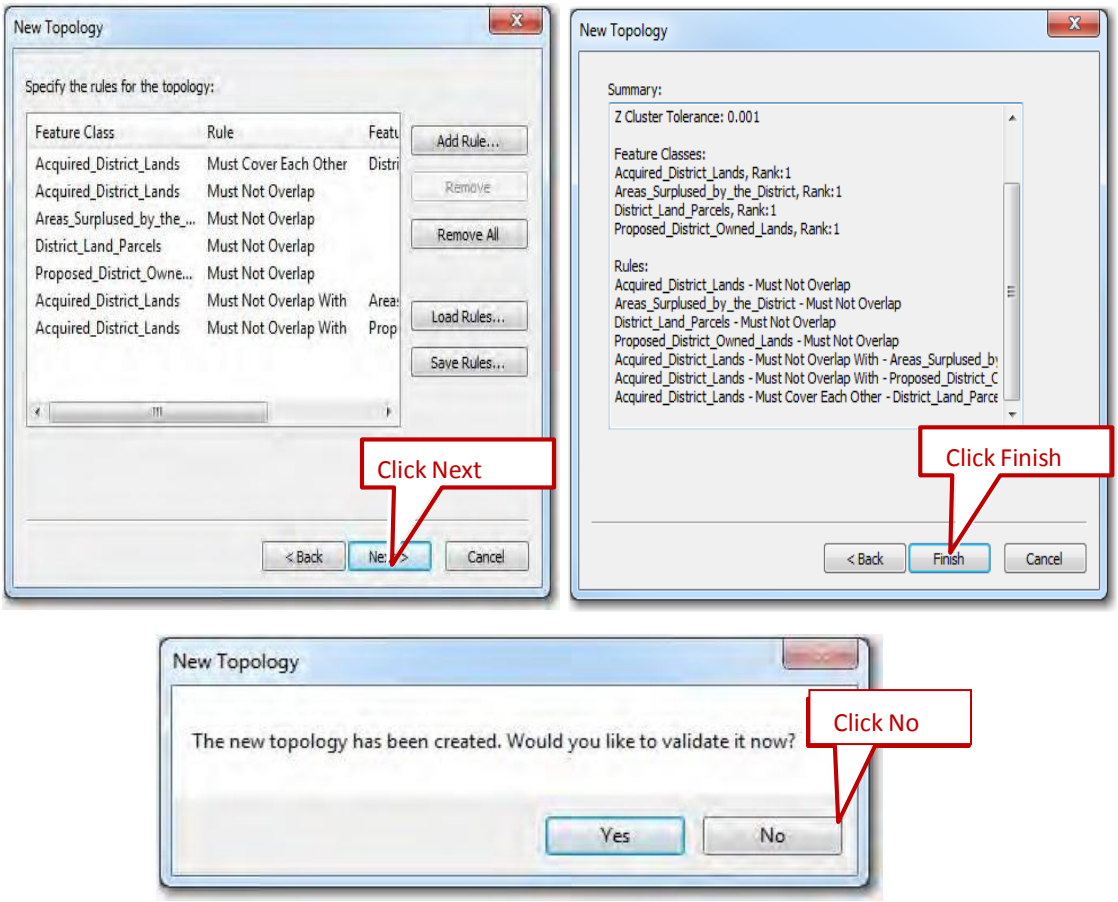




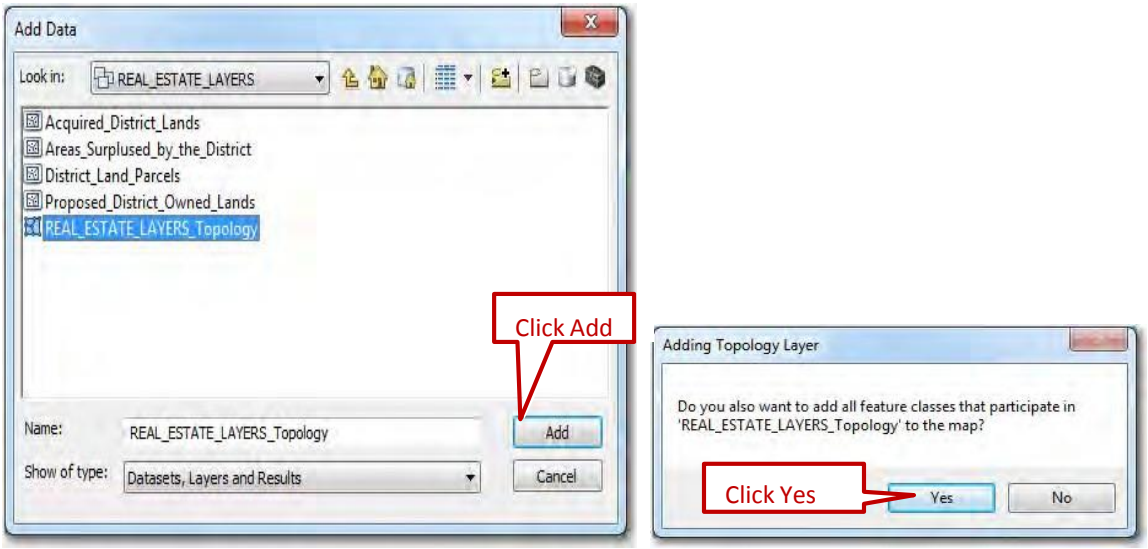


Add the following rules clicking Add Rule:

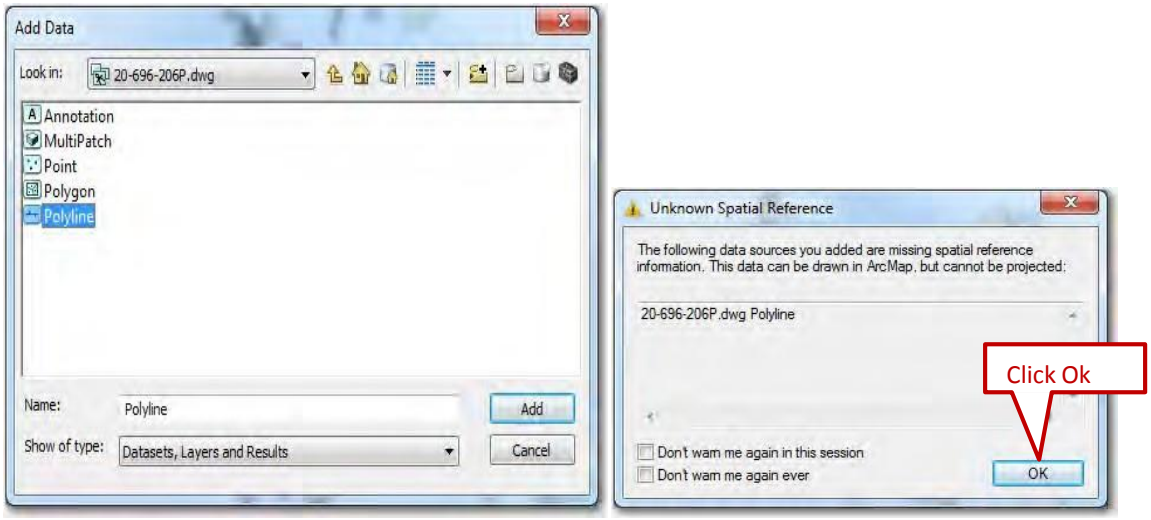
	Rule	Feature Class
Acquired_District_Lands	Must cover Each Other	District_Land_Parcels
Acquired_District_Lands	Must not Overlap	
Feature Class	Must Not Overlap with	Areas_Surplused_by_the_District
Acquired_Disrictt_Lands	Must Not Overlap with	Proposed_District_Owned_Lands
Areas_Surplused_by_the_District	Must not Overlap	
Proposed_District_Owned_Lands	Must not Overlap	



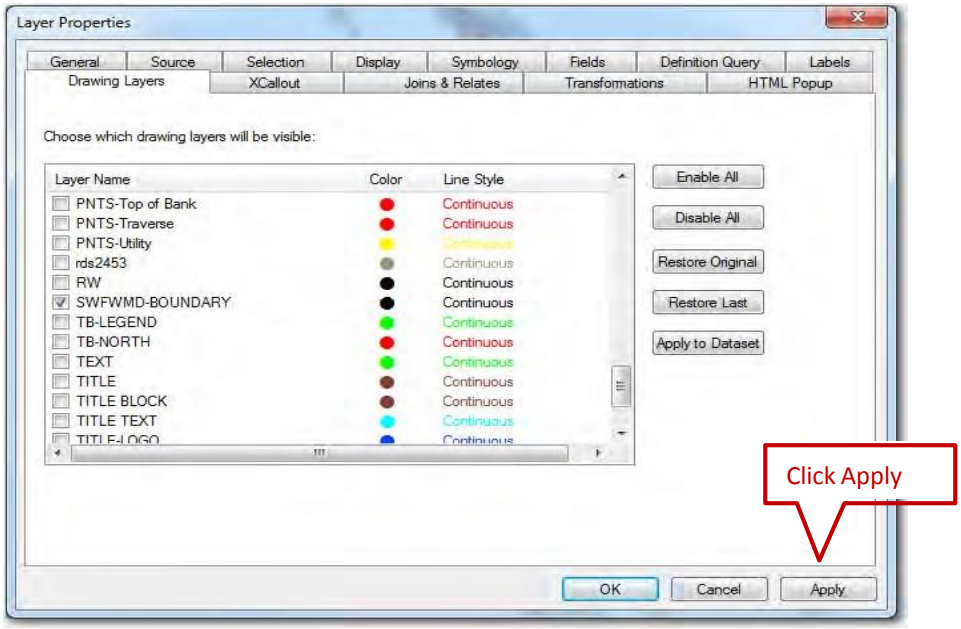
6. Open a new Arcmap project
7. Add the Topology



8. Add the AutoCAD drawing received from the Survey section to the project.



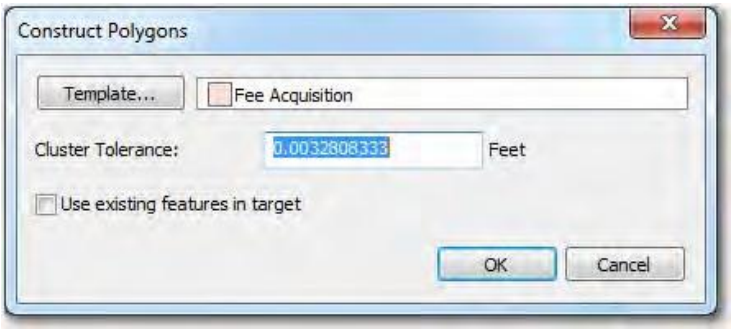
9. Open the drawing's properties to enable the SWFWMD-BOUNDARY drawing layer



10. Set symbology to Features Single symbol.
11. Zoom to the drawing layer

The type of closing, acquisition or surplus, determines which layer to edit first. If the closing is for an acquisition, the District_Land_Parcels is the target layer. If it is a surplus, then Areas_Surplused_by_the_District is the target layer. For this example, closing document is for an acquisition of an easement, so the target layer is District_Land_Parcels. The same procedure is used for adding the new data to the Areas_surplused_by_the_District.

12. Start an edit session for the District_Land_Parcels. Make sure that both the Advanced Editing and Topology toolbars are active.
13. Select all features from the drawing layer
14. Use the construct features tool from the Advanced Editing toolbar to create polygons in the District_Lands_Parcels layer.



15. Click the Template button to choose the correct acquisition type if necessary. The acquisition type will be identified in the closing statement received from the Real Estate section. Once the correct acquisition type is selected, click OK.

16. Fill in the attributes with the information provided in the closing statement:
    - SWFPNUM - SWF Parcel # from closing statement
    - ClosingDate – Closing Date from closing statement
    - AcqPartner1 & 2 – If any are identified on the closing statement. Enter in "None" if there are no partners
    - JointOwner – If any are identified on the closing statement. Enter in "None" if there isn't any
    - SWFPurchasePrice - Purchase price (only the SWFWMD portion if there are acquisition partners)
    - AcqPartnerPrice1 & 2 - Portion of purchase price identified if there are acquisition partners
    - Project_Name – Project from the closing statement. Choose the correct project from dropdown list
    - ProjectName – Type Project Name
    - GIS_UPDATE_DT
    - Acres – calculate geometry

    Or for Areas_Surplused_by_the_District

    - SWFPNUM - SWF Parcel # from closing statement
    - SURPLUSACRES – Calculate geometry
    - ClosingDate – Closing Date from closing statement
    - PARENTPARCEL – SWF Parcel # of the original acquisition parcel

- TYPE – Surplus type (i.e., Sale, Exchange)
- SALEPRICE – Amount received if any
- PROJECT_NAME – Choose from dropdown
- GIS_UPDATE_DT

17. Save Edits
18. Use the Validate Topology in Current Extent located on the topology toolbar.

19. Open the Error Inspector by clicking the Error Inspector tool from the topology toolbar.

The error inspector window shows a list of errors contained within the visible extent. It shows which topology rule is being violated.

20. Use the Fix Topology Error Tool from the topology toolbar to select and correct the error.

If a new parcel (polygon) was added to the District_Land_Parcels, the most likely rules to be in error would be**:**

Acquired_District_Lands and District_Land_Parcels must cover each other rule.

To fix this error: right-click the error and choose create feature form the menu. This will create a new polygon in the Acquired_District_Lands layer. This polygon will now need to be attributed.

a. Select the newly created polygon from the Acquired_District_Lands layer.
b. Field to be updated are:
   ACQSTATUS – choose acquisition status from dropdown ACRES – calculate geometry
   PROJECT – choose from dropdown
   PROJECTNAME – type in project name in upper case GIS_UPDATE_DT

Vaildate tolopogy in current extent to check for other errors.

Acquired_District_Lands must not overlap with Proposed_District_Owned_Lands

To fix this error: right-click the error and choose merge and select Acquired_District_Lands as the feature with which the error will be merged.

Vaildate tolopogy in current extent to check for other errors.

If a parcel was added to the Areas_Surplused_by_the_District, the most like rules to be in error would be:

Acquired_District_Lands must not overlap with Areas_Surplused_by_the_District

To fix this error - right-click error and choose merge and select Areas_Surplused_by_the_District as the feature with which the error will be merged.

Vaildate tolopogy in current extent to check for other errors.

Acquired_District_Lands and District_Land_Parcels must cover each other rule.

To fix this error – right-click the error and choose subtract. This will remove the polygon from the *District_Land_Parcels.*
Validate topology in current extent to check for other errors.

21. Once there are no topology errors, Save edits
22. Copy geodatabase to the GIS Database & Server Administrator to update the SDE layers.

Creator: P. Jackson and C. Glenn
Date 08/12/13
Revision # V5
Date of last review: 6/6/30/2016

Land Use Land Cover Mapping Procedures

Purpose

The purpose of this document is to provide a standard operating procedure (SOP) for the Land use/Land cover classification project. Updates to the Southwest Florida Water Management District's GIS (Geographic Information Systems) land use data have been performed on an approximate 5-year basis between 1990 and 2011; on a yearly basis between 2004 and 2011; and on a 3-year basis starting in 2011.

Scope

The District maps land use changes on a 3-year basis in an effort to keep up with the changing land cover. The District's orthophotos are used as a background for the mapping project. Accurate tracking of acreages and locations of key agricultural land cover is a key component of the Southern Water Use Caution Area (SWUCA) Recovery strategy. This information, when coupled with data collection through the District's Water Use Permitting (WUP) process; provide the most accurate means for tracking these significant water uses within the SWUCA. These data also provide an important source of information for monitoring permit compliance. A significant benefit of this program is a consistent, and therefore defensible, estimation of agricultural trends. Recently, the District began using LULC data as a source for watershed modeling (ArcWAM).

Background

The editing version of the Land Use Land Cover (LULC) feature class has the grid lines from "LU_Burn_Grid" burned into them to keep the check-out areas within a reasonable size. The LU_Burn_Grid starts with the state-wide grid layer, and then county lines and SWUCA lines were added to it because the work is often segmented in that manner.

Data Files and Maps Used With LULC Processes

LandUseGrids.mdb

1. LU_Burn_Grid feature class– Grid has the state-wide grid, county, and swuca linework burned into it. It is used to segment the LULC feature class into working segments
2. LU_Checkout_Grid feature class – This grid is the same as the LU_Burn_Grid, but is used to check out areas for land use editing
3. SmallCellGrid – This grid has all the cells contained in the state-wide grid, which are categorized by the checkout grid numbers
4. LULC_CHECKOUT_GRID_DISTRICT_ONLY feature class – This grid is a version of the LU_Checkout_Grid, but only includes areas within the District boundaries
5. LULC_CountyGroups_2008 feature class – This feature class has the county and SWUCA feature classes combined. It was used in creating the LU_Burn_Grid
6. LU_TRACKING_CO_ZONE_DISTRICT_ONLY feature class – This grid is a version of the LULC_CHECKOUT_GRID, but with fields added to track the progress of scanning, editing, and quality control functions

Points.mdb

1. Tracking_Grid feature class – A composite layer created from merging the statewide grid, the county feature class, and the SWUCA feature class.
2. FieldTripPoints_New – this feature class resides in the "Field Trips" folder, and is used to mark areas that need to have a field check done on them
3. Routes – this feature class is created when a field trip is required and plans the itinerary for the day
4. FieldTripPointsNorth2015 – Same as "FieldTripPoints_New" except only included those in the North part of the District
5. LULC_Change_Tracking – this feature class serves as a tracking mechanism for what action has taken place for field trip points

LULC_2014_Checks.mdb

1. REVTABLEMAIN table – this table resides in the Data_Reviewer folder within the LULC_2014_Checks file geodatabase. It is used to track edits that are done to the land use feature class. Updates should only be done to in within a data reviewer session

MXD Files

1. CHECKOUT_MAP- this MXD is used during the process of checking out data. It contains the feature classes in the QC1 version of land use data used for checkouts. Normally a version of this map is placed in each user's staff folder and customized to their needs
2. EDITING_MAP – this MXD is used during the scanning and editing portions of the land use project. Again, a customized version is kept in each user's staff folder

Procedures

Create edit version of LULC feature class

Make a copy of the previous year's editing version of LULC and change year to the current year. This step only needs to be done once at the start of the project.

1. Default and QC1 versions of LULC<year> are created and stored in direct_entop_sde.
2. LULC feature classes that are before 2011 are stored in feature data set LULC; while years 2011 and beyond are stored in LULC2
3. Segments of the data will be checked in and out as needed by the different editors.

MXD named "CHECKOUT_MAP" used for checking out data

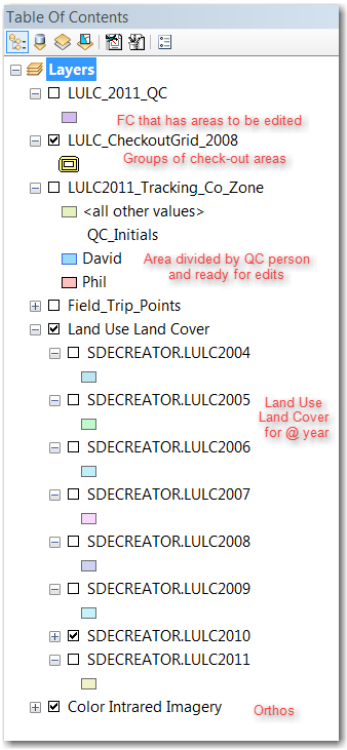
This map is used to control the checkout process of the land use project and to track the progress of scanning and quality control during the project. It contains the feature classes that are used in the process and provides the benefit of having the correct version needed for checking data out correctly. The template is located at the R drive. Each editor should copy the template in their own directory under staff folders; then it can be customized to fit their own needs.

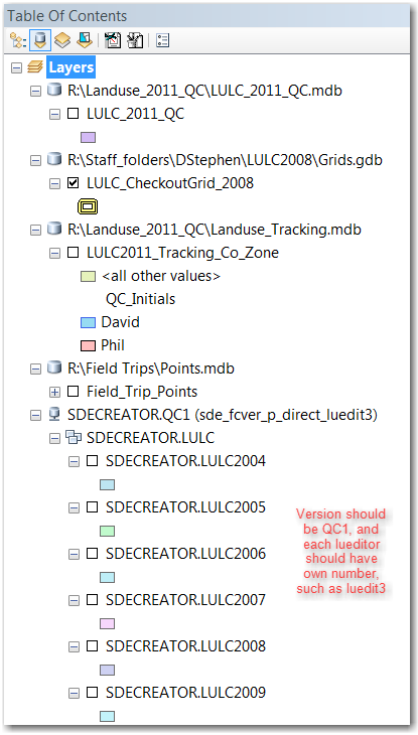
Land use for 2011 and 2014 are included on this map. Other years of land use can be added for updates. Every year of LULC on the map will produce its own checked out version. Only the version that will have edits performed needs to be checked out.

Include the following feature classes in the map at a minimum:

1. QC1 version of LULC<year>
2. LULC_CheckoutGrid
3. LULC_Tracking_CO_ZONE

Below is an example of how the Table of Contents on the MXD should appear. Note that the LULC years are removed and replaced as needed.





MXD named EDITING_MAP used for scanning and editing data
The editing MXD is contains the imagery, historic LULC feature classes, and any ancillary data being used to aid in photo interpretation. The template is located at the R drive, but each editor will copy this into their staff folder, where it can be customized as necessary.
Include these feature classes

1. Edit version of LULC<year> (i.e. checkout)
2. FieldTripPoints_New
3. District-wide parcels
4. National Wetlands Inventory
5. SSURGO (Soil Survey)
6. District Counties
7. LULC_CheckoutGrid
8. LULC_Tracking
9. WUPs Currently Permitted
10. ERP Permits
11. District-owned lands
12. Land Use from previous years (1990, 1995, 199 and 2004 – 2011)
13. NAVTEQ Streets in the SWFWMD
14. Elevation data such as County Wide DEMs or LAS points

15. FNAI – (Florida Natural Areas Inventory)
16. District-wide CIR imagery that corresponds to LULC data for all years captured.
17. District-wide Natural Color imagery for all years captured.
18. Major Springsheds
19. CFWI boundary

Scanning/Photo Interpretation

Open the Editing MXD. New changes to land use will be made and subsequently saved as the current updated vector data of the land use land cover. Changes are photo identified at a scale of 1:6000. Use the Photo Interpretation Key.pdf as a guide. (See reference) When an area or boundary has changed, staff will make the modifications on screen of the corresponding FLUCCS (Florida Land Use Classification Code) identifying features according to the changes detected in the updated imagery. Staff may zoom in closer to a scale that more closely corresponds to the features that need updating. For example, wetlands and small water bodies often require a very large scale, not to exceed the scale of the imagery (approx. 1:1000 for one-foot imagery).

The FLUCCS code label should be visible at all times for the current year being edited. The editor should display the previous years' FLUCCS code as well while scanning. See the "Scanning/Photo Interpretation section for setting up symbology.

If the feature on the imagery is not distinguishable, several ancillary resources may assist in making a determination; see the "Reference Layers" document located on "R:/Documents/SOP Reference Doc" for more details of each type.

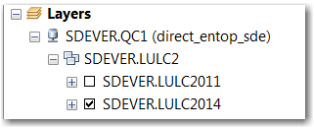
1. Parcel data - for ownership and detailed land use, especially in urban, industrial, and to a lesser extent, specialized agricultural areas.
2. Dual Maps - to see oblique Imagery of area. Check the dates of the photography to make sure it corresponds to the year of the LULC.
3. National Wetlands Inventory (NWI) feature class - to help approximate wetland features and type of vegetation cover. For example, deciduous forest vs evergreen wetland forests.
4. CLC Statewide land use land cover feature class based on FNAI (Florida Natural Systems)
5. Elevation data – used in natural systems areas for wetland/upland delineation. The DEMs or LiDAR LAS points may be used.
6. Permit information. Water Use Permits can help assist in determining different types of crops or land use types. Environmental Resource Permits can help to determine types of construction completed. Look up the permit number in WMIS to extract detailed information.
7. Soils Survey Geodatabase (SSURGO) feature class - to help delineate wetlands and natural systems. This ancillary data should be used sparingly due to the age of the data and manmade changes. It should also be used in conjunction with the NWI data when possible.
8. Other Photo Interpreters – a second set of eyes may notice additional details
9. Field trips – used as a last resort after all other resources have been exhausted

Editing is optional during the photo interpretation phase. If not done immediately, a feature is added to the QC feature class and the edit completed by another person. This situation will usually exist when the land use feature class has not been checked out.

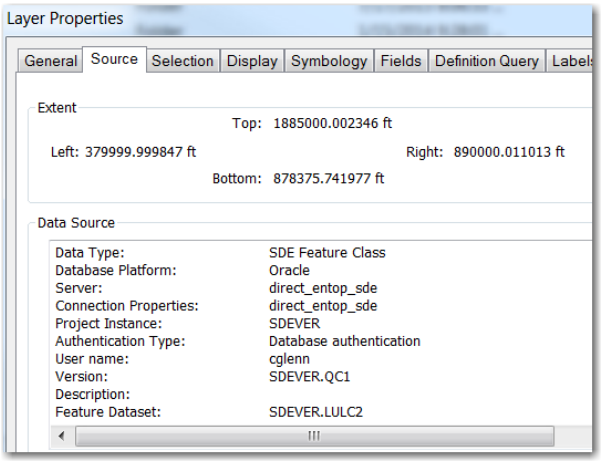
Check out the LULC feature class for editing

1. Open ArcCatalog and create a personal geodatabase to hold the checked out data. Name the database after the area that is being worked on.
2. Open the "CHECKOUT_MAP" MXD.
3. In the Table of Contents, click on "List by Source" tab. Make sure that the version is "QC1," as in the picture below. If the version is "Default," right click on the geodatabase and

choose “change version.” Select QC1 as the version.

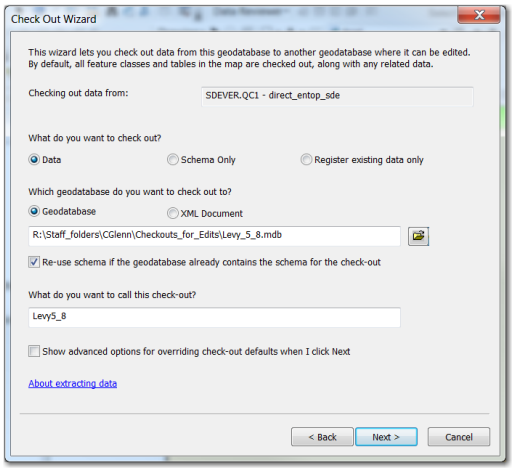


To check for the user, open the properties of the LULC feature class. The user and version will be listed there. Below is an example.

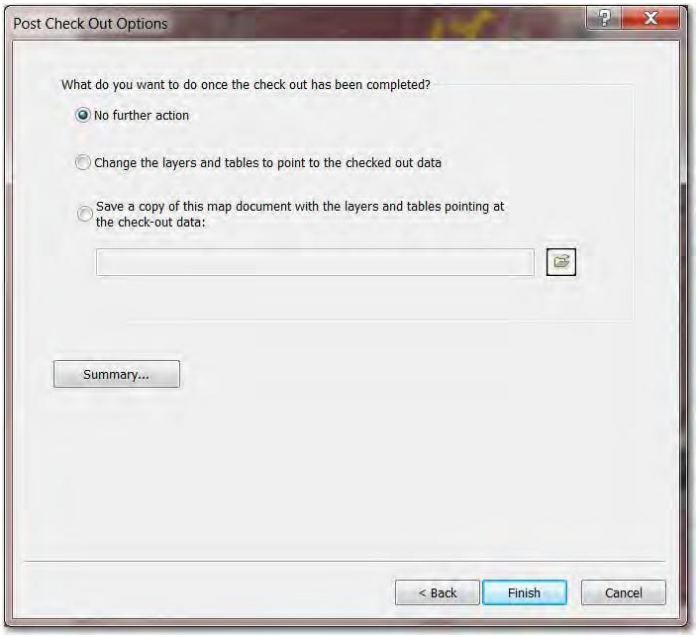


Each editor will have their own ID, and QC1 should be the only version of LULC used for checking out data.

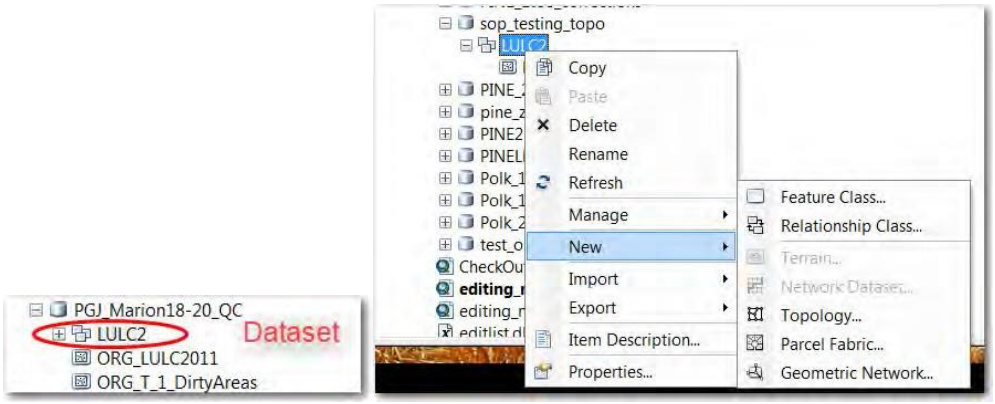
4. Zoom to area to check out (using LULC_Checkorid as reference), and then select “create replica” button from the Distributed Geodatabase toolbar. If the area covers 2 zones, check out both, but do not make the area too large, or the system will overload and crash. Make sure that the other editors are not near the checkout area as this will cause conflicts when checking the data back in. Follow the Wizard to create checkout. Leave the first dialog box with its defaults.
5. Make the changes as shown below for the second dialog box.
   a. Make sure the “checking out data from” contains QC1 and your own editor ID
   b. Verify that the geodatabase is the one created for this checkout
   c. Make sure that “Re-use schema…” is checked
   d. Name the checkout as appropriate



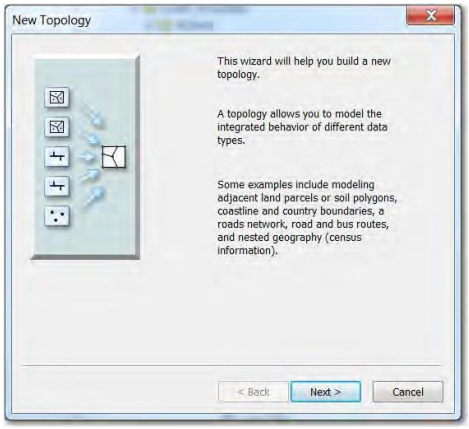
The last dialog box also remains at its default values.



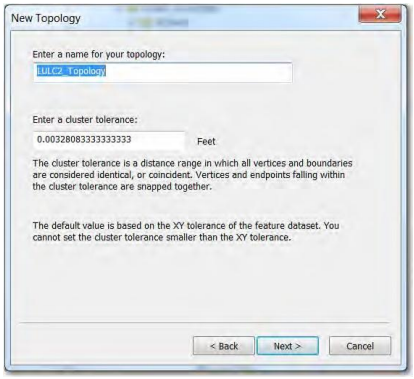
6. Open ArcCatalog. Make sure each year of land use that participates in the "schema" appears. Right click on the dataset name, and choose to create new topology.



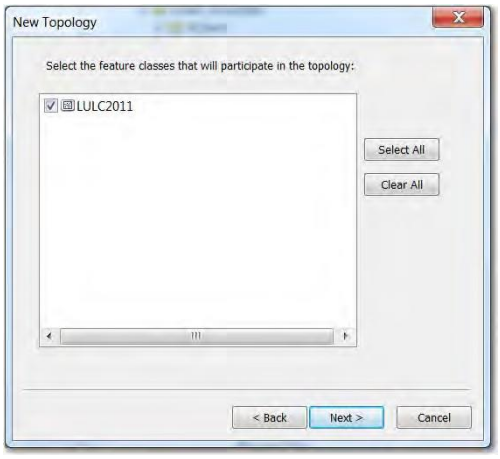
The wizard opens for creating the topology. Click on “Next.”



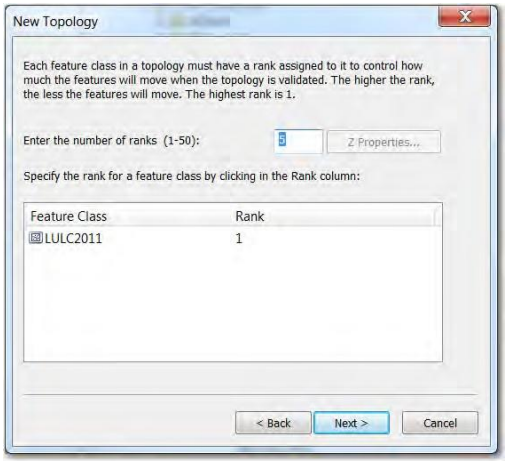
The next window allows the name of the topology and cluster tolerance to be set. This can also be left as the defaults. Click “Next.”



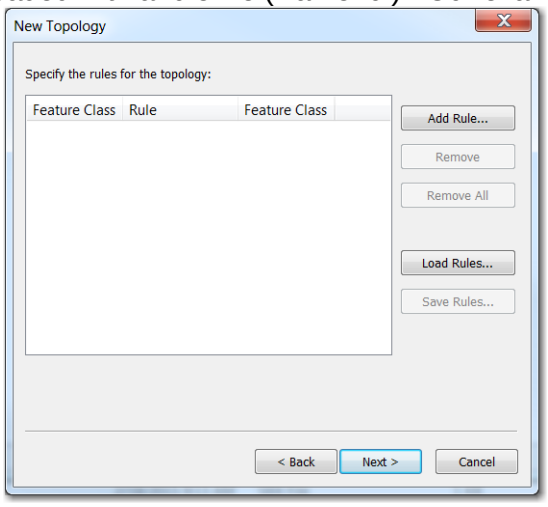
Select any feature class that should participate in the topology rules. The example below only has one option because it was the only one checked out.



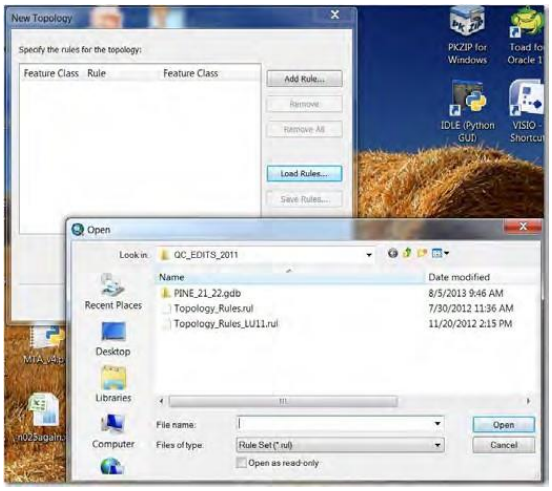
The next dialog allows the ranking to be set for the feature classes. This is not necessary so leave it as the default. Click on next.



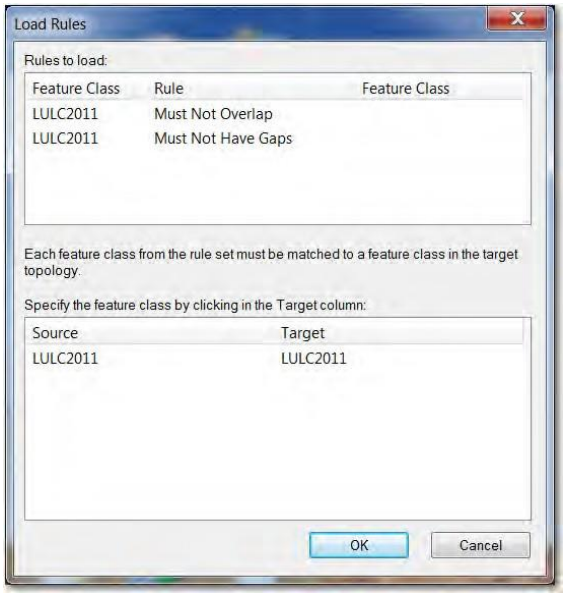
The next dialog box is used to set the topology rules. They may be either manually set up, or loaded with a rule file (Name.rul). Our example is only for loading the topology rules. Click on



"Load Rules" and go to the directory where the rule packet is stored. The original versions are in the R:/Data folder and are named LULC.rul and LULC2.rul.



A dialog box opens where you can load pre-saved rules. Two are available: LULC.rul has every year of land use participating in it. LULC2.rul only has the 2011 and 2014 years.



The next dialog box provides a summary of who participates on the topology and what topology rules have been set. Land Use uses “Must not overlap” and “Must not have gaps. Click on OK, and just scroll through the other options,

Do NOT validate now. Validation is done during editing process.

Symbology Setup for LULC feature classes

For each LULC layer, make the following changes in the properties before editing. This will assist in editing, especially when working with multiple years at one time.

1. Change symbology to no fill color, and unique outline color for each
2. Under display tab, change the Display Expression Field to “FLUCCSCODE”
3. Under Labels tab, change the Text String Label Field to “FLUCCSCODE”
4. Under Labels tab, change the Scale Range Out Beyond field to 1:24,000
5. Under Labels tab, change text color to corresponding polygon color
6. Turn on labels for each layer

Editing LULC

Editing may be done during any of the other steps in the LULC project, which depends on staffing, workload, time frames, or urgency. The first time a new checkout is to be edited, the topology needs to be validated. After the first time, topology can be validated as needed. The "preferred" method of editing is using the "cut polygon" tool, and then merging coincident polygons as needed. However, any editing tools that are based on topological editing will work. There are normally several people working on land use, and they need to coordinate to make sure their edit areas do not overlap. A minimum of at least one LULC grid cell is required, and two LULC grid cells are preferable.

1. Open the Editing MXD in ArcMap
2. Add the replicated geodatabase, including the topology.
3. Zoom to the entire dataset.
4. Start an edit session. Can right click on any LULC year and select to start an edit session.
5. Validate topology (note – there is an alternative method under Data Reviewer options that also performs this task)
    a. Zoom to the entire dataset
    b. Select every feature by using the Select Tool (not editor select) and explode all features; then save.
    c. Validate entire topology
    d. Check for errors (by turning topology on and viewing for visible errors, and then by turning error inspector on, select "Search Now" button, sort the "Rule Type" column, and check the first and last entry for overlaps (save edits).
    e. If no gap errors (except along the border of checked out data), and no overlap errors, proceed to editing.
    f. If errors do exist, they need to be fixed, and if a large area exists that extends beyond your checkout, this must be addressed before edits.
6. Set snapping properties.
    a. Open editing options > General tab. Click on "Use classic snapping." Click OK.
    b. Start edit session.
    c. Open Snapping Window and choose which snapping features to use.
    d. As work is being done, the "snapping tolerance" will show how far the tolerance is for.
    e. To turn snapping function off temporarily, hold down the space bar as you do editing.
7. Begin editing. When performing an all-inclusive scrub, begin your edit analysis by scanning the data at a 1:6000 scale, adjusting as needed. Make any changes necessary as you come to them. Follow the Tracking Grid feature class until you have viewed the entire checkout (save often throughout edit sessions). Edits are normally determined to be required during the scanning and quality control processes; however, any project task can initiate them. Adjust the scale depending on what is required for the task at hand. See the section on tracking progress for details on tracking scanning and quality control during the LULC project.
    a. Open the "Attributes" button on the editor toolbar. This is where you will make your changes to the tabular data. Change the FLUCCSCODE and DATESTAMP for each edit. Comments may be put in the "COMMENTS" field as well.
    b. As the edits are being done, make sure that the land use is being compared to the same year of the imagery.
    c. The "Cut Polygon" tool is used to split polygons into smaller features or create multiple features within larger features.
    d. The merge tool is used to combine two polygons into one.
    e. The "Reshape Edge" tool can be used to rework boundaries between two features. Be sure to use the "topology" based tool, and not the simple vector based tool.

f. The “Modify Edge” tool can be used to modify vertices. Be sure to use the “topology” based tool, and not the simple vector tool.
g. To fix overlapping polygons, select the area that is common to both and clip the polygon. If necessary, create the polygon. Then the feature can be merged into the appropriate feature.
h. NEVER use any non-topology tools, such as the delete, copy/paste, add new polygon, etc. The LULC feature class is contiguous with no “open” areas or voids within the District. If it is necessary to fill in a void, it will be done when topology is checked, and the proper tool is used to within the Topology Editor.
i. Coincident polygons: When entering lines that are coincident to another line on another polygon, make sure to use the trace tool so the lines are followed exactly. When the place is reached where the lines are no longer coincident, change the sketch tool as appropriate.
j. Validate topology as edits are completed to ensure there are no errors.
k. Another check on data can be the “Intersect” tool. Run the geoprocessing tool “Intersect” on two years of the LULC that are being edited. When complete, check for differences between FLUCCSCODE and FLUCCSCODE_1. Every difference either should be marked as an exception or corrected.

Validate Final Topology Before Check-in
(This function can also be performed using Data Reviewer, see table of contents)

1. In edit map, zoom out beyond the LULC layers that are checked out.
2. Turn on all land-use layers (topology too) that have been edited. Set them to be the only feature classes that are selectable. Make sure edit session is active and select all features and explode. Save edits
3. Open topology toolbar. Validate entire topology (can use current extent option if the extent is to the whole topology).
4. Check for topology errors (by turning topology on and viewing for visible errors, and then by turning error inspector on, select “Search Now” button, sort the “Rule Type” column, and check the first and last entry for overlaps (save edits).
5. Make any corrections necessary and repeat validation process. Editing can be accomplished in most cases by right-clicking the selected features and choosing from the available options to correct the topology.

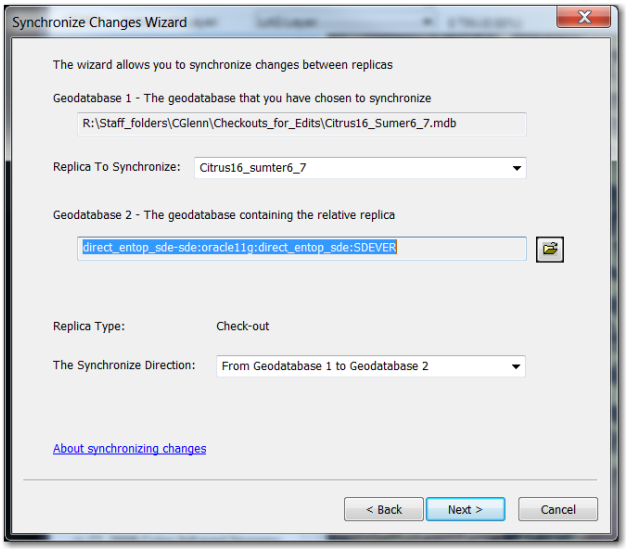
Synchronize Changes and Check-In

1. Open the Distributed Geodatabase toolbar. Can use the “Manage Replica” tool to see what is checked out and by whom if desired.
2. Use the “synchronize changes” button to check in the data. Once clicked, a wizard will go through several panes of information that is required.

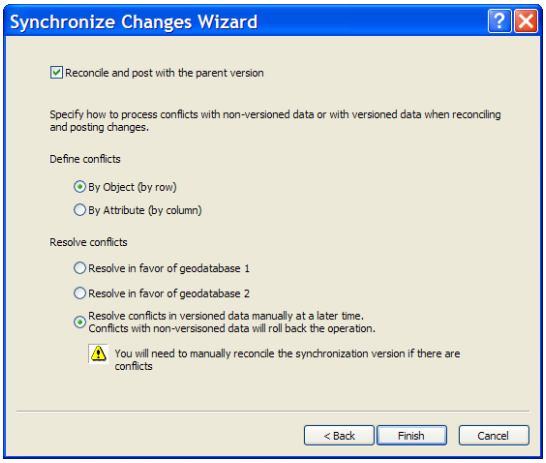
   Pane 1:

   Make sure replica to synchronize is yours, and paths are identical to those in the dialog.
   a. Geodatabase 1 is the replica that is being checked in.

b. Replica to Synchronize is the name of the replica (does not need to be the same as the database that contains the checked out data)
c. Geodatabase 2 is the parent version.

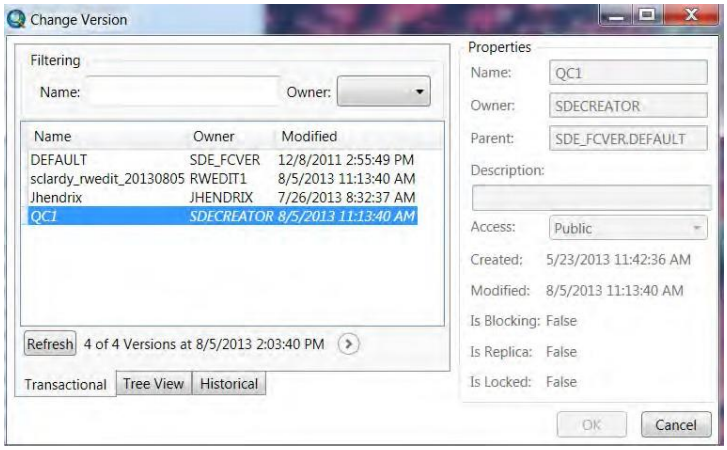


Pane 2: Check first box “Reconcile and post with the parent version.” Under “Resolve Conflicts”, select the last selection “Resolve conflicts in versioned data manually at a later time. Conflicts with non-versioned data will roll back the operation”



If successful, there will not be any messages. If there are topology errors, they need to be corrected.

3. Remove all LULC and topology layers from map document.
4. Verify that the current version no longer exists.
   a. Open the CheckOutMap. In the Table of Contents click on the “List by Source” button
   b. Right click on the geodatabase name for QC1 and click on the “change versions” option. The version that was just checked in should NOT appear on this list. If it is, there is a problem that needs to be resolved.

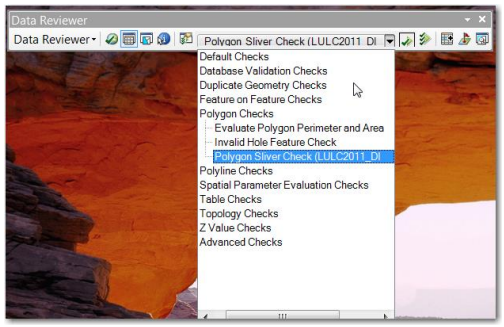


5. Enter updates to LULC<YEAR>_Tracking_Co_Zone geodatabase if editing was conducted as a result of scanning or quality control functions. Open corresponding grid square(s) for the area that has been edited. Change fields for the appropriate function performed.

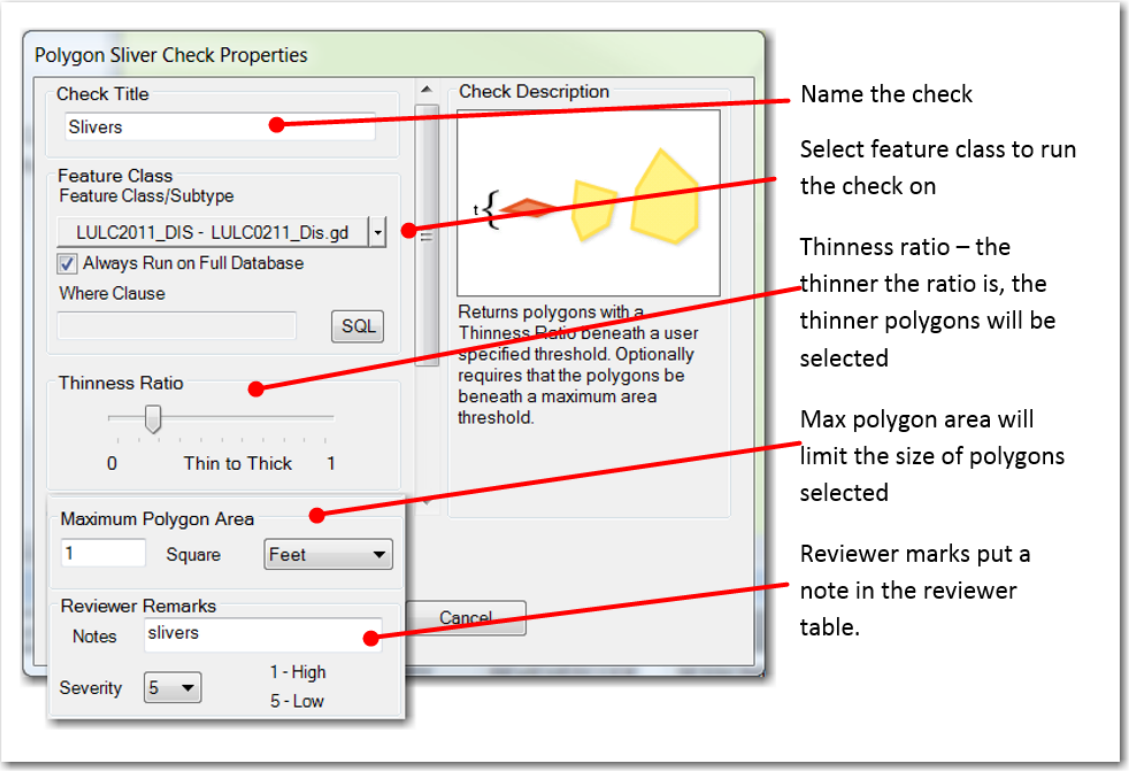
Quality Control process of LULC project

The quality control portion of the land use project incorporates three functions; edgematching, classification designations, and verification of edits. The tracking grid will be used to select areas to be worked on, and generally the editors focus from county to county.

1. Find slivers (using Data Reviewer)
   a. Start a Data Reviewer session if not active already.
   b. Click on the “Checks” drop down arrow, expand “Polygon Checks” and select “Polygon Sliver Checks.”



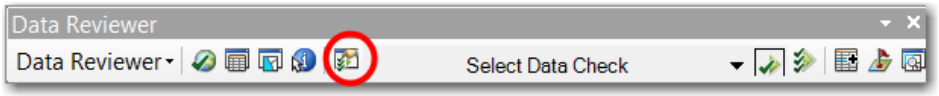
   c. The “Polygon Sliver Check” will find every polygon that is thinner and/or smaller than the specs. The thinness is the width of the polygon. The parameters can be reset, and the check rerun to experiment with the best thinness ratio and polygon size.



d. Click on the "Run Data Check" tool. When the check is complete, you will receive a dialog asking whether to browse the results or place them in the reviewer table.

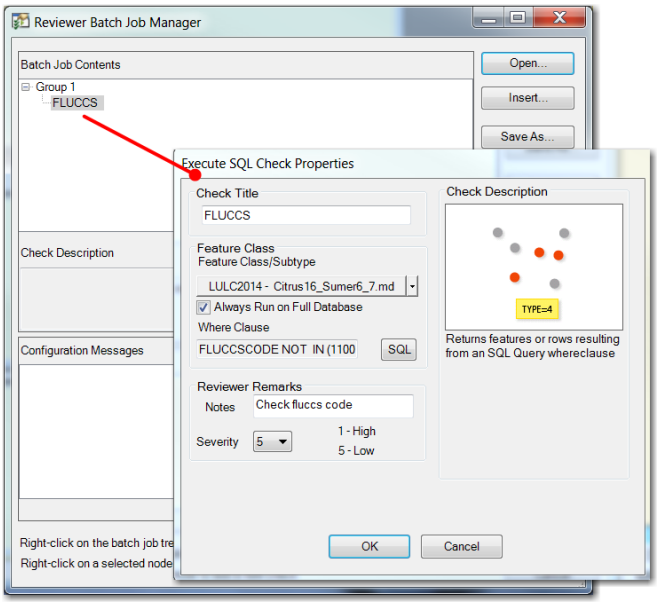
e. Either mark the records as an exception or go back and correct the errors.

2. Check FLUCCS Codes (using Data Reviewer) for validity
   a. Open the "Reviewer Batch Job Manager" tool on the Data Reviewer toolbar and click on the "Open" option. Select the batch file (.rbj) that contains the batch job required.

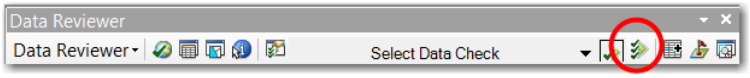


All batch files for land use are located at: R://Data_Rewiewer

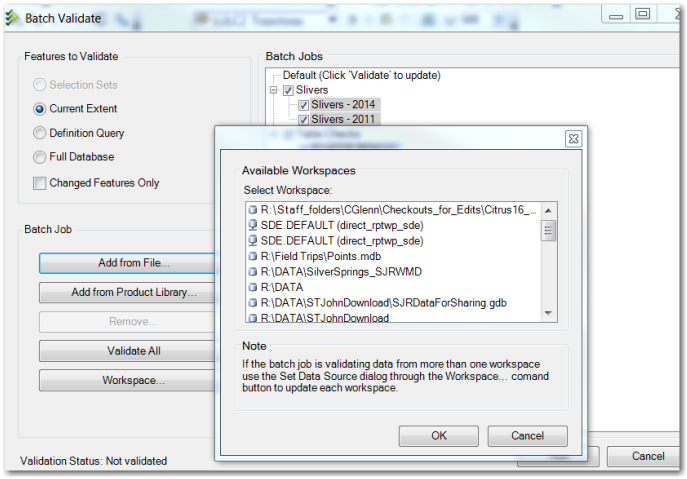
   b. The window for the "Reviewer Batch Job Manager" will open with the batch job file loaded. Double click on the check name to open the check properties. Populate the Feature Class with the feature class the check will be run on.
   (note: this will need to be done for every check contained in the batch job)



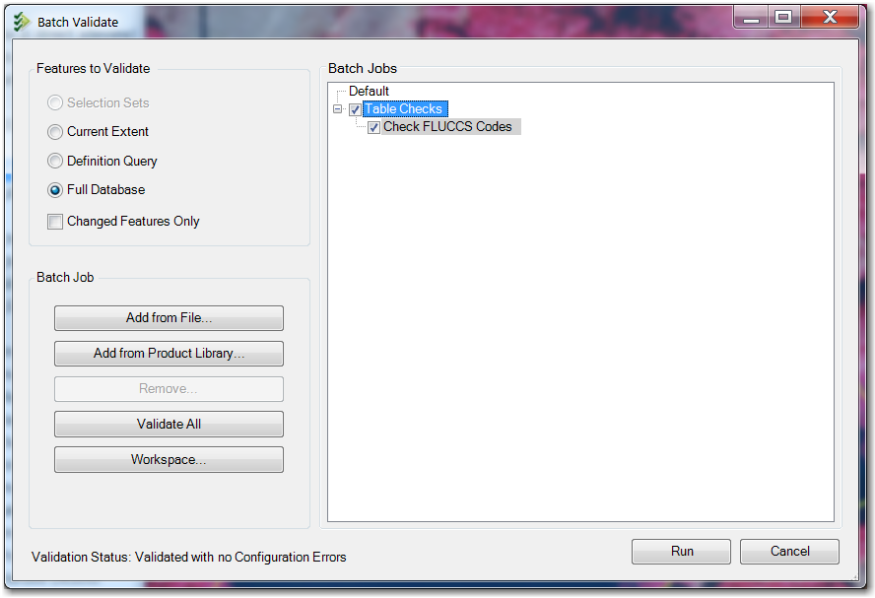
c. Click the “OK” button. Save changes and overwrite existing file.
d. Open the “Reviewer Batch Validate tool” on the Data Reviewer toolbar.



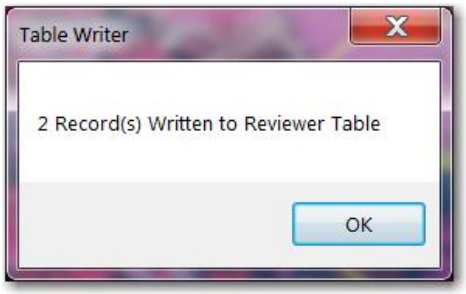
e. Click on “Add from File” and select the check to run. A window will open to select the database the feature class is contained in. Select the Database and click OK.



f. The batch job appears on the contents window. Select “Full Database” to run check on. You have the option to validate to find configuration errors. Only the checks with a checkmark will be run. Click on run.



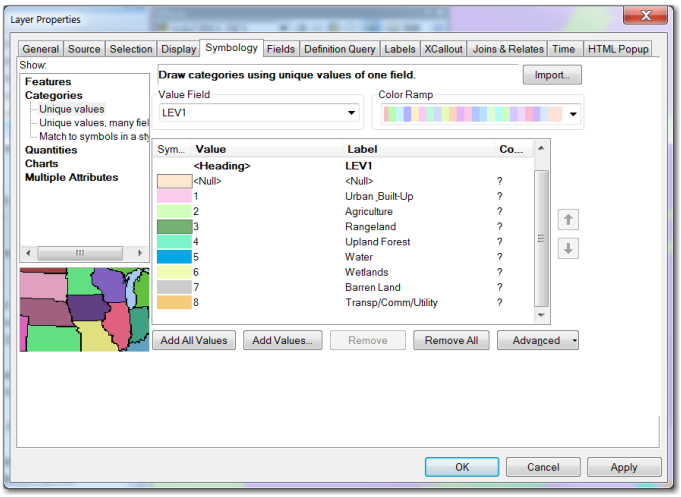
Once done, a dialog box will pop up stating what the results were; whether there were items written to the Reviewer Table (the errors) or if nothing was found.



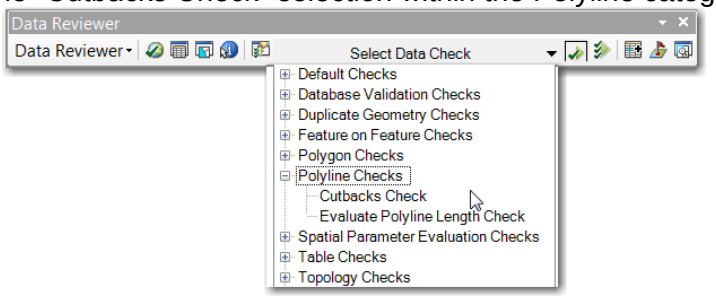
g. Open the Reviewer Table and review records to determine the problem. Return to the Land Use feature class that was being edited and make any corrections as necessary.

3. Edgematch
   a. Set scale to 6000. If code numbers are being left off due to scale, change it.
   b. Scroll along the boundary of the cell, and look for polygons that continue from one grid to the next, but have different codes or linework that does not align.
   c. Set background color to light brown and linework and labels to yellow (or other color combination) that makes it easy to see. Can also turn on imagery as a backdrop.
   d. Correct any errors found in the edit version of the LULC feature class.

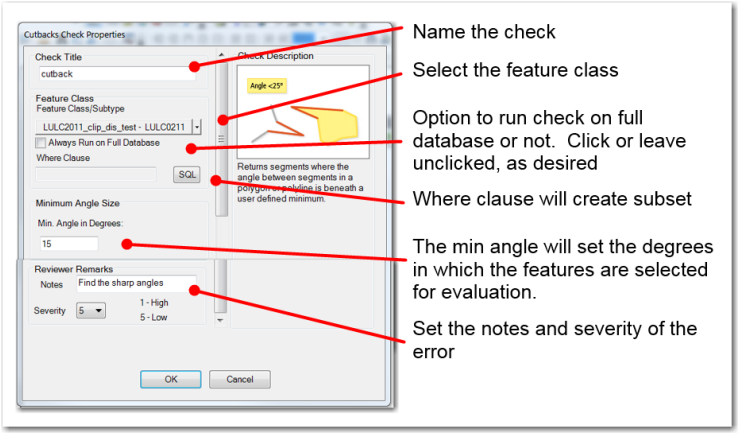
4. Classification Check
   Set symbology as high level groups, and use effects toolbar to examine aerial underneath.



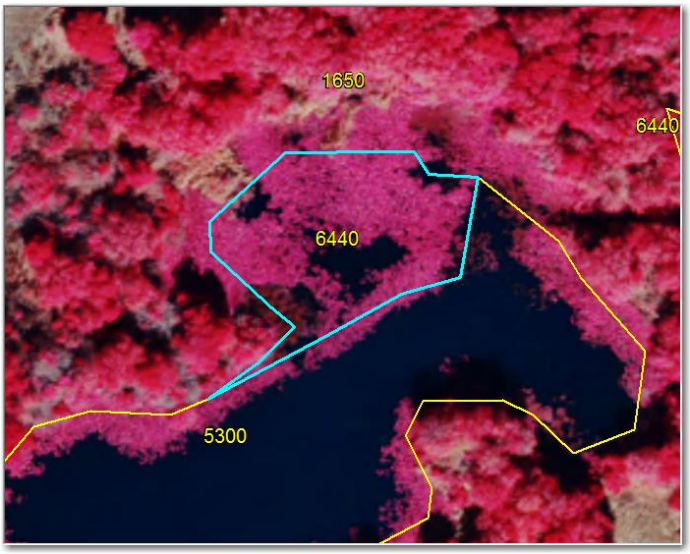
5. Check for sharp angles
   The cutbacks check will find any linear portion of a polygon that has too sharp of an angle. The smaller the number for the angle is, the sharper the angle of the items being identified in this type of a check.
   a. Open the “Cutbacks Check” selection within the Polyline category.



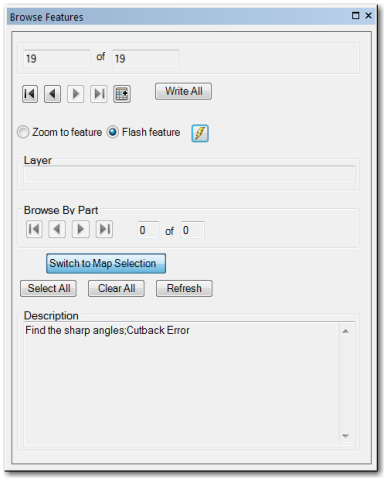
   b. Fill in the properties of the tool



6. Run the cutback tool, and either browse the results or add them to the reviewer table.
   Example of sharp angle



The browse dialog window



7. Double check edits
   Draw LULC with just recent edits set as definition query, and see if edited items make sense.

Field Trips

Field trips are conducted to assist editors to identify areas that they were not able to identify by photo interpretation. When the area is accessible by the ground, then a trip may be planned. If the area is not accessible by ground, there are several methods to help determine the most likely land use/land cover. One option called "remote interpretation" is done by having the area evaluated on-screen by two or more GIS Analysts and agreeing on a FLUCCS code that best fits the land cover if parcel data, and other ancillary sources do not clearly identify the area in question. This method of identification may also eliminate or reduce the need for field trip verification. Another method to verify difficult land use/land cover is a fly-over field trip, using a single-engine aircraft. Yet another method, most commonly used, is to drive to the location of the area in question, and walk around if needed. This is most beneficial in urban areas.

> *If the editor wants a second opinion on* the parcel, the "access type" field in the "FieldTripPoint_New" feature class is marked as "remote" and a meeting will be conducted among LU staff. If a consensus is reached the edit can be made. Otherwise, put it on one of the site visits.

1. Preparation for field trip: An itinerary of the field trip will be created to determine the most efficient route for the trip. Maps will be generated with the locations marked for the site to be verified. Each map will have a section dedicated for note taking. A note section for each site appears at the bottom of the map that can be used to verify the results of the inspection. This can be used to indicate code changes, site verification of codes, and other notes such as flooding, inundation, access (i.e. fences, gates).
2. Editing portion - While performing the editing on any particular year, if the land use type is unclear and cannot be determined, a point is placed in the Points geodatabase in the FieldTripPoints_New feature class. The following fields are to be populated at this time:

Access: Choose between Drive, Flight, or Remote
Code: Enter the existing LULC code
Issue: State what the problem is that need to be fixed.
District Section – the District is divided into three sections for easier planning of site visits. Enter the section to add, which are central, north, and south.

When a field trip verifies any data, it is placed in the QC list and the editor makes the changes to the LU covers. Put a comment in the "comment field" that says how it has been field checked, what type of access was used, and the date.

3. The more common type of site visit is a road trip, but in cases where a site is impossible to get to by road, a flight trip can be scheduled (contingent on available funds).
   a. Road Trip
      i. Need to have map to make route of the path to travel to the sites.
      ii. One person will have camera to take pictures of the sites.
      iii. A second person will have a log sheet for each site to visit, where they will take notes regarding any comments or answers regarding the area.
      iv. If the site cannot be reached by road, the access type can be changed to flight.
      v. Bring insect spray
      vi. No open toed shoes.
   b. Flight Trip
      i. Call American Aviation to arrange flights. They need a week or two of notice. The plane travels at a speed of about 120 mph to its destination(s). The plane will slow down and drop to an altitude of 300 feet or more to allow the LULC editors enough time to observe and photograph the site from oblique angles at an altitude. The hourly rate is $159 for the plane and $59 for the pilot for a total of $218.00 an hour, as of 2012. A purchase order is cut beforehand, and they send a bill after the flight.
      ii. Need to have map with flight plan (two copies) for the pilot. The map will have all the coordinates for the sites to be reviewed. The map is made manually. You start at the airport and map out the route.
      iii. First person will have camera to take pictures of the sites. A second person will have a log sheet for each site to visit, where they will take notes regarding any comments or answers regarding the area.
      iv. Some field verification points may be added for the hydrography data layer project by the Staff GIS Analyst. (i.e. to see culverts for connectivity for rivers)

End of Year Intersect process

The Intersect Geoprocessing tool is used to compare the data between two years of Land Use Land Cover (LULC) to determine if there is inconsistency between them. When multiple years of LULC are being evaluated, the two most recent years need to be compared first, and then work backward one year at a time.

This process can be performed at two occasions; first during the regular editing process with the checked out data, and next as a QC process for the entire LULC feature class at the end of the project. The "Before Starting" section below only needs to be done for the end of the year final check.

1. Before starting the intersect process, make sure all of the following have been completed.

a. All LULC is completed and checked in.
b. All field trip points are corrected and checked in.
c. All QC has been completed, corrected, and checked in.
d. All field trip points have been added to the comments field.
e. Metadata has been updated (See word document "Metadata_Update").
f. Make sure that you have the dissolve script copied to a drive other than R – the script will not work on the R drive.

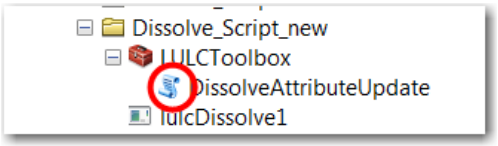
2. Preparing Data
   a. Start ArcCatalog session. Go to the "End_Of_YR" folder and create a new subfolder.
   b. Create a File GDB for the project. Inside, create separate datasets for each intersect year. Data will be stored here.
   c. Set the coordinates to NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet. Leave all other options to their defaults
3. Start ArcMap session. Add the two years that you are intersecting
   a. Choose Database Connections, and select direct_entop_sde. Choose the years that will be intersected
   b. Click on the "List by source" tab, and right click on the database name. Change the version to QC1.
   c. Run topology for each year. Fix errors, and repeat until there are no more topology errors.
4. Open the intersect tool [Analysis Tools – Overlay – Intersect].
   a. Input features- add both years that are to be intersected.
   b. Output feature class- navigate to the correct dataset and give a name appropriately (example- LULC_Change08_09).
   c. Run the tool.
5. Add the new feature class to ArcMap session. The following queries should be run in this order: (add each queried feature class to the appropriate dataset)
   a. Select all FLUCCSCODE that does not match FLUCCSCODE_1
   b. Select all records that are in the section you are analyzing (North/South) using Border_Cut shapefile (from [R:\LULC_Change\LULC_Change.gdb]).
   c. Select all records that are less than 1 acre. (See step f for area calculation)
6. Add the following fields to the attribute table of the final feature class:
   a. "Area" (double) -to calculate area in acres
   b. "Need_Corrections" (Text 15) -to determine if record needs fix
   c. Use the Domain "Correction", and set default value to "NO"
   d. "Checkout_Num" (double) – to organize your correction checkouts
7. Proceed to view each record individually as to see if the change is accurate. If so, leave alone. If not, give the "Need Corrections" field a value of "yes".
8. Once you have viewed all records for a specific area, select all records to be corrected and export the data into the appropriate dataset and name accordingly (example- Charlotte_Fix).
9. Determine the checkouts required to fix all errors, and give each record (In the Fix feature class) a value for "Checkout_Num". This will ensure that all errors are checked out and corrected.
10. Checkout all years for the checkout area from QC1. Edit each record as is necessary, and then check the data back in.
11. Make sure that this process is done starting with the most recent years and working backwards, one year at a time. Do not start the next intersect until all data has been corrected and checked back in.

Dissolve and Update Attributes

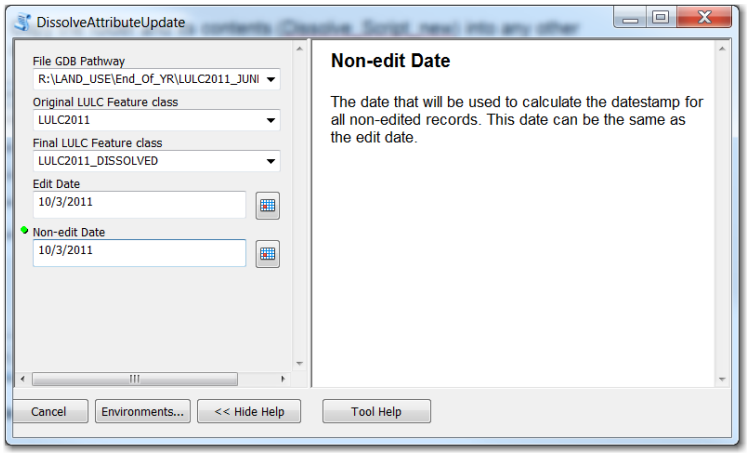
A python script is used to dissolve the LULC features that were segmented with the grid to provide a continuous layer. It is also used to update the attributes: LEV1, LEV2, LEV3, LEV4,

COMMENTS, DATE, and DESCRIPTION. The Python Script is located in the \\bkvctxfs01\LULC$\ End_OF_YR\Dissolve_Script folder, and is used within the LULCToolbox.tbx tool.

1. Copy the folder and its contents (Dissolve_Script_new) into any other directory other than R.
2. Double click on the script to open dialog box.



3. Fill in the five variables the script requires. Copy and paste the values or type them in (the script is not set to use the drop-down arrow).



4. Verify the results of the script.

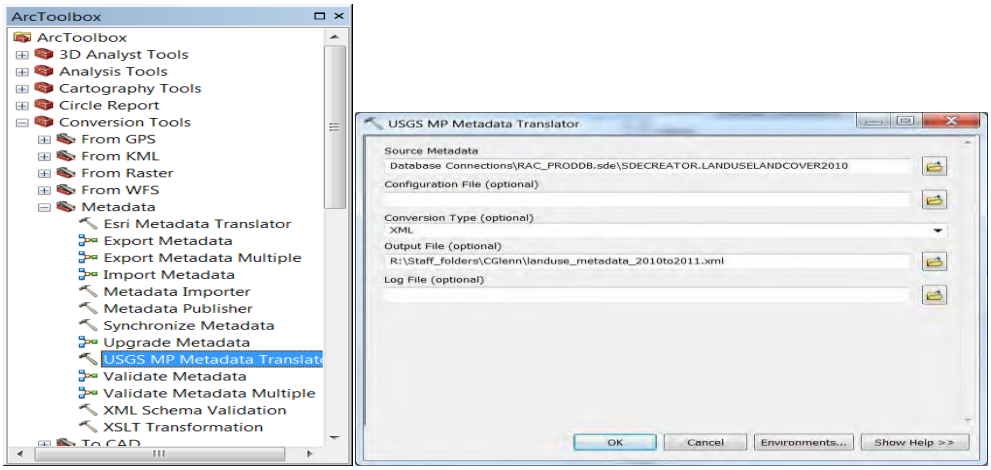
   a. Open attribute table and sort FLUCSDESC ascending. Make sure there are no blank records; this would mean that there was an error in the FLUCCSCODE field.
   b. Click the "Select by Attributes" button, click the FLUCCSCODE field and click the See all Values button. Ensure every number on the list is a value FLUCCS code.
   c. Repeat above step for FLUCCS_DESCRIPTION and DATESTAMP. Correct any errors.

Update Metadata

Assistance with metadata can be obtained at:
http://bkvvmweb01p/gis/Metadata/MetadataStandards/MetadataStandardsMain.htm

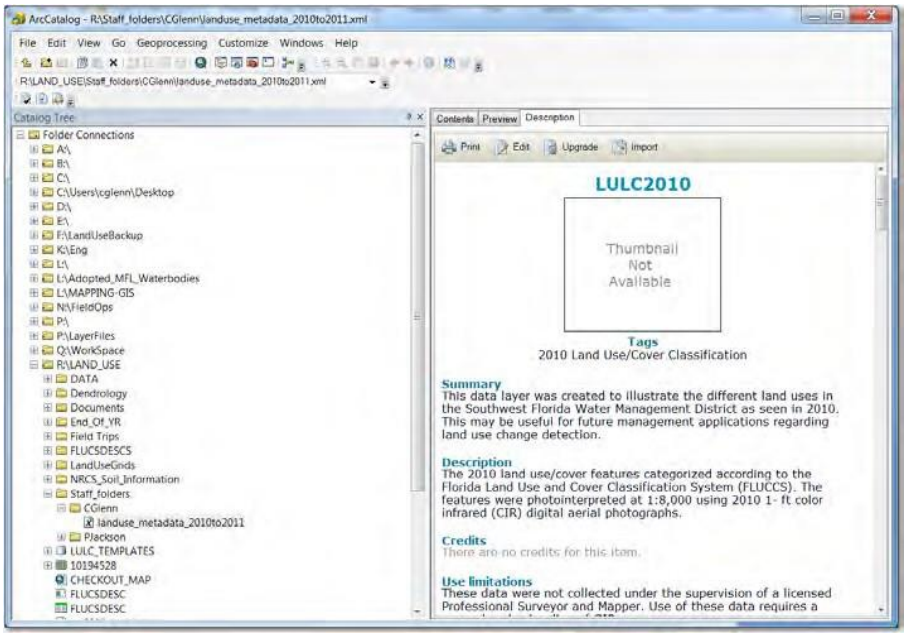
1. Export existing metadata from previous year. Use the tools listed below so that the metadata remains FGDC compliant.

   ArcToolbox > Conversion Tools > Metadata > USGS MP Metadata Translator Note: Make sure the output file ends with an .xml (is not done automatically).



2. Modify the metadata to reflect the current year of LULC feature class

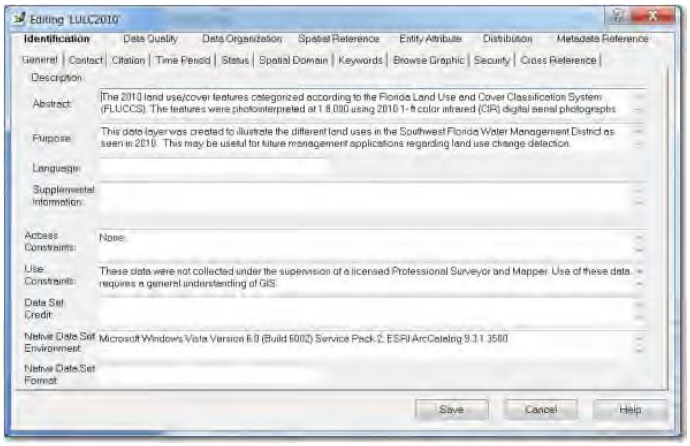
   Go to ArcCatalog where the XML file has been stored and highlight it. The metadata should appear in the “Description” tab.



Click on the “FGDC Add-in Edit Metadata” button  and go through the tabs to make required changes to reflect the current year. This is a button that needs to be added manually; if you do not have it, see the “Metadata Guide – tools needed and writing” document, and go to the “Installing the FGDC METADATA EDITOR FOR ARCGIS 10” section.

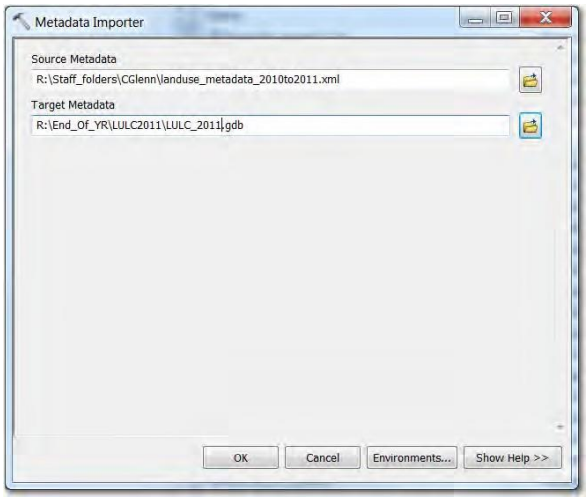
http://bkvvmweb01p/gis/Metadata/MetadataStandards/Arc10_MetadataGuidev1.pdf

The editing screen will look like the one here (only bigger).



3. When the metadata is complete, import into the new LULC feature class, unless it created directly within it. (As an alternative, the XML file may be given directly to the GIS Database and Server Administrator).
   a. Go to ArcToolbox as before, but select “Metadata Importer”

      Source Metadata = the xml file with new metadata
      Target Metadata = the geodatabase it will be imported to

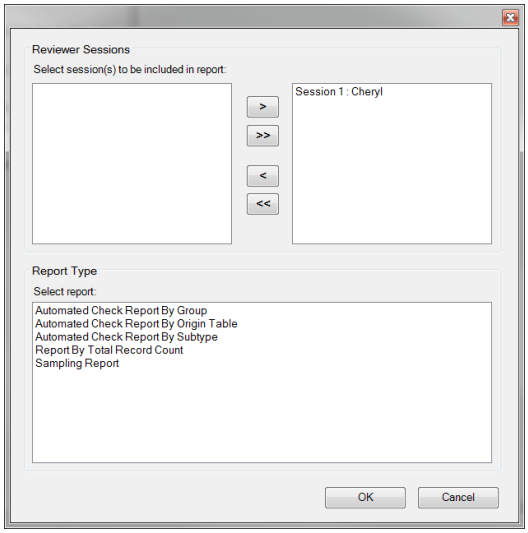


   b. The metadata will appear in the “Description” tab in ArcCatalog.

LULC Quality Control Reporting

1. Data Reviewer checks
   There are checks saved in batch mode to check for valid FLUCCS codes, slivers, and topology rules. Run each of these against the final version of the current LULC feature class. The checks should be done in a new Data Reviewer session so that the results are independent of any daily editing sessions. For more help on data reviewer, see the Data Reviewer Tutorial on the “SOP Reference Docs” folder on the R drive.
   a. Select the batch job in the “Reviewer Batch Job Manager”

b. Double click on the batch job name, and the properties box will open. Select the feature class to run the check on, if not already populated. Save and close.
c. Open the “Batch Validate” too. Click on the “Add from File” button and add the batch job here. Select “full database” option, and click on “run”.
d. Add errors to the Data Reviewer Table. Fix the errors, but leave the records in the table.
e. When all three checks have been run, generate the report for them. Click on “Options” in the “Reviewer Table” to open the following dialog box.



f. Select the session to run the report on. If there is only one, it will automatically populate.
g. Select the type of report to run. For this report, select “by Origin Table” as this will run the report based on each check. Remove the extra data that is added by data reviewer in calculating the percentages. A copy of the report is shown below.

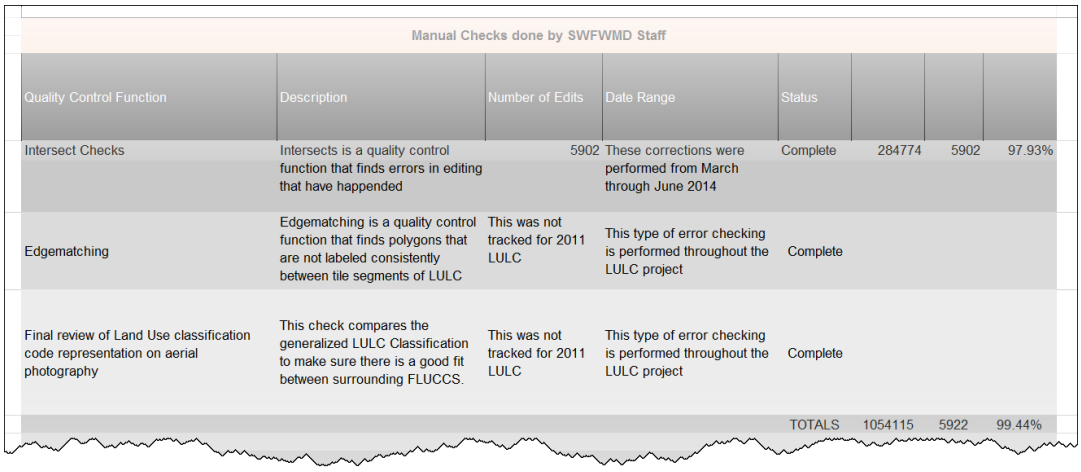
Automated Check Report By Origin Table

Report generated on 9/18/2014 1:58 PM by cglenn
Reviewer Workspace Location: R:\Data_Reviewer\LULC_2011_QC_REPORT.gdb
Report generated by Cheryl Glenn and Phil Jackson

Batch Job Name	Date/Time	Origin Table	Check Type	Check Title	Severity	Records Validated	Total Results	Total Percent Accuracy
R:\Data_Reviewer\FLUCCS_Codes.rbj								
	9/18/2014 12:40:48 PM							
		FINAL_LULC2011						
			Execute SQL Check					
				Check FLUCCS Codes	1	256447	0	100.00%
R:\Data_Reviewer\SliverSearch.rbj								
	9/18/2014 12:45:15 PM							
		FINAL_LULC2011						
			Invalid Geometry Check					
				Invalid Geometry Check (FINAL_LULC2011)	5			
			Polygon Sliver Check					
				Slivers	5	256447	5	100.00%
R:\Data_Reviewer\Topology_2011.rbj								
	9/18/2014 1:06:00 PM							
		FINAL_LULC2011						
			Topology Rules Check					
				Topology2011	5	256447	15	99.99%
Total								

Manual Checks done by SWFWMD Staff

h. All the other quality control functions are placed in the report. Add a section under the report data and name it “Manual Checks”. Currently these include the results of intersects, edgematching, and classification accuracy. See table below for an example. The report is given to the MGIS manager.



Manual Checks done by SWFWMD Staff

Quality Control Function	Description	Number of Edits	Date Range	Status			
Intersect Checks	Intersects is a quality control function that finds errors in editing that have happended	5902	These corrections were performed from March through June 2014	Complete	284774	5902	97.93%
Edgematching	Edgematching is a quality control function that finds polygons that are not labeled consistently between tile segments of LULC	This was not tracked for 2011 LULC	This type of error checking is performed throughout the LULC project	Complete			
Final review of Land Use classification code representation on aerial photography	This check compares the generalized LULC Classification to make sure there is a good fit between surrounding FLUCCS.	This was not tracked for 2011 LULC	This type of error checking is performed throughout the LULC project	Complete			
				TOTALS	1054115	5922	99.44%

Distribute LULC

The LULC feature class is given to the SDE administrator when complete to distribute to the Enterprise GIS Database and the external data download Web page.

REFERENCES

"Versioning LandUse HowTo_V2;” Southwest Water Management District Mapping and GIS Section, 2379 Broad Street, Brooksville, Florida 34604-6899 R:\\documents\VersioningLandUseHowTo_V2.docx

Florida Land Use Classification Code System (FLUCCS) codes; Southwest Water Management District Mapping and GIS Section, 2379 Broad Street, Brooksville, Florida 34604-6899 \\bkvfs01\man\Res Mgmt\MAPPING-GIS\Projects\B219_2006_Landuse_Landcover_Mapping\Documents\FLUCSDESC. xls

Photo_Interpretation_Key.pdf document

DataReviewerTutorial.docx

REFERENCE LAYERS.docx

Appendix – Florida Land Use Land Cover

FLUCCSCODE	FLUCSDESC
1100	RESIDENTIAL LOW DENSITY < 2 DWELLING UNITS
1190	RESIDENTIAL LOW DENSITY - UNDER CONSTRUCTION
1200	RESIDENTIAL MED DENSITY 2->5 DWELLING UNIT
1290	RESIDENTIAL MED DENSITY - UNDER CONSTRUCTION
1300	RESIDENTIAL HIGH DENSITY
1390	RESIDENTIAL HIGH DENSITY - UNDER CONSTRUCTION
1400	COMMERCIAL AND SERVICES
1480	CEMETARIES
1500	INDUSTRIAL
1600	EXTRACTIVE
1650	RECLAIMED MINING
1700	INSTITUTIONAL
1800	RECREATIONAL
1820	GOLF COURSES
1900	OPEN LAND
1920	INACTIVE LAND WITH STREET PATTERN BUT WITHOUT STRUCTURES
1930	URBAN LAND IN TRANSITION WITHOUT POSITIVE INDICATORS OF INTENDED ACTIVITY
2100	CROPLAND AND PASTURELAND
2110	IMPROVED PASTURES
2120	UNIMPROVED PASTURES
2130	WOODLAND PASTURES
2140	ROW CROPS (Corn, Tomatoes, Potatoes, Beans, Peanuts, Soybeans, Strawberries, Tobacco)
2150	FIELD CROPS (Wheat, Oats, Hay, Watermelons, Grasses, Sugar Cane)
2200	TREE CROPS (Not sure this should be used if level III is used)
2210	CITRUS GROVES (Oranges, Grapefruits, Tangerines)

2220	FRUIT ORCHARDS (Blueberries)
2240	ABANDONED GROVES
2300	FEEDING OPERATIONS
2400	NURSERIES AND VINEYARDS
2410	TREE NURSERIES
2420	SOD FARMS
2500	SPECIALTY FARMS
2550	TROPICAL FISH FARMS
2600	OTHER OPEN LANDS <RURAL>
2610	FALLOW CROP LAND
3100	HERBACEOUS
3200	SHRUB AND BRUSHLAND
3300	MIXED RANGELAND
4100	UPLAND CONIFEROUS FOREST (At least 66% coniferous canopy)
4110	PINE FLATWOODS (open or herbaceous understory with at least 10% Pine trees)
4120	LONGLEAF PINE - XERIC OAK (canopy closure must be 25% and may be sparse)
4200	UPLAND HARDWOOD FORESTS - (Oaks, Maples, Palms, Bays, Wax Myrtle, Australian Pines)
4210	XERIC OAK (lacks Pine trees, distinguishable mid-story of smaller oaks)
4340	HARDWOOD CONIFER MIXED
4400	TREE PLANTATIONS
5100	STREAMS AND WATERWAYS
5200	LAKES
5300	RESERVOIRS
5400	BAYS AND ESTUARIES
5720	GULF OF MEXICO
6100	WETLAND HARDWOOD FORESTS

6110	BAY SWAMPS
6120	MANGROVE SWAMPS
6150	STREAM AND LAKE SWAMPS (BOTTOMLAND)
6200	WETLAND CONIFEROUS FORESTS
6210	CYPRESS
6300	WETLAND FORESTED MIXED
6410	FRESHWATER MARSHES
6420	SALTWATER MARSHES
6430	WET PRAIRIES
6440	EMERGENT AQUATIC VEGETATION
6520	SHORELINES
6530	INTERMITTENT PONDS
6600	SALT FLATS
7100	BEACHES OTHER THAN SWIMMING BEACHES
7200	SAND OTHER THAN BEACHES
7400	DISTURBED LAND
8100	TRANSPORTATION
8200	COMMUNICATIONS
8300	UTILITIES

Minimum Mapping Units:

Upland: 5 acres

Water and Wetlands: 1/2 acre

Irrigated Agriculture: 2.5 acres

Upland within Irrigated Agriculture: 1 acre

Creator: Cheryl Glenn
Date Created: 9/2/2015
Revision #: Original
Date of last review: 4/22/2016

Learning Center – Admin Roles

Purpose

The purpose of this document is to provide enough information for a person to go into the administrative portion of SWFWMD's learning center and enter information to set up a course, schedule a class for that course, push the course into the course catalog, push the class into the calendar, print out the roster, and enter attendance information.

Scope

The intention is to provide basic steps, using the dashboard only (see below). The dashboard should be sufficient for all tasks that need to be performed, with the exception of any anomalies or errors that may occur, or with a request of an unusual nature that is not part of the common workflow.

Terminology

Training Activity – Any course that is offered by the District. It can be compared to a college course catalog.

Training Event – The actual classes which students attend. It can be compared to the schedule of classes that a college would publish each semester.

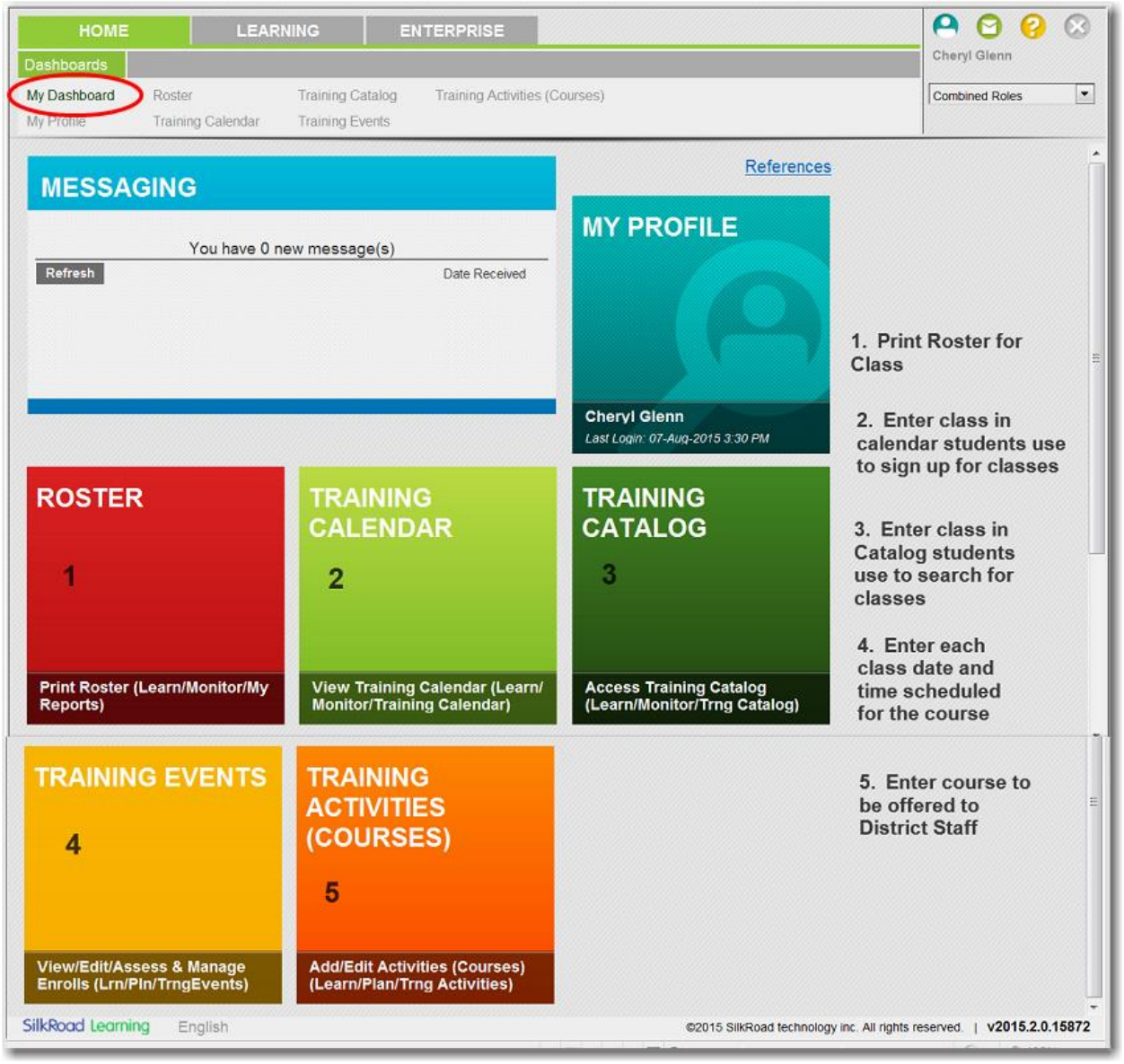
PROCEDURES

Open SilkRoad Learning Center Administrative View

1. Open Internet Explorer and navigate to the following link:
   https://swfwmd-greenlight.silkroad.com/manager/default.aspx

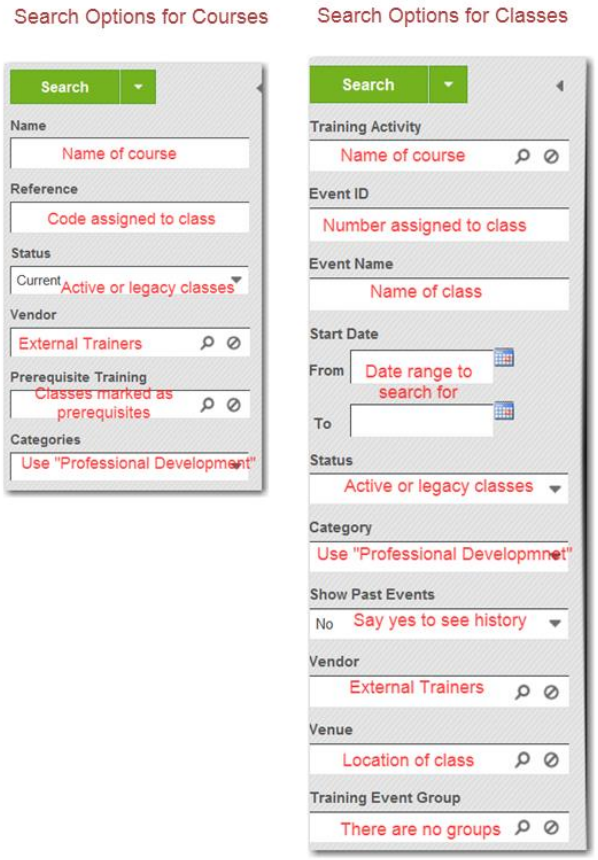
2. Use the administrative user name and password assigned by ITB to sign in.
   Note: this is a separate interface than the learning center used by District employees to register for a class.

The main window will open that displays the dashboard with the five most common functions that are done. Training activities and training events create the course and class, respectively. The training catalog and training calendar pushes the class schedules out to the students. The roster prints the class roster for the class.

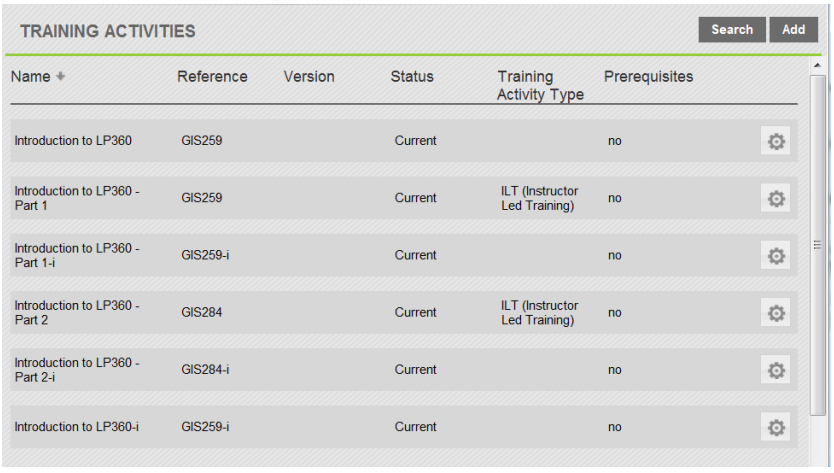


Basic Search

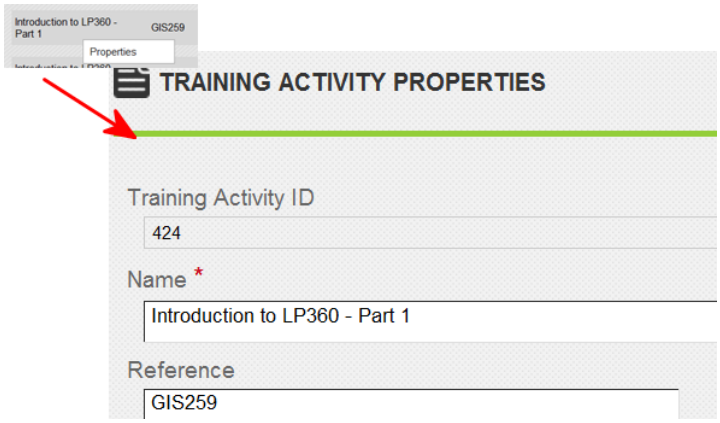
When the links for Training Activities or Training Events are clicked, a blank screen opens with search options on the left-hand side.



1. Enter any known information about a class or course, and those that meet the search criteria will appear in a list. In this example, LP360 was used as the search criteria.



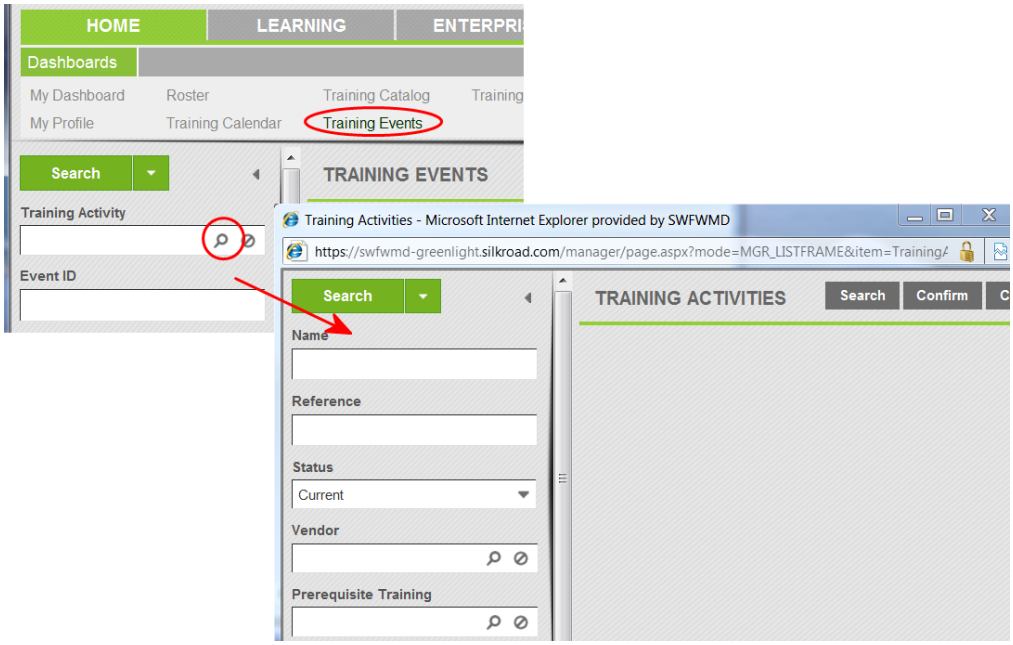
2. Left click on the record to be viewed, and a link named “properties” pops up. Click on this link and the associated record will display.



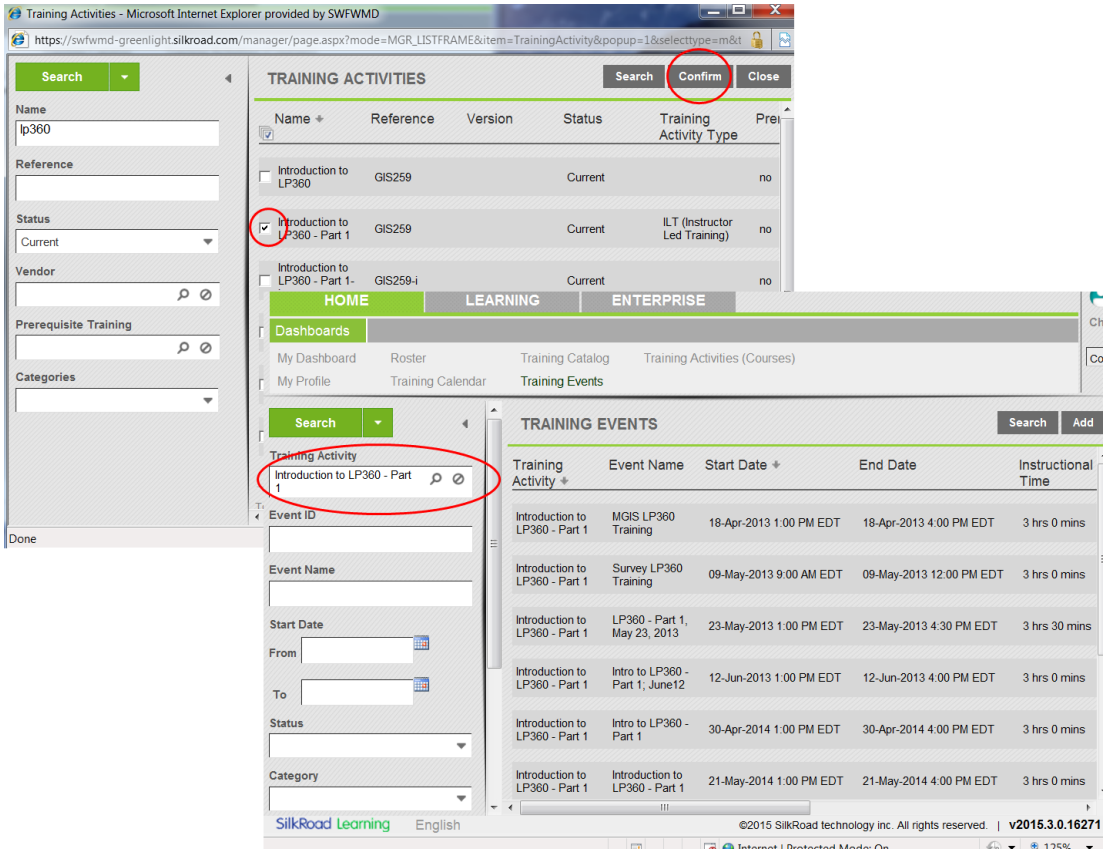
Nested Search

Nested searches are indicted with a symbol, as in the picture below. These are available when searching on different sections of the Learning Center system while in another (i.e. search for course while working in events). Click on this symbol to open a second search window that will search the other section. Once the search is complete, the results are brought into the current search window. At this point the main search can be done. In the example below, a training event (class) needs to be found for an activity (course).

1. Click on “Training Events” to open the search dialog for classes. The first search option is named “Training Activity,” and has the nested search symbol. Click on this symbol and the search dialog box opens for Training Activities (courses).



2. Results are returned as with the basic search, but are not yet in the search screen for events (note title is for activities). Select one course by activating the checkmark and then click on the “Confirm” button. The result is now put into the events search box for “Training Activity.”

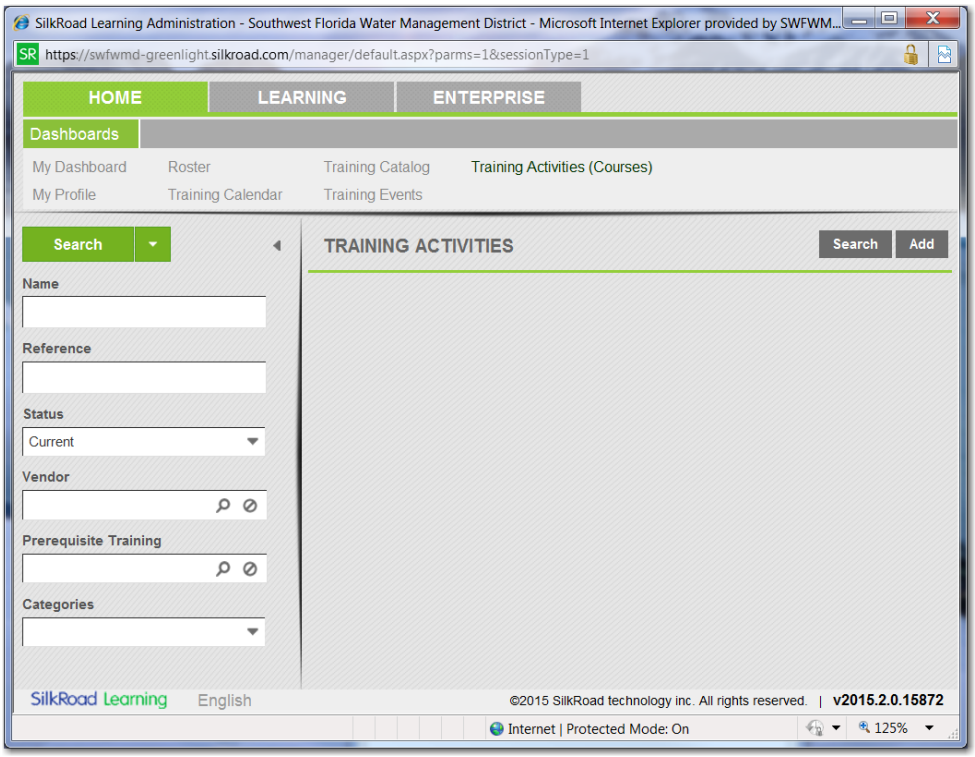


3. Click on the search button once more to obtain every class that has been offered for the course. Click on one and select the “properties” link to open class information. (Note: If no results are returned make sure the “Show Past Events” is marked with a “yes.”)

Create a New Training Activity or Edit Existing Training Activity (Course)

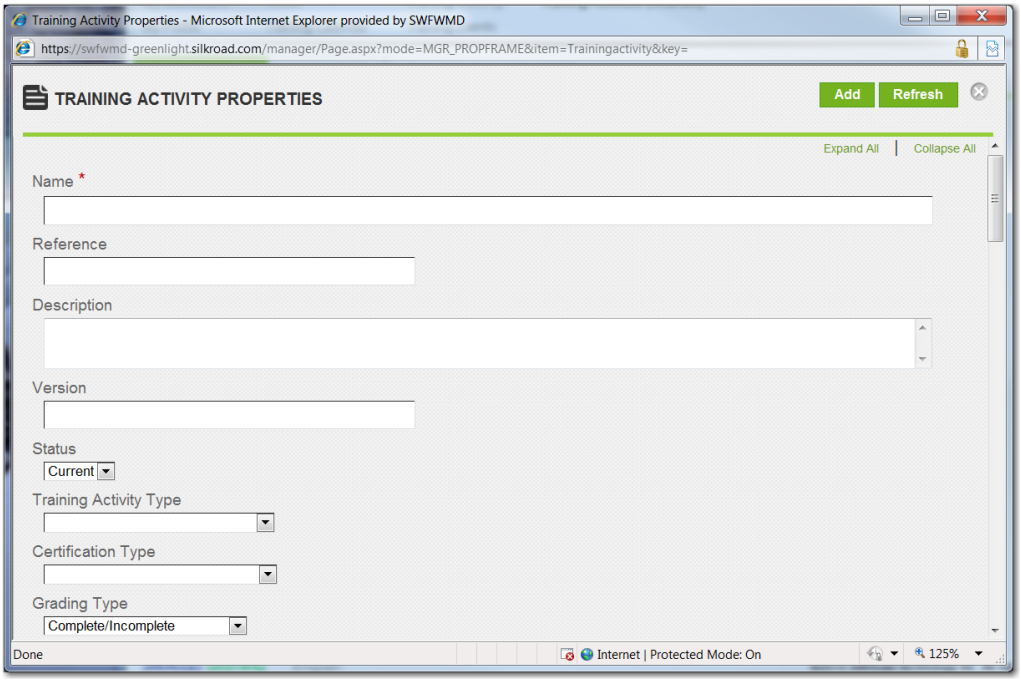
1. Click on the box titled “Training Activities (Courses) to enter a new course or modify an existing course. There only needs to be one record for each course offered by Mapping and GIS, so this only needs to be done if a new course if being offered by GIS or if an existing course is being modified. The following dialog window opens.

   IMPORTANT: The status of the class MUST be set to “scheduled” or “confirmed” before students can start enrolling.



If the class is new, click on the “Add” button on top right of dialog. If the class is existing, use one of the search criteria to find it. See section titled “Search Basics” for instructions.

The following screen will pop up. If an existing course is selected, the course information will be populated in the fields.



2. Enter or modify the course information, which is provided by the instructor. Mandatory fields have a red asterisk. Most information will not be necessary; this form is used for any class offered at the District, whether internal or external and free or charged. Below is a list of the fields with a description of them. The fields highlighted in blue are used by GIS.

   Name: Name of the class

   Reference: Unique number assigned to class. GIS uses "GIS#." This is not mandatory, but is helpful when conducting searches.

   Description: Short description of what the class is meant to accomplish.

   Version: Version number of the class if it has been modified from the original.

   Status: Indicates if class is active or no longer offered. Options are "Current or Legacy."

   Training Activity Type: Indicates the format course will be provided in. Options include Instructor Led Training, Online Self-study, Video Conference, or Web Classroom)

   Certification Type: If the course if part of certification process the student is undergoing, enter the time frame of certificate renewal

   Grading Type: Enter the grading method here. Options are Complete/Incomplete or Percentage system.

   Default CEUs: If course will be accepted for classroom credits, enter the number here.

   Default CEU Reference: If course will be accepted for classroom credits, enter the institution credits will apply for.

   Notes: Information that would be helpful for students that does not appear elsewhere.

   Objectives: Enter the learning goals of the course

   Prerequisite Training: Classes that should be taken before this course can be taken.

   Prerequisite Notes: Provide an explanation as to why the listed classes should be taken before this course.

   Cancellation Policy: Provide instructions for students who want to cancel their enrollment in a class. Usually applies when a cost is involved in the class.

   Target Audience: If course is geared to a subgroup of employees at District (i.e. managers or field staff), state who the course is geared for here.

   Associated Survey: If there is a survey for students to fill in, enter here.

   Location and Contact Information: This section is to provide contact information for students looking for information regarding a course. Usually use the Learning Center Coordinator as the contact person, but may be any person who is maintaining the course and scheduling classes.

Event Type – options appear on drop-down menu (i.e. class-room, on-line)
Administrator Name
Administrator Email

List Price per Course: Any cost that may be associated with the course

List Price per Student: If there is a cost associated with the course, enter the price divided among each student here

Instructional Time: If there is a cost for the course, enter the length of the course.

Schedule: Check if the classes have been scheduled.

Enrollments Section: This section provides different ways to control activity for classes during the enrollment period.

Minimum & Maximum Enrollments – controls the class size
Enrollment and Cancellation Cut-off period – Restricts time period in which students can enroll for or cancel a class
Cancellation or Absentee Penalty – Indicates whether there will be a penalty for cancelling a class or not showing up.
Enrollment Approval Required: Check if manager is required to approve attendance
Allow User Registration by Supervisor: Check if managers will be able to enroll their employees

Categories: Select type of training the course will provide from the list. GIS is usually "Professional Development."

Languages: Can skip

Cost Center: If there is a charge for the course, this will assign the responsible department.

Vendor: If an external training company or person will be providing the training, enter their information here.

Materials: Indicates if there are any books or other materials students need.

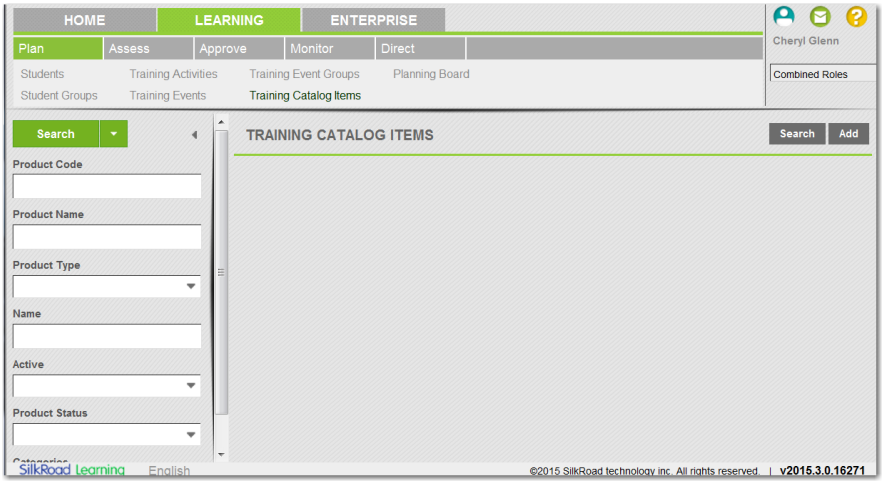
Links: Only available if links have been created, and there aren't any.

Custom Data Fields: Can ignore this.

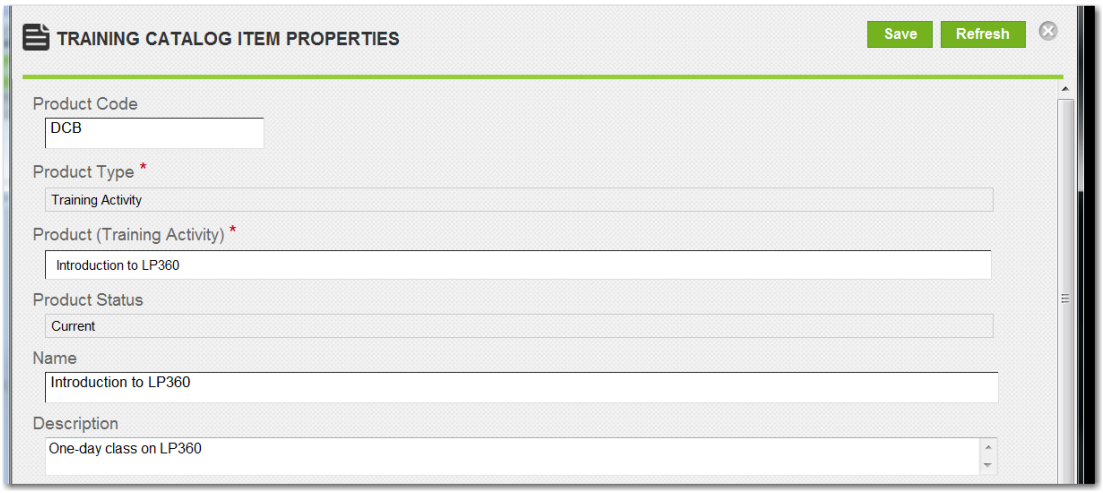
3. Click on "Add" to save course

Enter Course into Training Catalog
The course catalog is a repository that lists every training course that the District offers. Every new course is entered in the catalog so that District staff can know that it is available. Courses in the catalog can also be edited.

1. Click on the "Training Catalog Items" to open the following window. Make sure the "Learning" tab is active.



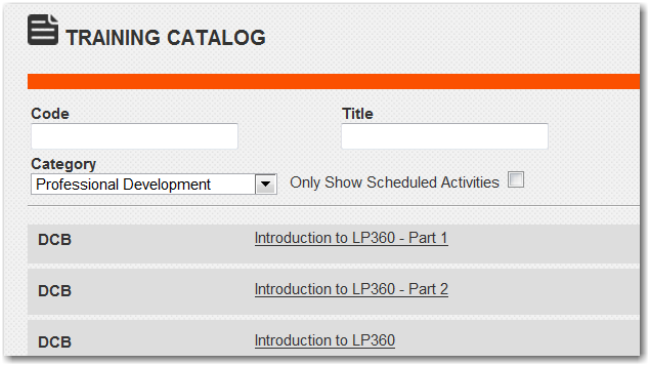
2. Use any of the search criteria to find existing items in the catalog or click on “Add” to enter a new course. The following window will open.



Below is the list of fields in this form with a brief description. It should be written to provide students with enough detail so that they can grasp the learning goals of the course.

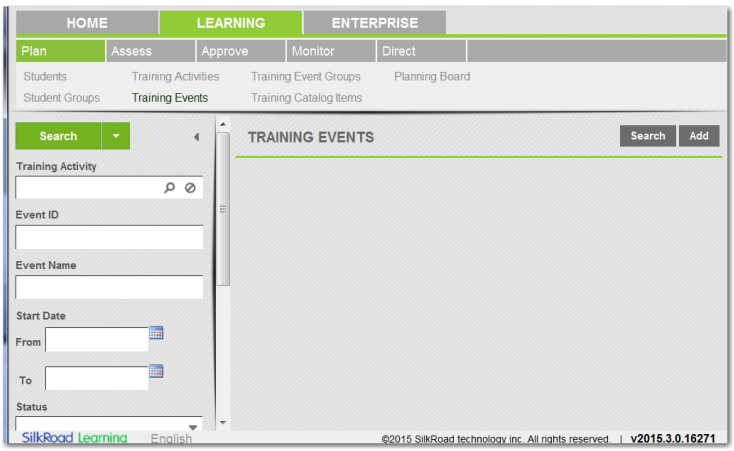
Product Code: Use DCB for GIS code. This field is not mandatory.
Product Type: Should be automatically populated based on the class information.
Description: State the overall goals of the class. Can use the description entered into the class information.
Active: Activate check box is the class is still being offered.
Membership Access Only: Activate if there is restricted access to the class. When checked, a search tool will display to add the members.
Syllabus Notes: Enter any notes of interest about specifics of the class.
Categories: Provides a high-level description of the types of skills that are obtained through the class. GIS is usually marked as “Professional Development.”

3. Once complete, the course should be visible in the Training Catalog in the student's view of the learning center, located on Currents under Employee Resources > Learning Center.

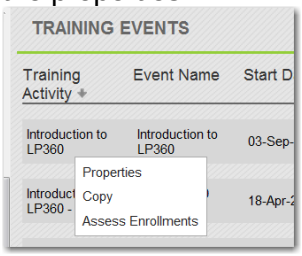


Create a New Training Event or Edit an Existing Training Event (Class)
There is a separate training event created every time a course is offered to District staff. If there needs to be edits done for the event, it is best to complete them before the class is marked as scheduled and students start registering. Otherwise, unintended events may happen.

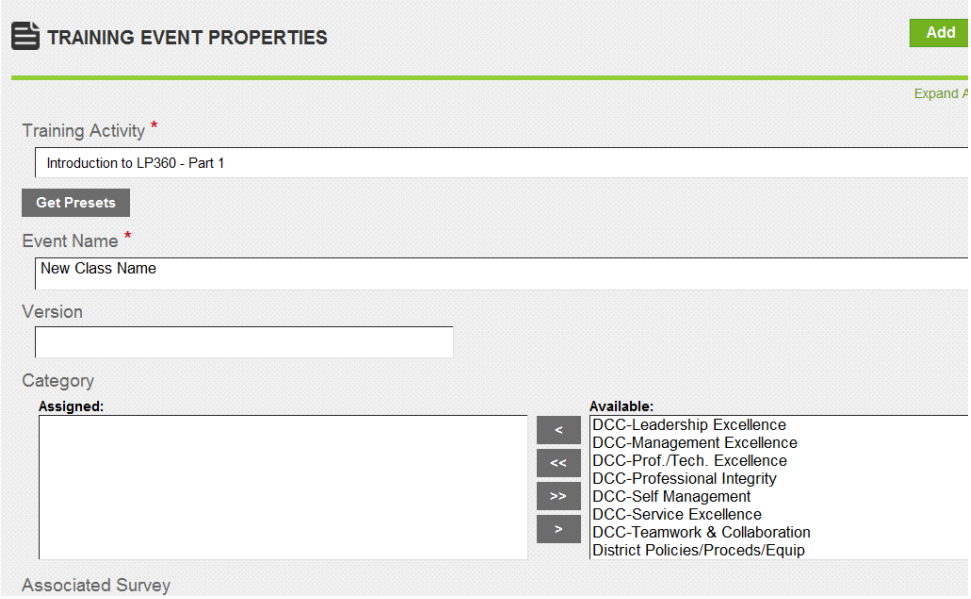
1. To create or edit a training event, click on the Training Events link. The following window will open.



2. If the Training Event is new, search on Training Activity search box to select the course. Then click Add to enter the new class. If the Training Event exists and needs to be edited, search on any of the other search functions. Then left click on name of class and click on the properties link.



The following dialog box will open in both cases. The existing events will have current information populated, and new events (classes) will be empty.



3. Enter or modify information for the event (class), which should be provided by the instructor. Mandatory fields have a red asterisk. Below is a list of fields on the form with a brief description. The fields highlighted in blue are usually used by GIS.

Training Activity: The name of the course the event (class) is for.

Event Name: Enter a name for the class that is distinct from any others
Version: Version number of the class if it has been modified from the original.
Training Event Group: GIS does not have any classes grouped.

Category: Select type of training the course will provide from the list. GIS is usually "Professional Development." This should be brought in from the course information.

Associated Survey: If there is a survey for students to fill in, enter here.

Schedule:

Status: Click on the drop-down arrow to make selection. When the status is scheduled or confirmed, students will be able to enroll in the class. Options are:

Planning: Select when class is preliminary or should not be available to students.
Scheduled: Select when class has been scheduled and ready for students to enroll in.
Confirmed: GIS does not use this.
Cancelled: Select if class has been cancelled.
Closed: Select if no more students can enroll in class.
Completed: Select when class has taken place.

Time Zone: Automatically set for Eastern Time Zone

Start Date: Enter the beginning date and time of the class.

Span Type: Choice of “End Date” or “Instructional Time.” Instructional time is the total time of the class hours, and is usually used when the class spans several days.

End Date: Enter the closing date and time of the class

Scheduling Rules: Used to remove a span of time from the class range. This field can be used to schedule in a lunch during the class.

Instructors: Select an instructor from the approved list. If this will be the first time the instructor is teaching, contact the “Senior Performance & Staff Development Specialist” to have them added to the list. Currently this is Carolyn Joslin.

Location and Contact Information:

Event Type: Select from the dropdown arrow. Usually “Classroom Training.”

Vendor: Click on the search button if the instructor is an external person.

Venue: Provides the general location of training class. Options are one of the District offices or an off-site location. Click on the “Search” tab without entering in any search criteria and a complete list of options will come up.

Training Location: Provides the training room the class is to be held in. The easiest way to use this is to select the District Office under Venue and click on search. A list of every training room in that office is listed. Click on the checkbox for the room to be used, and click on “Confirm.”

Administrator Name: Name of person in charge of class.

Administrator Email: Email of person in charge of class.

Training Event Contacts: Click on the add button to add contacts perspective students can get in touch with to answer questions.

Enrollments:

Minimum or Maximum Enrollments: Enter the minimum number of students required to hold the class or the largest number of students that can be accommodated.

Enrollment Cut-off: The number of days before the class starts in which students can no longer enroll.

Cancellation Cut-off or Penalty: The number of days before class starts in which students can cancel their enrollment without penalty, and what that penalty will be.

Absentee Penalty: Penalty a student will face if they do not show up for class. Usually done for charged classes.

Enrollment Approval Required: Activate checkmark if approval required.

Enrollment List: The list of students who have enrolled in the class. This list will become activated once the status of the class is changed to "scheduled" and students begin to enroll. Students can be manually enrolled by clicking the "Add" button, but this is not normally done.

Automatic Enrollment from Waitlist: Check to enable students on the wait list to be automatically moved to the enrollment list if other students cancel.

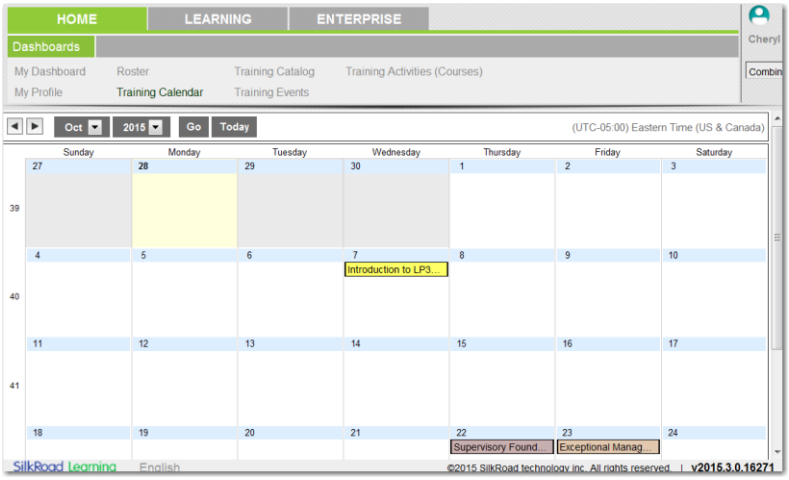
Waiting List: If enrollment for the class is full, students who try to register will be automatically added to the wait list.

Notes: Enter any information that students may find useful.

Syllabus Notes: Enter any comments regarding the syllabus that students may find useful.

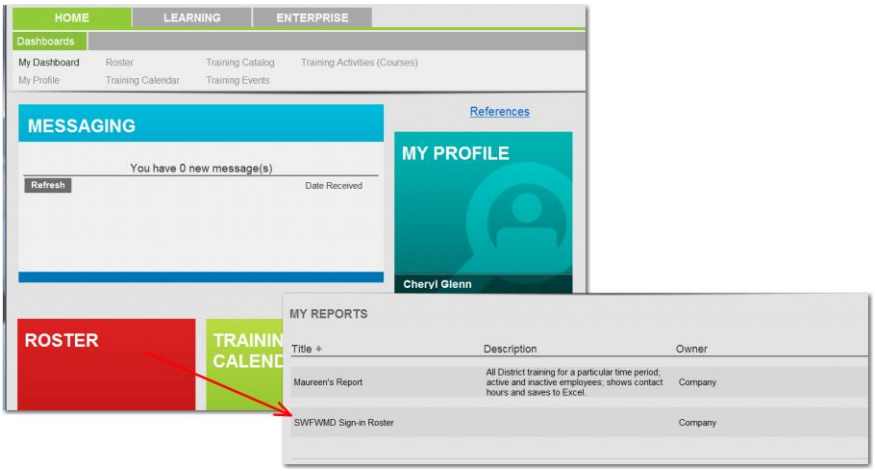
Using the Training Calendar

Once the class information has been completed, the training calendar can be viewed to see that the class has been entered. The training calendar is located under the Dashboard Section. Below is an example of the calendar.

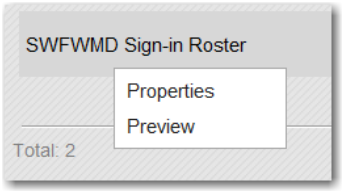


Create the Class Roster
Before class, the roster needs to be printed so students can sign in and attendance tracked.

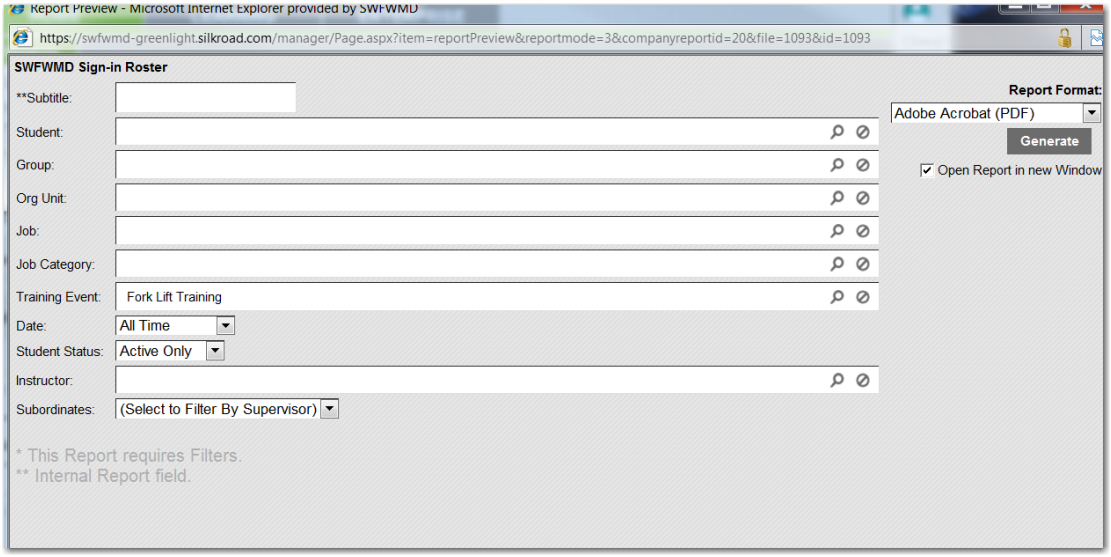
1. Click on Home < Dashboards < Roster.



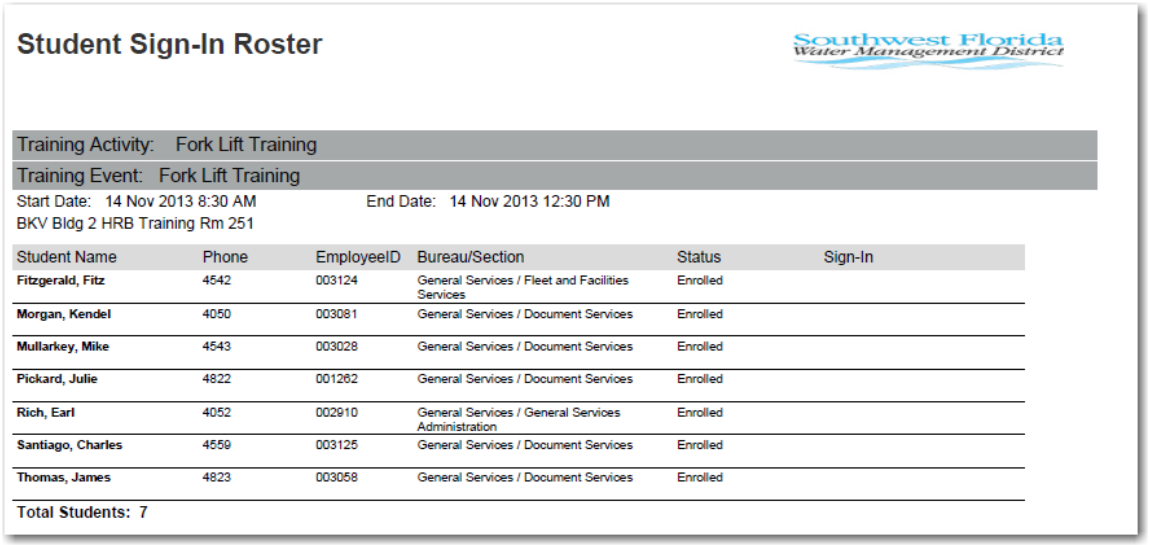
2. Left click on “SWFWMD Sign-in Roster and select “Preview.”



The following search utility will open. Choose the training event by any search criteria listed. On the upper right of winder there is a section called “Report Format” which will show the different formats (i.e. word, pdf, excel) the report can be produced in.



3. Once complete, click the “Generate” button. A report like the one below should be generated.



Student Sign-In Roster

Southwest Florida Water Management District

Training Activity: Fork Lift Training

Training Event: Fork Lift Training

Start Date: 14 Nov 2013 8:30 AM End Date: 14 Nov 2013 12:30 PM

BKV Bldg 2 HRB Training Rm 251

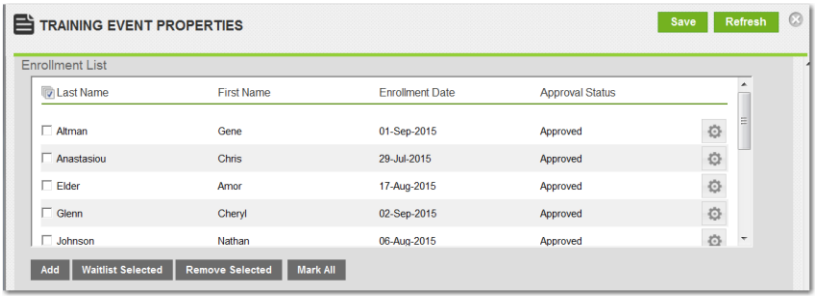
Student Name	Phone	EmployeeID	Bureau/Section	Status	Sign-In
Fitzgerald, Fitz	4542	003124	General Services / Fleet and Facilities Services	Enrolled	
Morgan, Kendel	4050	003081	General Services / Document Services	Enrolled	
Mullarkey, Mike	4543	003028	General Services / Document Services	Enrolled	
Pickard, Julie	4822	001282	General Services / Document Services	Enrolled	
Rich, Earl	4052	002910	General Services / General Services Administration	Enrolled	
Santiago, Charles	4559	003125	General Services / Document Services	Enrolled	
Thomas, James	4823	003058	General Services / Document Services	Enrolled	

Total Students: 7

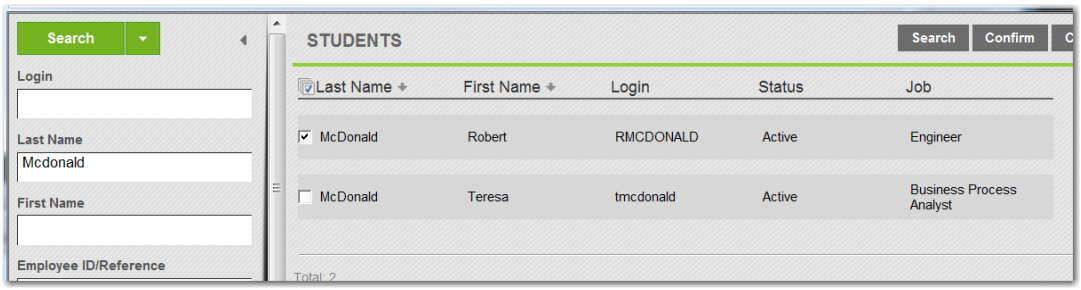
Mark Attendance Records

Once the class is over the roster should have been returned to the GIS person who tracks GIS training activities on the SWFWMD learning center. Attendance records will be recorded for that class session.

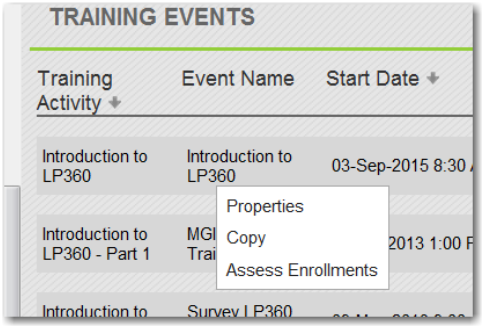
1. If a student did not register they will not appear on the list, but will write their name in. When this happens go back to the Training Events section to register them as a student. Scroll down to the “Enrollment List” section, as seen in the figure below.



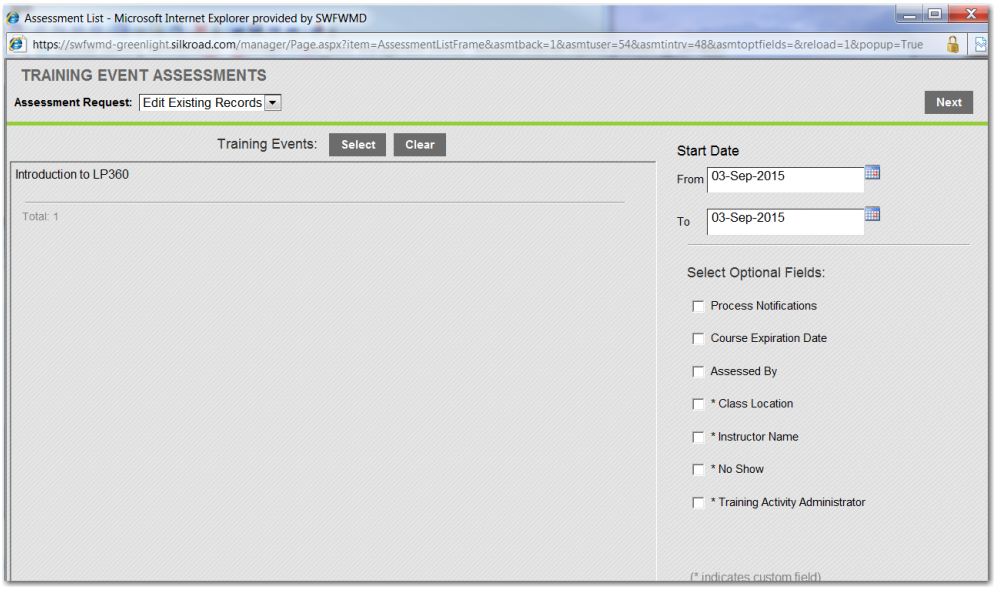
Click on the “Add” button, and the following search screen will open. Search for the student by any of the search criteria present. Select the correct student, and click on “Confirm.”



That person is added to the end of the enrollment list, and the attendance information can be entered.

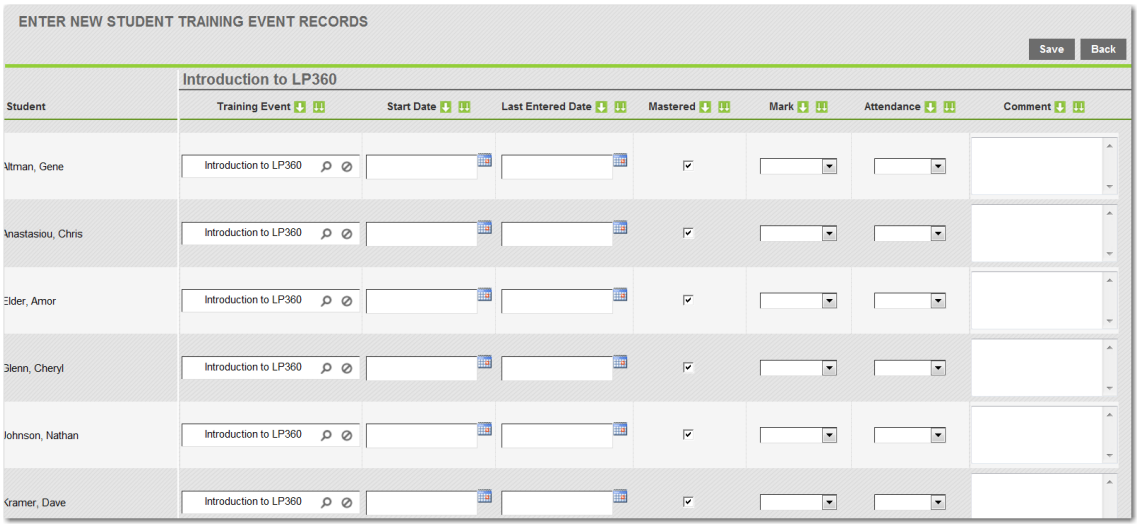


2. Open the training event (class) for the class to be updated. Left click on the class name, and choose “Assess Enrollments”. The following window will open.



Verify the class name and the date. On the upper left of screen is “Assessment Request.” The options for this is to edit existing records or add new ones. Use “Enter New Records” if this is the first time entering attendance records for that class, and existing records if the data is being modified.

3. Click “Next.” Another window will open that has the list of students. The only thing that appears are the names of the students that were enrolled in the class. Everything else will be blank. Below is how the window should appear. Click on one of the green arrows to copy the data throughout the row and/or table.



Below is an explanation of the fields in this table.

Training Event: Name of class taken

Start Date: Enter the date of the class

End Date: Enter the date of the class

Mastered: Activate check if class successfully completed.

Mark: Select complete/incomplete. Anybody who attended will get a complete; anyone who did not attend will get an incomplete. Exception: sometimes a person who cannot attend will send somebody in their place. In this case, mark them as canceled and add the new student.

Attendance: Options are attended, no show, and cancelled. Pick the appropriate one.

Light Detection and Range (LiDAR) Digital Elevation Data Quality Control (QC) Standard Operating Procedures

Purpose

This document defines the deliverables and quality control (QC) procedures for projects that use airborne Light Detection and Ranging (LiDAR) to capture digital elevation data. Previous documents included traditional photogrammetric collections, but this document only addresses LiDAR sources. Although this QA/QC methodology specifies a combination of tools available within the Environmental Systems Research Institute's (ESRI) ArcGIS and QCoherent LP360 environment and GlobalMapper, the data QC steps could be implemented within other vendor applications, such as Merrick-MARS, PhotoScience - FOCUS and/or EarthEye-EarthShaper.

Scope

In an effort to update county-wide or specific watershed topographic information, the District is managing mapping projects that produce Light Detection and Range (LiDAR) data point clouds digital imagery (not QCed for this purpose) and breakline, impervious surface, and project-specific feature classes and geodatabases .

LiDAR uses an advanced laser ranging device and geographic reference system to automate the capture of surface elevations at a fraction of the cost of conventional survey or photogrammetric mapping approaches. The deliverables from the project will include surface elevations that meet the District's and the Federal Emergency Management Agency's (FEMA) mapping specifications. The data will be compatible with the District's Geographic Information Systems (GIS) databases and available to cooperators and the general public.

The primary purpose of the data is to support District (and cooperative County) projects that result in the update of FEMA Flood Insurance Rate Maps (FIRM). Additionally, the data fills topographic voids, provides a base map in Digital Terrain Modelling, supports planning for future watershed management programs, design and implementation of any large-scale drainage improvement projects, assists in emergency preparedness planning, Homeland Security and facilitates accurate and efficient mapping of wetlands.

The Mapping and GIS section has created and maintained documentation on LiDAR digital elevation QC procedures. This document standardizes existing LiDAR QC procedures, and affords for the periodic review of processes.

Standards

The deliverables shall include the following; American Society of Photogrammetry and Remote Sensing (ASPRS) classified point cloud in a recent point record format, breakline features, mission-specific features, and a gridded Digital Elevation Model (DEM). Optional deliverables include, extracted rooftop polygons, impervious surface polygons, and concurrent digital imagery. The subsequent sections define acceptable data formats for these deliverables.

ASPRS LAS Point Cloud
NOTE: At the time of this document, LAS Format 1.2 is the most common format available to most software. LAS 1.0 and 1.1 are not acceptable formats, while LAS 1.3 and LAS 1.4 (or newer) will be accepted.

LiDAR Point Cloud Format: LiDAR point clouds will be delivered in the ASPRS LAS format. As this standard evolves, and moving forward, versions LAS 1.4 and newer are acceptable.

LiDAR Tiling Scheme: LiDAR point clouds will be tiled according to the 2014 Florida Statewide Tiling Scheme of 5000' x 5000' tiles.

Tiles shall be contiguous, non-overlapping and suitable for creating seamless topographic data mosaics that exclude "no data" areas.

LiDAR Tile Naming Convention:

File Name: **LIDYYYY_cellnumber.LAS**

where *LID* stands for LiDAR, *YYYY* is the year, *cellnum* is appropriate CELLNUM values found in the 2007 Florida Statewide Tiling Scheme shapefile, and .LAS is the file extension type (ex: LID2013_00279.LAS).

Content: Mass point data shall be delivered in LAS files compatible with the LAS Specification 1.4 (or more recent) format and must meet the requirements identified within this specification including header blocks, variable length records and point data. The mass point data shall not contain any holidays in the data and overlap between flight lines shall be removed.

1. The classification code for these files will follow the LAS 1.4 format and will include the following:

   - Class 1 = Unclassified
   - Class 2 = Ground
   - Class 6 = Building Rooftop (Optional)
   - Class 9 = Water
   - Class 12 = Ground Overlap*
     Unless overlap flag is set
   - Class 17 = Bridge Decks

   Class 1 will be used for all other features that do not fit into the above specified classes (ex., vegetation, low noise, etc.).
2. Public header information must be contained as specified within the LAS 1.4 file specification. In addition to the LAS 1.4 required fields, the following items are required to be populated:

   Project ID –GUID data 1: project identifier
   File Creation Day of Year: DD
   File Creation Year: YYYY

The fields File Creation Day of Year and File Creation Year as the file creation date. This date will represent the day the final LAS file is generated for submittal to the District.

3. Projection information for the point data must be specified in the Variable Length Records using the Combined Well Known Text (WKT) specification as the model per the LAS 1.4 file specification.
4. The Point Data Record Format shall follow the Point Data Record Format 6 as defined in the LAS 1.4 (or newer) Specification. The following fields are to be populated:
    - Intensity
    - Return Number
    - Scan Direction
    - Classification (see above)
    - Classification Flags
    - Scan Angle Rank
    - Point Source ID

Breaklines

Breaklines shall be captured as appropriate to support the development of a hydro- enforced, hydro-flattened Digital Elevation Model (DEM) and the generation of 1-foot contours meeting ASPRS and NSSDA/NMAS Standards. Breaklines shall be delivered in the TopographicInformation Esri file-based GeoDatabase (fGDB) feature classes.

Additional formats (Esri shapefile, EarthShaper Breakline database, etc., may also be delivered, however, these formats are auxiliary and not the contracted deliverable.

Format: Esri file-bases GeoDatabase

File Name: A###_Description_Breaklines.gdb where A### is the SWFWMD Project name (Alpha delimited + three numbers), Description is a descriptive name for the LiDAR mission.

Example: B813_HillsboroughCounty_Breaklines.gdb

Content: See Appendix A for TopographicInformation.gdb specification

Digital Elevation Model (DEM)

A hydro-enforced, hydro-flattened Dem will be constructed from the bare-earth point cloud (ASPRS Class 2) and breaklines. The DEM will consist of 5' x 5' cells, tiled according to the 2007 Florida Statewide Tiling Scheme. Tiles will be complete (1000 x 1000 cells) and inserted at a Florida State Plane West (NAD1983) coordinate ending in a 0,0). Tiles shall be contiguous, non-overlapping and suitable for creating seamless DEM mosaic.

Format: Esri Grid 32-bit floating point values. Note: Additional formats may be delivered (.FLT, .ASC, etc.) but these are not a contracted

File Name: **DEMcellnumber**

Where *DEM* stands for Digital Elevation Model, *cellnum* is appropriate CELLNUM values found in the 2007 Florida Statewide Tiling Scheme shapefile

Content: All DEM tiles will contain projection information and tile-specific FGDC Metadata.

Media

Data has been delivered using portable USB hard drives, CDROM, Firewire hard drive (250GB minimum) or DVD media (only allowable if final deliverables do not exceed four disks). Upon completion of review, all data deliverables must be loaded onto the Mapping and GIS network drive for topographic data.

Note: The media containing the final delivery becomes property of the District.

Locations of Various Documents

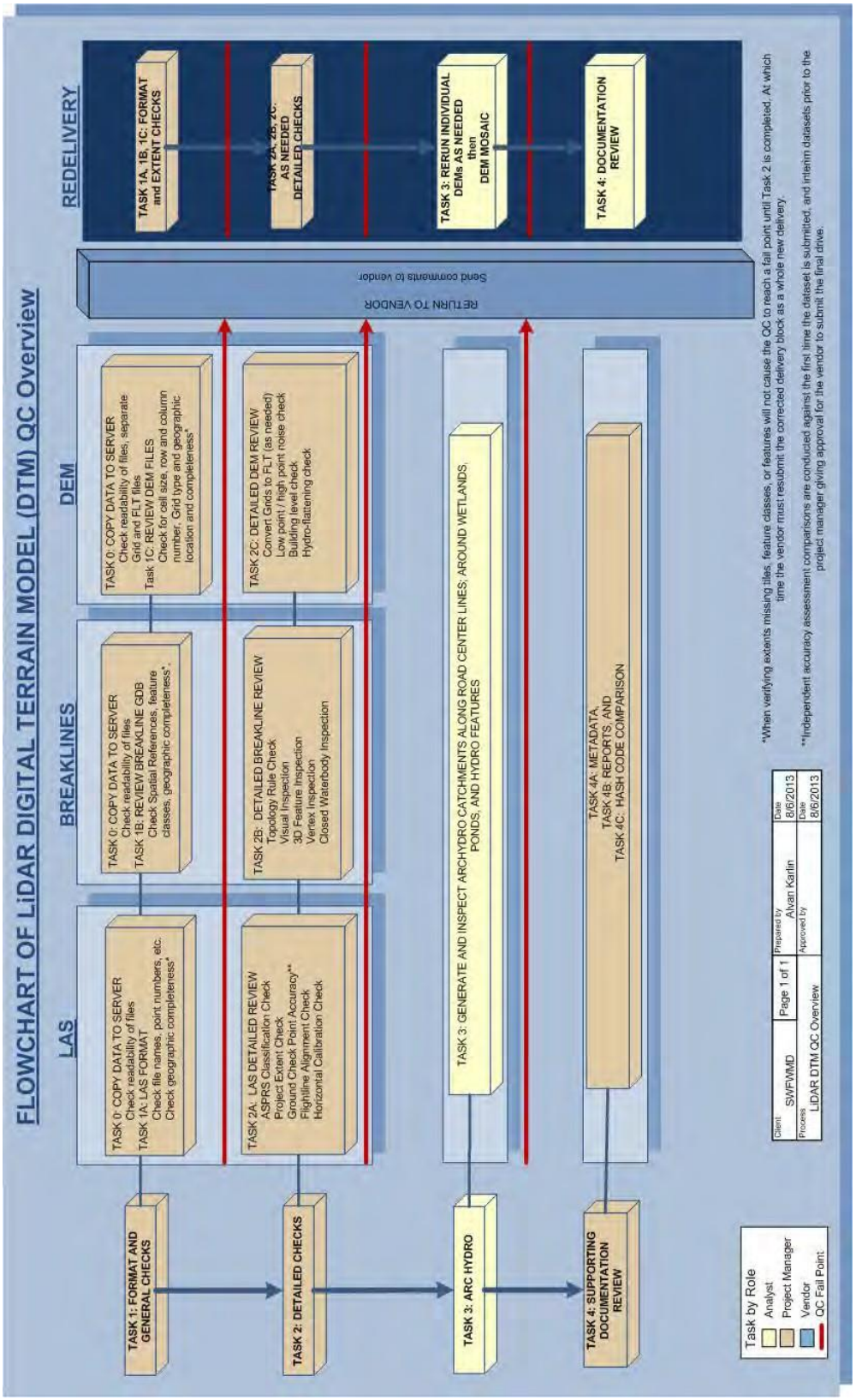
L:\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Current_LiDAR_and_Ortho_Specs

- LiDAR Specs
- Terrain specs
- Geodatabase specs

L:\DCB\Mapping-GIS\Projects

- Individual Project Specs

QA/QC PROCEDURES OVERVIEW



Two tools are available to assist with the review of LiDAR deliverables.

1. **LAS Data Checks QC Checklist –** This is a WORD document that is used to record observations and screen captures during the QC processing. It also serves as a guide and checklist for conducting the analysis.

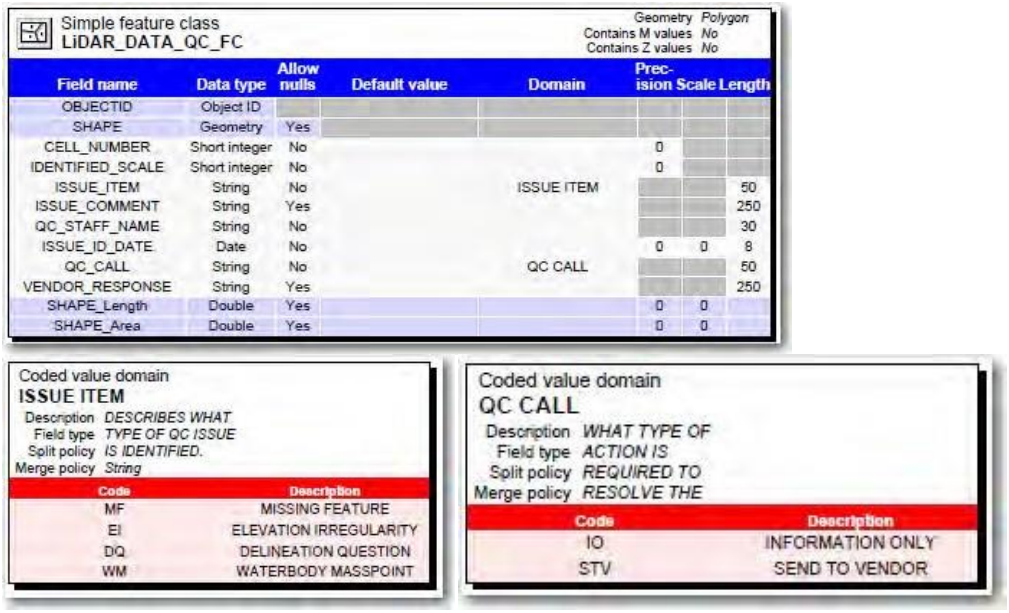
   This document is located on:

   \\bkvfs03\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Topographic_Data_QC\QA_Tools\LAS Data Checks QC Checklist-REV 15June2015.docx

   This document serves as both a checklist and a permanent record for the QA/QC of a LiDAR project.

2. **LIDAR_DATA_QC** GeoDatabase – There are two (2) geodatabases, one a Personal GDB, the other a file-based GDB available for recording polygons of interest. The GDBs are located on:

   \\bkvfs03\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Topographic_Data_QC\QA_Tools\QC_Database_Templates



Simple feature class
LiDAR_DATA_QC_FC

Geometry *Polygon*
Contains M values *No*
Contains Z values *No*

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
CELL_NUMBER	Short integer	No			0		
IDENTIFIED_SCALE	Short integer	No			0		
ISSUE_ITEM	String	No		ISSUE ITEM			50
ISSUE_COMMENT	String	Yes					250
QC_STAFF_NAME	String	No					30
ISSUE_ID_DATE	Date	No			0	0	8
QC_CALL	String	No		QC CALL			50
VENDOR_RESPONSE	String	Yes					250
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

Coded value domain
ISSUE ITEM
Description *DESCRIBES WHAT*
Field type *TYPE OF QC ISSUE*
Split policy *IS IDENTIFIED.*
Merge policy *String*

Code	Description
MF	MISSING FEATURE
EI	ELEVATION IRREGULARITY
DQ	DELINEATION QUESTION
WM	WATERBODY MASSPOINT

Coded value domain
QC CALL
Description *WHAT TYPE OF*
Field type *ACTION IS*
Split policy *REQUIRED TO*
Merge policy *RESOLVE THE*

Code	Description
IO	INFORMATION ONLY
STV	SEND TO VENDOR

   Either GDB is used to draw polygons around areas of interest for transmittal to the vendor for repair. This database can also contain comments for reviewers.

   Alternatively, shapefiles can be constructed from GlobalMapper polygons using the Type field as the comment (see description below).

Task 0 – Data Preparation for QC – All Data Types

Step 1 – Copy data to a staging server.

For smaller projects (<200GB), copy the data to a new directory on \\bkvlid01p

Construct the following folders:

\LAS
\BREAKLINES
\DEM
\IMAGERY
\SurveyReports
\METADATA

and copy the appropriate file(s) to these folders Options:

Depending on the deliverable:

\FLT - for binary DEMs, their headers, and projection files. If the vendor supplied these in the DEM folder, it is best to separate them into a new folder. These files will have extensions: .flt, .hrd, and .prj. Do not be concerned that these may (or may not) have .met (metadata files). These files will be used for GlobalMapper inspection.

\SHAPEFILES – the vendor may supply the breaklines, footprint, flightlines, etc. as shapefiles. Put all of those into this directory.

For large projects *(> 200 GB),* check with ITB for a special allocation of disk space.

Step 2 - Basic Review of the Data

1. Verify that all files have transferred (compare file types and numbers on the Vendor's media and the District's LiDAR storage.
2. Verify through ESRI-ArcCatalog that the files are viewable with ArcGIS
3. Verify the file types and numbers with the Vendor's transmittal information and that the Project deliverable agreement.

TASK 1 – FORMAT CHECKS

Task 1a – LAS Data: Receive, Download & Initial Review of Deliverables

Step 1: Initial Review of the Deliverables

Verify that the LiDAR data have been delivered in LAS format.

Method 1: Use the LASTOOL "LASINFO" to review the header from one or more files. To use the LASTOOLs, copy the LASINFO.exe file from L:\MAPPING-GIS\LiDAR_Tools\lastools\bin to the directory that you are using to store the LAS files.

Then use the START|RUN|CMD to open a command prompt, navigate to the storage directory and at the > prompt, type "lasinfo filename.las". This will generate a report of the LAS header information (if the file is a LAS 1.0 or higher file). You can delete the

LASINFO.EXE file when you have verified the format.

NOTE: This method would be used for a 1 or a few tiles. If several hundred tiles are being inspected, Method 2, using LP360 (or MARS) to construct a Project Report is preferred.

Checks

1. the “version major.minor” field to verify the LAS version number,
2. the “file creation day/year” field,
3. the “classification” fields

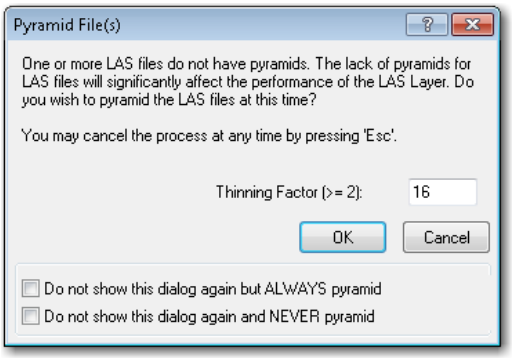
Method 2:* LAS Statistics – *Use this method for MOST QC projects.

LAS Statistics are generated using the Point Cloud Tasks in LP360. (MARS, EarthShaper, and LiDAR-FOCUS have similar tools.)

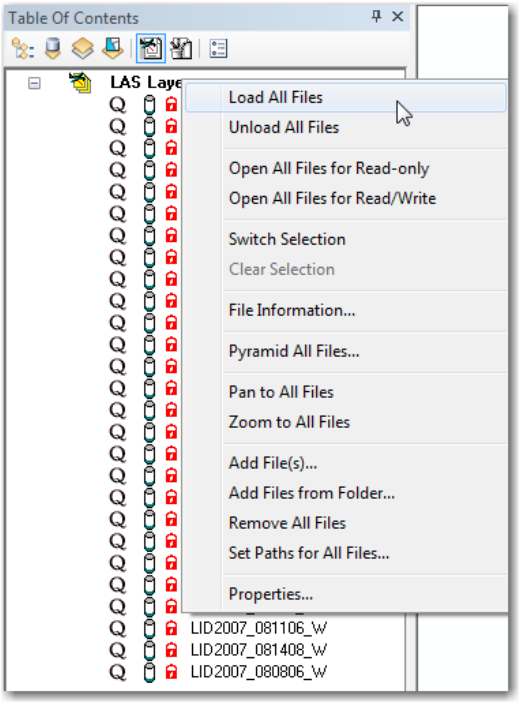
The vendor is not expected to build LP360 .QVR (or any other) index files for the las data. However, if index files fail to build, this is an indicator that the LAS point record format is incorrect.

1. Open ArcMap and activate the LP360 extension.
2. Activate the LP360 “Standard” Toolbar
3. Using the LP360 Add Data tool, add all of the LiDAR (LAS) files into the project.

4. You will be prompted to Build Pyramid file(s)



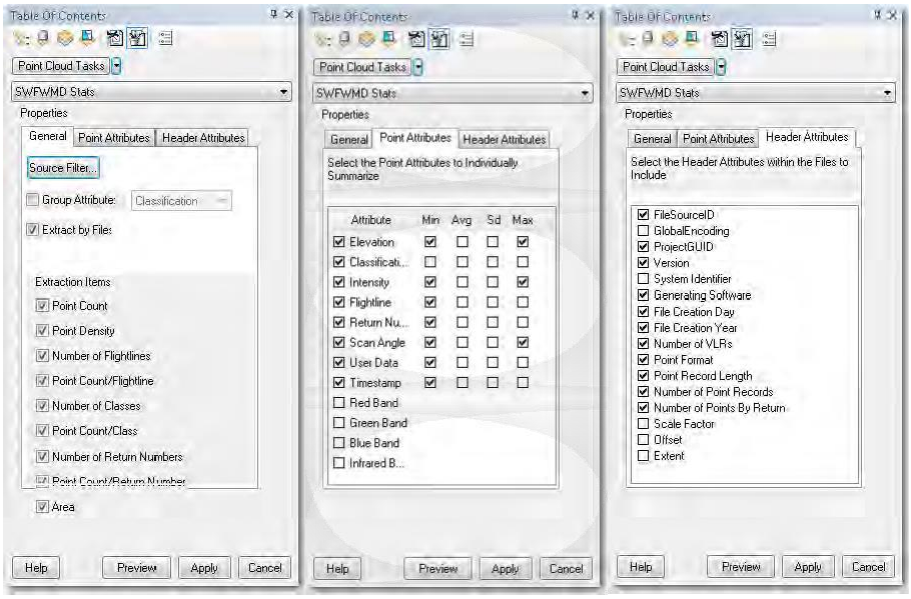
5. Use the default (16) as the thinning factor, and press “OK”
6. It will take ~ 4 minutes per tile to construct the index (pyramid) file, so you might want to do this overnight for a large project.
7. When the indexing has completed, use the LP360 icon on the Table of Contents to load the files,



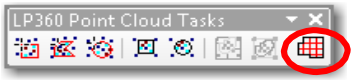
8. Inspect that all of the files loaded. Note: Add the Project footprint to your ArcMap
9. If any tiles fail to load, delete the .QVR file and try again. If it still fails, reject the delivery as not being LAS compliant.
10. If tiles fail to load, discontinue the QC process.

To Construct the QC Report Shapefile:

1. With all the LAS tiles loaded into ArcMap, Activate the LP360 Point Cloud Task Icon in the Table of Contents:
2. Use the Dropdown Task selector to choose “SWFWMD Stats” and examine each Tab. Check the tabs as follows.



3. When finished, click on “Apply”
4. Activate the LP360 Point Cloud Tool Bar



5. Press the “Execute Point Cloud Tasks” Icon
6. On the Task(s) to Execute portion of the menu, activate the Dropdown and select “SWFWMD Stats”
7. On the Output Dataset portion, double-click to invoke a file browser, and browse to a directory to put the output (which will be a shapefile).
8. Press “Run” to start the process. This analysis will take approximately 5 minutes per tile, so, again, this might be an overnight process.

9. The shapefile that results will have one polygon record for each tile, and several fiels. Check each field as:
   a. Filename – correct format
   b. SRS – NAD83/Florida West
   c. FileScrID – should be populated (these are flightlines)
   d. ProjGUID – should all be the same and populated
   e. Version = 1.2 (or higher)
   f. CrDay – should be populated
   g. CrYear – should be populated
   h. PntFormID – 1 or greater
   i. PntCnt - > 1000000
   j. PntCntAsDB > 1000000
   k. NumCLUsed >= 3
   l. PntDen >= 0.2
   m. SumArea = 25000000 (if any are different, tile was cut improperly)

10. Check the additional fields (as needed refer to LP360 Help for field names)
11. Save the Shapefile in the \METADATA folder

Task 1b- Review the Breakline GDB

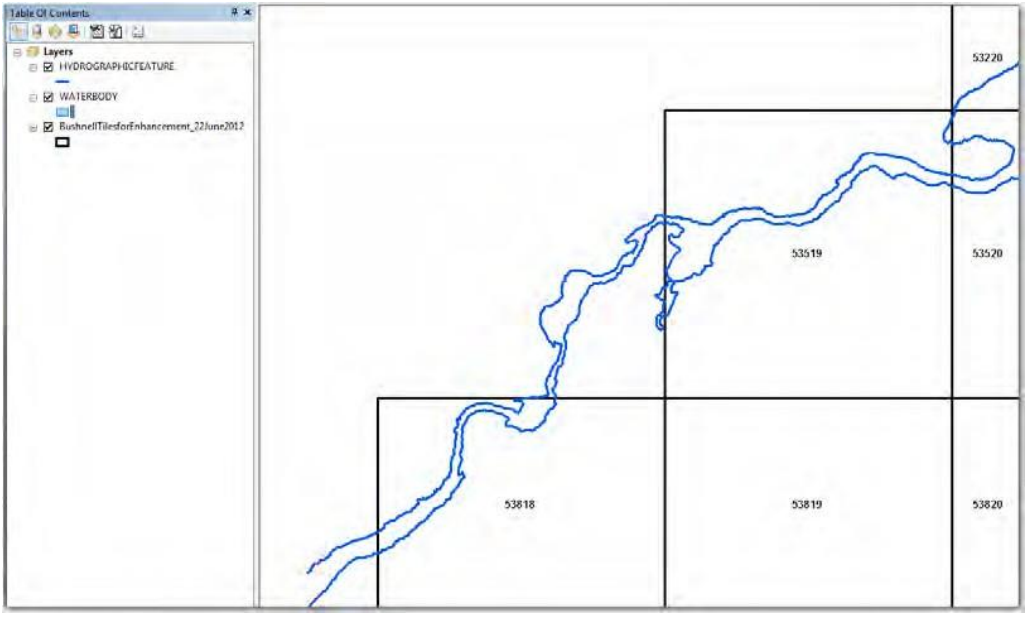
Construct an ArcMap document. Load in all of the breaklines for the following checks:

1. Spatial Reference:
2. NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet
3. Vertical Reference: North America/NAVD_1988 USFoot
4. Feature Classes:

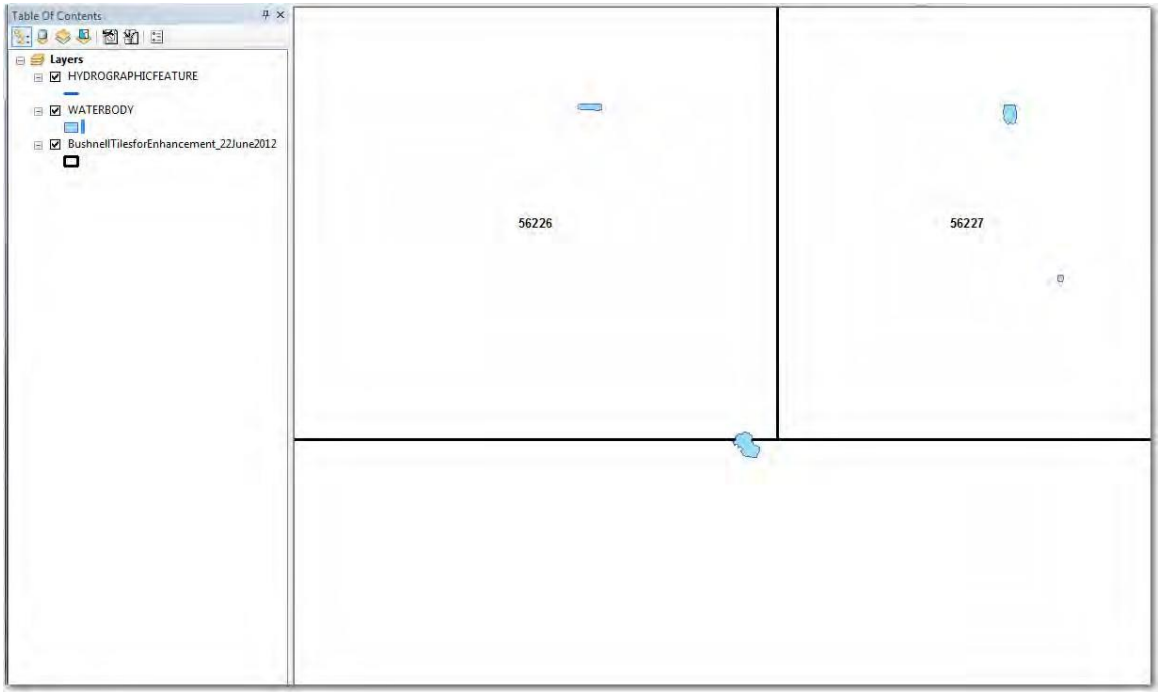
COASTALSHORELINE
CONTOUR_1FT HYDROGRAPHICFEATURE
ISLAND
LOWCONFIDENCEAREAS (optional)
OVERPASS
ROADBREAKLINE (optional) SOFTFEATURE
WATERBODY

5. Check the completeness of each feature class. Pay particular attention to the HYDROGRAPHICFEATURE and WATERBODY feature classes. The water bodies should be complete even though their extent may exceed the study area. The hydrographic features should continue and complete outside of the study area as below.

   Hydrographic feature complete outside of Flight Area

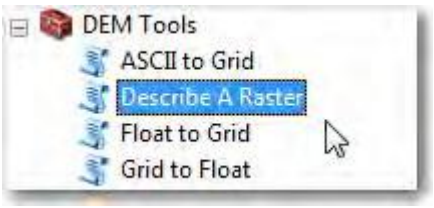


Waterbody complete outside of Flight Area

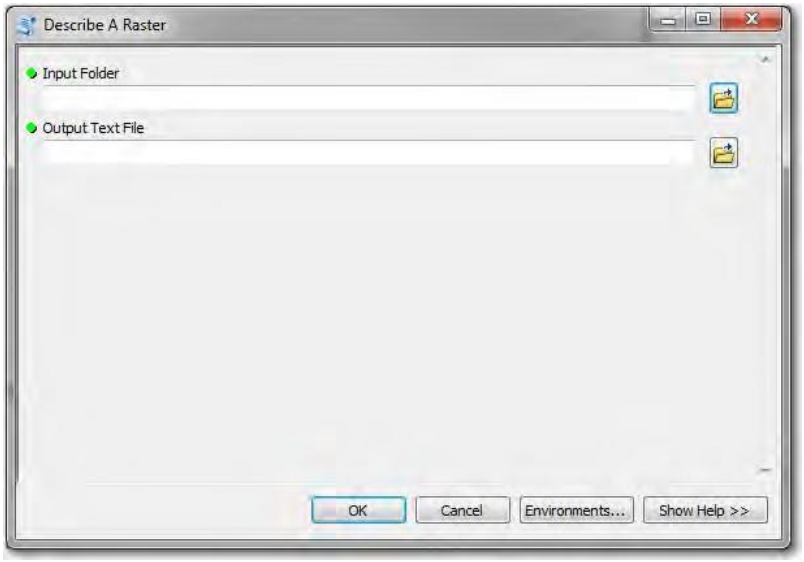


TASK 1c -- Review the DEM tiles

Using ArcMap (or ArcCatalog), open ArcToolbox and add the DEM Toolbox (located on: \\bkvfs03\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Topographic_Data_QC\QC_Tools\DEM_Tools). Open the "Describe a Raster" tool.



Direct it to the folder containing the DEM files and direct it to construct an output file in that same folder.



Note: The \DEM folder should NOT contain any .FLT or .HDR files. If these are included, copy these to a \FLT folder and delete from the \DEM folder

Checks: Open the TXT file using WordPad and examine each record.

Every Grid should report as:

GridName: demXXXXX (where XXXXX = the cell number)
Number of Rows: 1000
Number of Columns: 1000
X size: 5
Y size: 5
Grid Type: F32
NW Corner: 600000 x 1625000 (coordinates will always end in a "0")
SE Corner: 605000 x 1620000 (coordinates will always end in a "0")

TASK 2 – DETAILED REVIEWS

Task 2 requires a workstation equipped with the following software:

1. An ArcGIS Advanced license with access to a QCoherent-LP360 Standard license,
2. GlobalMapper v13 (or higher).
3. Experienced LiDAR users may want to use Merrick- MARS, PhotoScience- FOCUS, and/or DTS- EarthShaper.

[Note: At the time of this writing, it is not recommended to use the Esri LAS tools for the QC process as unpredictable results may occur.

Optional Setup1 – Create QC Geodatabase

Using a LiDAR-equipped workstation,

1. Copy the Project Folder from *bkvlid01p* to the local drive for QA/QC. NOTE: If the vertical reference system was not properly defined by the vendor, then it will be necessary to construct a NEW file-based geodatabase (fGDB) with both the horizontal and vertical units defined as "Foot US" and load/import the NEW fGDB with the breaklines (and contours).

2. Copy the LiDAR_QC personal or file-based geodatabase from ***L:\MAPPING-GIS\LiDAR_Tools*** to the local workstation directory.

3. Rename LiDAR_QC.mdb (or .gdb) to agree with the LiDAR project name

4. There are four domains (CATEGORY, ISSUE ITEM, QC CALL & QC STAFF). Review the domain attributes by reading through the properties of the database (right-click on the database [not the feature class], go to Properties|Domains). You can add (your name and initials) and other domain attributes at this time.

   Use this database to flag all errors discovered in the tasks below.

Optional Setup 2 - Recommended Workspace

As indicated above, it is **strongly recommended** that you copy the LAS and Breakline folders to a local drive. This is the recommended workflow. However, if multiple reviewers will be performing the QC, each reviewer may (1) copy their portion of the data locally, or (2) the data can be maintained on a network fileserver. If the network fileserver is used, be aware that transfer times (rates) may be affected by the number of concurrent users, the time of day, and whether or not a virus program is conducting a check on the local machine.

Task 2a – LiDAR Project Area Completeness and Accuracy Check

Step 1 – Assemble an ArcMap document

Assemble an ArcMap document with the following feature classes:

Breaklines:

- COASTALSHORELINE (if appropriate)
- HYDROGRAPHICFEATURE
- ISLAND
- ROADBREAKLINE (if appropriate)
- SOFTFEATURE
- WATERBODY

StatewideLiDARGrid/Project Area

Step 2 – Activate the LP360 extension

Use Tools|Extensions in ArcMap and activate the LP360
(If it reports that no licenses are available, see Al Karlin or Theresa Mulroney to release a license.)

Activate the LP360 Toolbar (if not already activated) by using the View|Toolbars|LP360 (or right-click on the Main Toolbar and add the LP360 Toolbar)

Step 3 – Add LAS files to the ArcMap document

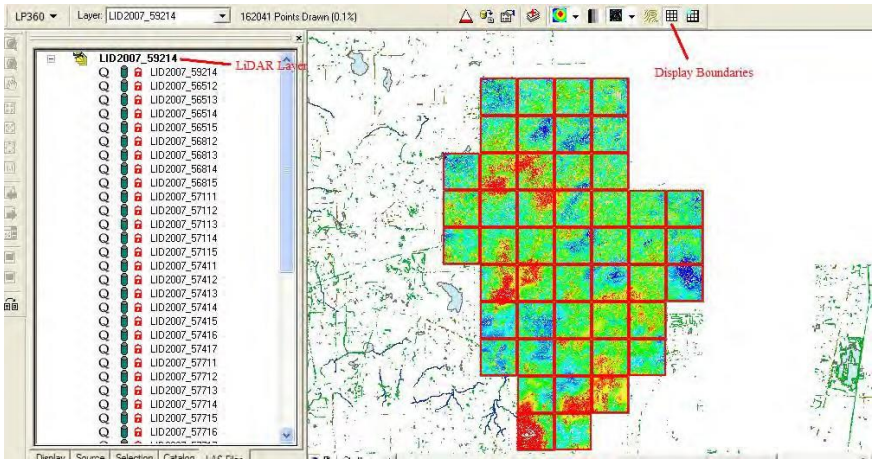
Using the LP360 "Add LiDAR Data Layer" from the LP360 Toolbar

Select and add all the LiDAR LAS tiles for the project.

Note: Las index/pyramid files were constructed in Task 1. These files DO NOT need to be rebuilt for this (or any future) step.

Step 4 – Load LAS data

From the "LAS Files" Tab in the Table of Contents, right-click on the LiDAR Layer, and load all LAS files. This will take a few minutes depending on the number of tiles. Make sure that the "Display Boundaries" is depressed on the LP360 Toolbar.



Step 5 – Set the Display characteristics of the LAS Data Layer

In the LAS Files Tab, right-click on the LiDAR layer and go to “Properties”, In the Layer Properties, click on the “Display” Tab,

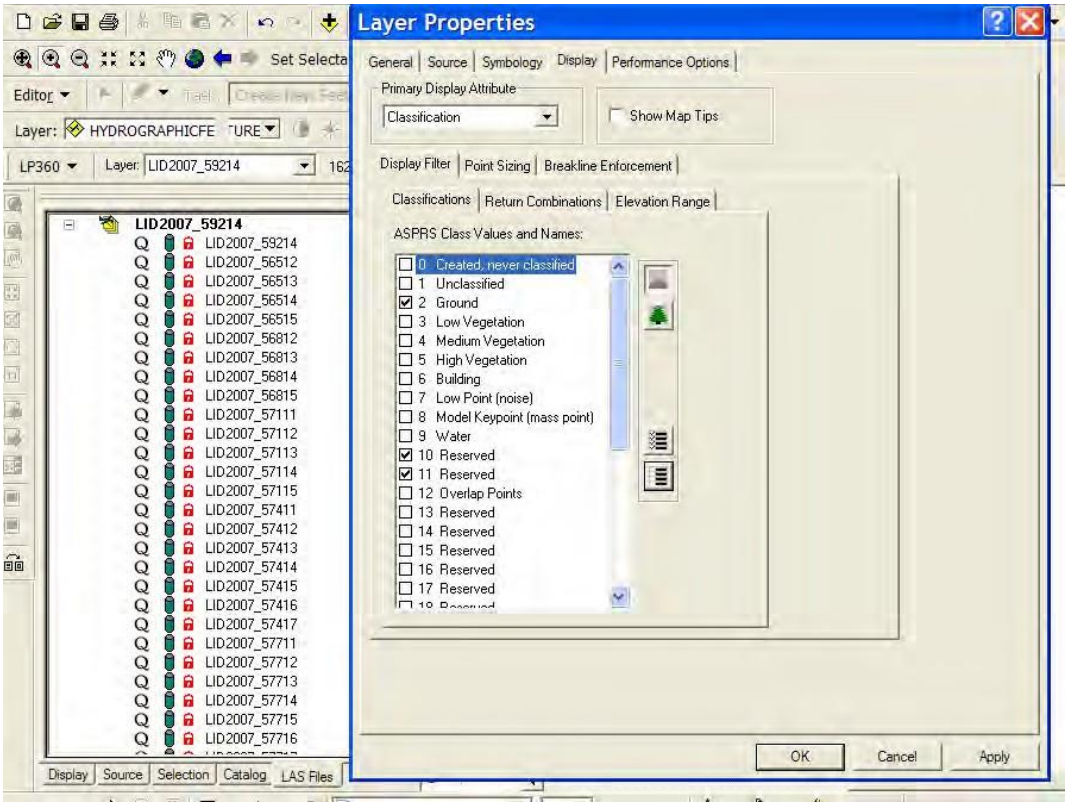
Clear all Classifications and
Check 2, 10, and 11

Note: You can also change the color, point size, etc. of the display using the “Symbology” Tab.

Recommended Workflow – Custom Filters

If not previous constructed, it is recommended that the reviewer construct Custom LP360 filters with the following characteristics:

All points – all LiDAR Classes on
SWFWMD Ground – LiDAR Classes 2, 10, and 11
ASPRS Ground – Class 2
Rooftop – Class 6
Water – Class 9
Marsh – Class 11
Ground Overlap – Class 12
Bridges/Overpass – Class 23
Bathymetric – Class 29
BufferedBreaklines – Class 30



Remember to Click on the “Apply” and then “OK” buttons to apply your modifications.

Step 6 – Visual Inspection

Checks:

1. Visually inspect the LAS data (zoom in, pan around, etc.) to verify that the ground (Class 2) points cover the entire extent of the project.
2. Loop through each of the following: ASPRS Ground, Rooftop, Water, Marsh (if appropriate) and Ground Overlap filters, coordinating with the QC shapefile outputfrom Task 1 to make sure that points are properly classified. [Alternatively, change the LP360 display from “By Elevation” to “By Classification” making certain that you have added the classifications to the Layer Properties.

Step 7 – Ground Check Point Accuracy Report

Ground accuracy reporting is performed using either ASCII XYZ text files or Esri Shapefiles containing the Northing (Y), Easting (X) and NAVD88 (Z) values for the Ground Check Points. There are three accuracies that are to be tested:

1. Fundamental Vertical Accuracy (FVA) – this is computed using only Ground Check Points (GCPs) that are on open, level, and hard surfaces. NSSDA accuracy at the 95% confidence level should have an RMSe <= 0.3’.
2. Supplemental Vertical Accuracy (SVA)– this is computed individually for points that occur in different habitat types.
   a. Supplemental Vertical Accuracy Type2 – GCPs occurring in high grass, not obscured

b. Supplemental Vertical Accuracy Type3 – GCPs occurring in scrub/high brush, may be partially obscured,
c. Supplemental Vertical Accuracy Type 4 – GCPs occurring in wetlands, forests, and other obscured areas.

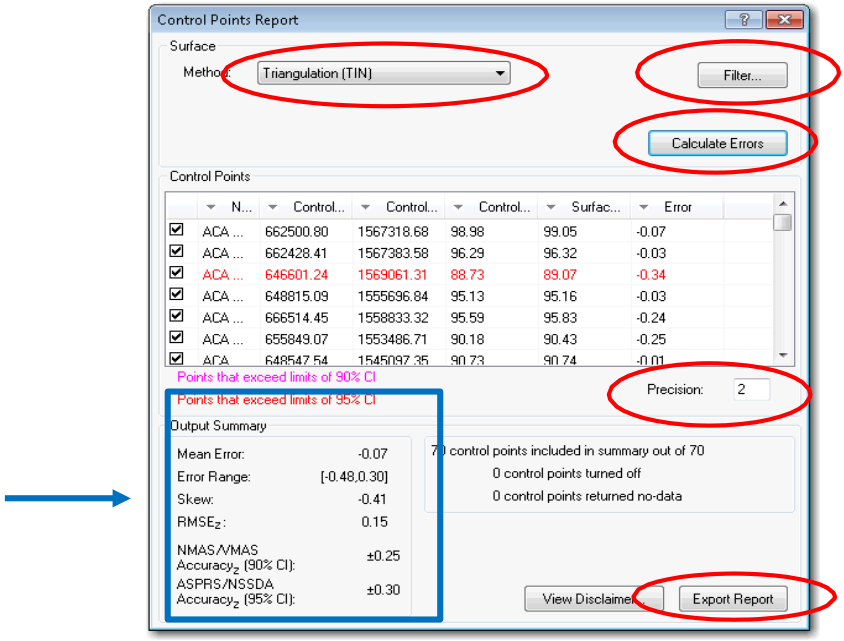
NSSDA accuracy at the 95% confidence level for each SVA type should have an RMSe <= 0.6'.

3. Consolidated Vertical Accuracy (CVA) – this is computed by using ALL of the GCP simultaneously. NSSDA accuracy at the 95% confidence level should have an RMSe <= 0.6'

To run the report, in ArcMap (with LP360)

1. Make shapefiles (or event themes) corresponding the accuracy being tested,
2. Load all of the LiDAR into the MXD,

3. Activate the LP360 Control Points Toolbar
4. Use the DropDown selectors to point to the shapefile/event theme holding the survey GCPs and the field holding their elevation,
5. On the Control Point Report, set the Filter to Class 2 (or 10 and 11 as appropriate)
6. Set the Method to "Triangulation (TIN)
7. Set the precision to 2 (it defaults to 3)
8. Run the report by pressing the "Calculate Error" button
9. Capture a screenshot of the report(s) and paste them into the CheckList Report. Alternatively, export the results as a text file for storage.
10. **REMEMBER** to capture one screenshot (or output individual files) for each vertical accuracy tested.



Step 8 –Flightline (Seamline) Relative Accuracy

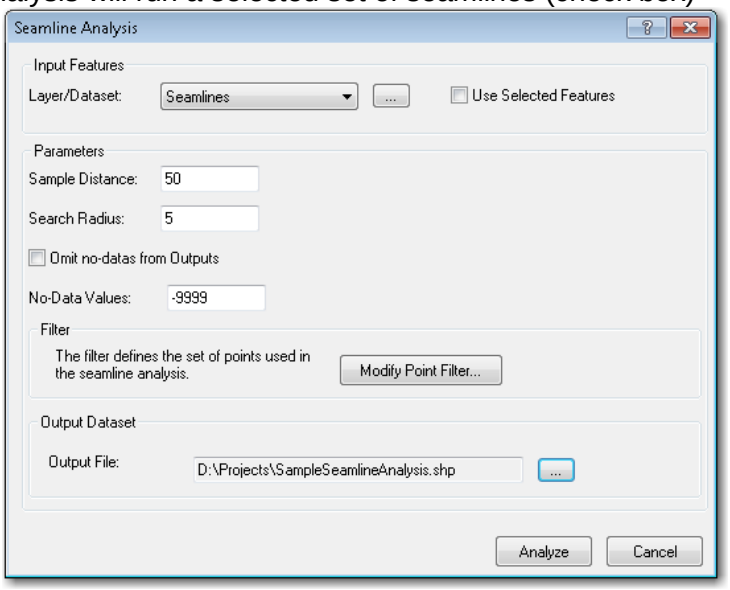
Flightline-to-flightline relative accuracy tests determine whether the flightlines are aligned to the same datum. This test compares the Ground Overlap from adjacent flightlines to each other. A special tool was developed in LP360 for performing this analysis. Similar tools are available in Merrick – MARS, DTS-EarthShaper, and PhotoScience-FOCUS.

This test uses the "APPARANTSEAMLINE" feature class in the Breakline GDB. These lines represent the midway point between overlapping, adjacent flightlines. If none is provided by the vendor, it is acceptable to heads-up digitize a "best estimate" of the apparent seam line.

The Seamline Analysis tool is located on the LP360 QA/QC toolbar:

Construct an ArcMap MXD with the following:

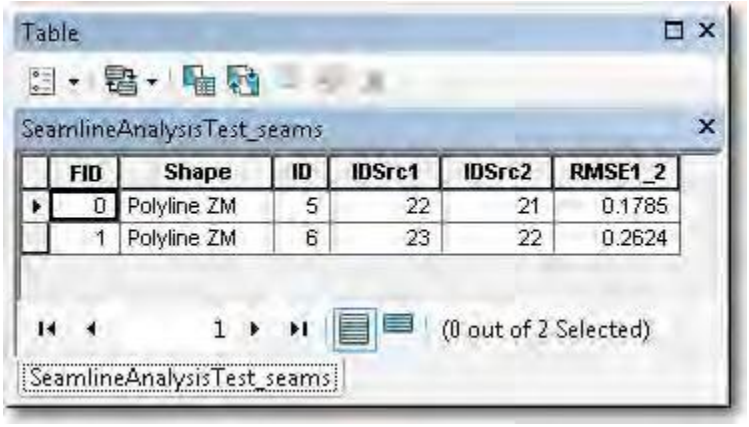
1. The LiDAR data for testing
2. The APPARANTSEAMLINE feature class (or your heads-up seamlines) 3- Activate the Seamline Analysis Tool and fill in the parameters as below
   a. Sample Distance = 50
   b. Search Radius = 5
   c. No-Data Value = -9999 (default is OK) (Alternatively, check the box to eliminate No-Data values from Output)
   d. Set the Point Filter to Class 2 (only!)
   e. Set a directory for the output shapefile
      Note: This analysis will run a selected set of seamlines (check box)



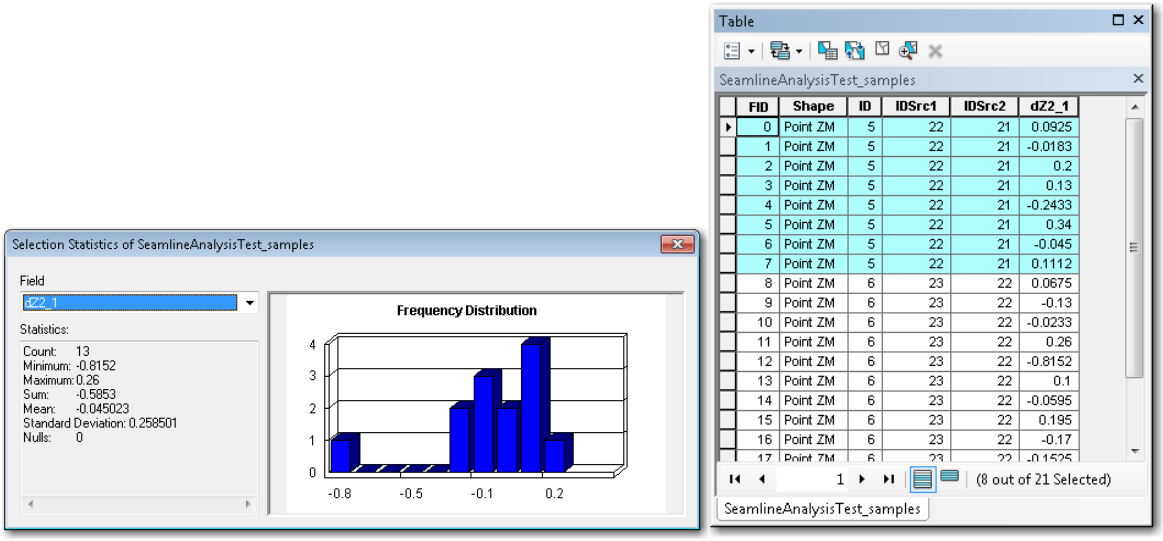
This analysis will generate two (2) shapefiles; a line shapefile and a point shapefile with the same name as the seamline file. When the analysis tool has completed, you will be prompted to add these to your MXD.

Checks:

1. Open the Table for the line shapefile. There should be one line for each seam and a comparison of the RMSe. The RMSe value <= 0.3 and should not vary greatly between seamlines, Ex.



2. The point shapefile requires a bit more analysis. Open the table and select the points based on the Source ID. As shown below, the analysis will compare IDSrc1 and IDSrc 2. Then compute the statistics for dZ2_1 and examine the distribution. The distribution is expected to be “normal.” Repeat for each seamline. If more than 5% are not “normal”, instruct the data provider to look for systematic error in the calibration

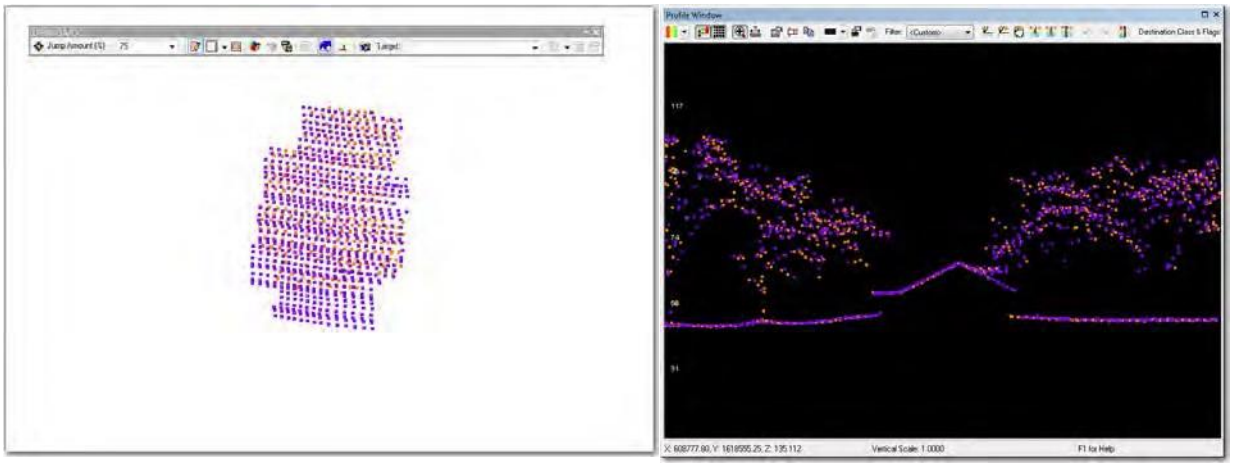


Step 9 – Horizontal Calibration

It is very difficult to analyze the horizontal calibration/displacement in a LiDAR dataset. This is generally a function of the “bore-sighting” process that the vendor should be doing before and after each day’s flight. In general, the vendor does not provide a daily bore-sighting report, because, if there is an error, the day’s flightlines will never calibrate with another day’s work and the flightlines need to be re-flown (anyway).

To check Horizontal Calibration in an ArcMap/LP360 session:

1 . Use the APPARANTSEAMLINEs to identify areas in the overlap area.
2. Color the points by Flightline (Point Source IDs) in the Layer Properties.
3. Increase the point size to a larger size (as needed).
4. Filter the points using the Class 6 (Rooftop) filter, so that you can see a rooftop that is in the area of overlap (in the example, this is a rooftop covered in two flightlines (purple and orange points).



5. Using the LP360 QA/QC toolbar, construct a profile perpendicular to the roof (in both directions) as to the right above.
6. Zoom-in to the peak of the roof, so that you can see the topmost points from both flightlines,
7. Using the LP360 measuring tool, measure the HORIZONTAL distance between close points from adjacent flightlines.
8. Test at least three buildings in each overlap area between adjacent flightlines. Select a few (two or three) and capture screenshots to be included in the Checklist Report.

   Checks: The horizontal distance between points from adjacent flightlines should be <= 3.15'. If the distance is greater than 6.5' for more than 5% of the comparisons, advise the vendor of a possible bore-sight issue.

Task 2b – Detailed Inspection of Breaklines

Breaklines are essential for constructing a "hydrologically correct" surface model. Although there are several issues that may occur, we are focusing on the three major issues:

- Topological errors (dangles and crossovers)
- Breaklines coincident with masspoints
- Breaklines missing Z-values (3D enabled)

Step 1 – Create Topological Rules and Checks

A ruleset (.rul) of the following topological rules has been constructed and can be found on: \\bkvfs03\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Topographic_Data_QC\QA_Tools\TopographicRuleSets

There are three (3) .rul files; one for LiDAR breaklines (Breakline_Rules_10Dec2012), one for contours (Contours.rul) and one for LiDAR Enhancement projects (Enhancement_Rules_10Aug10.rul).

To use these pre-constructed rulesets;

1. Open ArcCatalog and navigate to the Breakline GDB.
2. Create a new Topology.
3. Include all of the feature classes in the Topology.
4. Import the appropriate ruleset.
5. Note: This rule set can be modified in ArcCatalog and the updated/revised ruleset written out.

Alternatively, if you want to create the ruleset from scratch,

In ArcCatalog, navigate to the Breakline Geodatabase, and right-click on the TopographicInformation feature dataset, go to New|Topology, and create the following rules:

Note: All feature class names MUST strictly adhere to the nomenclature as indicated in Task 1 and below.

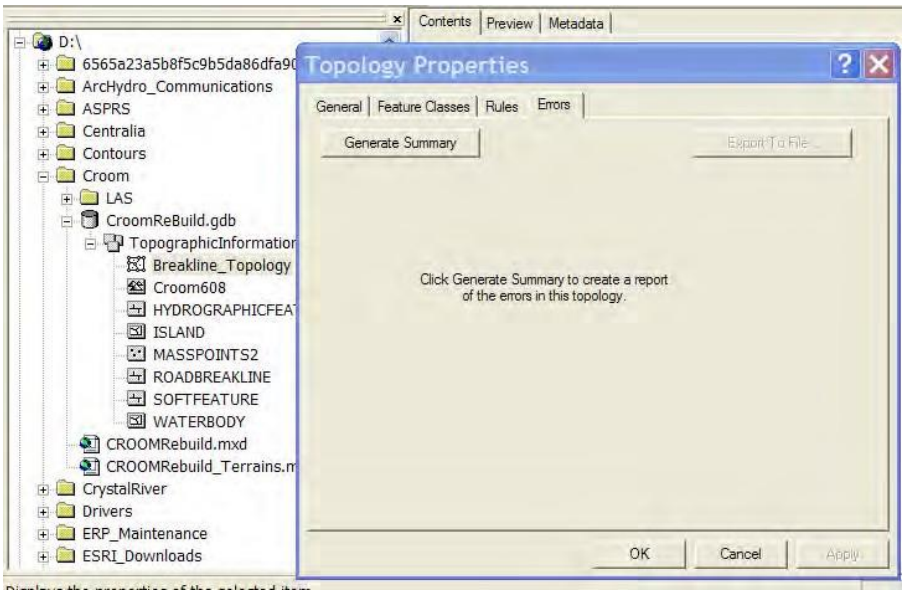
Breakline_Topologys
HYDROGRAPHICFEATURE must not overlap
HYDROGRAPHICFEATURE must not overlap with ROADBREAKLINE
HYDROGRAPHICFEATURE must not overlap with SOFTFEATURE
HYDROGRAPHICFEATURE must not self-intersect
HYDROGRAPHICFEATURE must not self-overlap
ISLAND must not overlap
ROADBREAKLINE must not overlap
ROADBREAKLINE must not overlap with SOFTFEATURE
ROADBREAKLINE must not self-overlap
ROADBREAKLINE must not be covered by Feature Class of HYDROGRAPHIC FEATURE
ROADBREAKLINE must not be covered by Feature Class of SOFTFEATURE
SOFTFEATURE must not overlap
SOFTFEATURE must not be covered by Feature Class of HYDROGRAPHIC FEATURE
SOFTFEATURE must not self-overlap
WATERBODY must not overlap

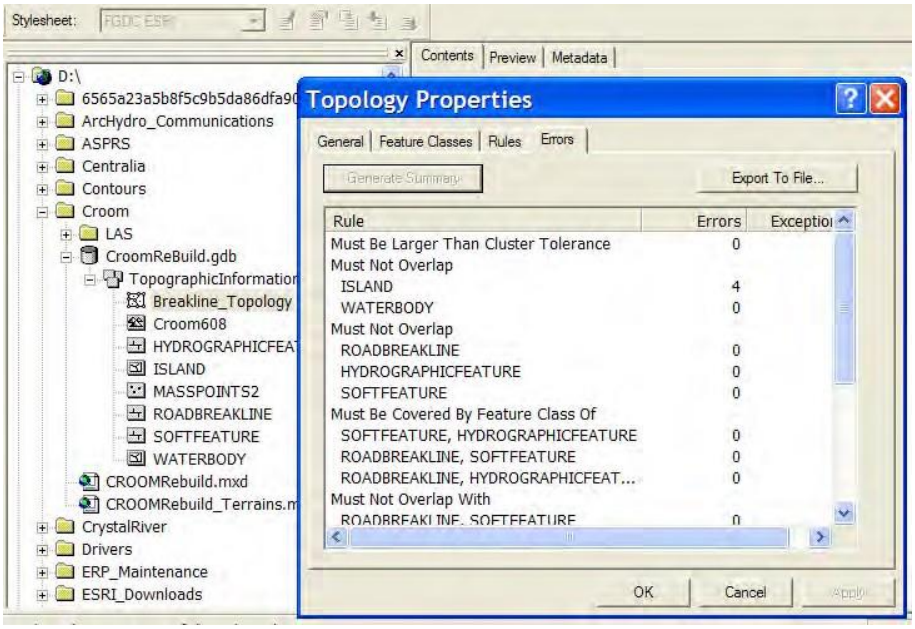
Step 2 – Apply/Validate the topology rules (in ArcCatalog)

Right-click on Breakline_Topology|Validate

Step 3 - Generate a Topology Report

Right-click on Breakline_Topology|Properties, click the Errors Tab, “Generate Summary” and then “Export to File” to a text file. Save the .TXT file in the same directory as the ArcMap document for the record.





Step 4 – Visual Inspection

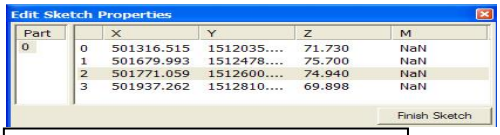
Inspect each error carefully to determine whether or not it needs to be repaired. Dangles are not critical unless they cross over other breaklines or extend into polygons. Overshoots (HYDROLOGICALFEATURE, ROADBREAKLINE, SOFTFEATURE) extending into ISLAND or WATERBODY will require repair. All places where lines of different feature classes overlap or are congruent will require replacement/repair.

Step 5 – 3D Feature Inspection

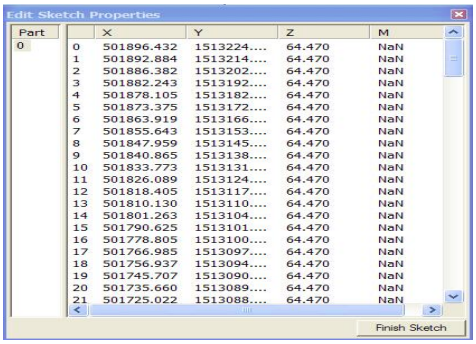
All breaklines should be 3D enabled as Polyline Z (or ZM) or Polygon Z (or ZM). In ArcCatalog, inspect the tables of each feature class to verify Z-enabling has been enforced. If not, enter a note into the Topology Report using any text editor.

Step 6 – Vertex Inspection

Once the 3D enabling has been determined above, start an editing session in ArcMap and select a feature from a 3D enabled feature class. Right-click on the selected feature open the "Properties" and inspect the Edit Sketch Properties. Verify that the Z field is populated. Repeat this for between 5 – 10% of the features in each feature class. Pay particular attention to the first and last nodes, THESE MUST HAVE non- NULL and non-ZERO VALUES. WATERBODY Z-values should be constant at all nodes. Note the feature class and record number of any records not meeting these criteria in the Topology report.



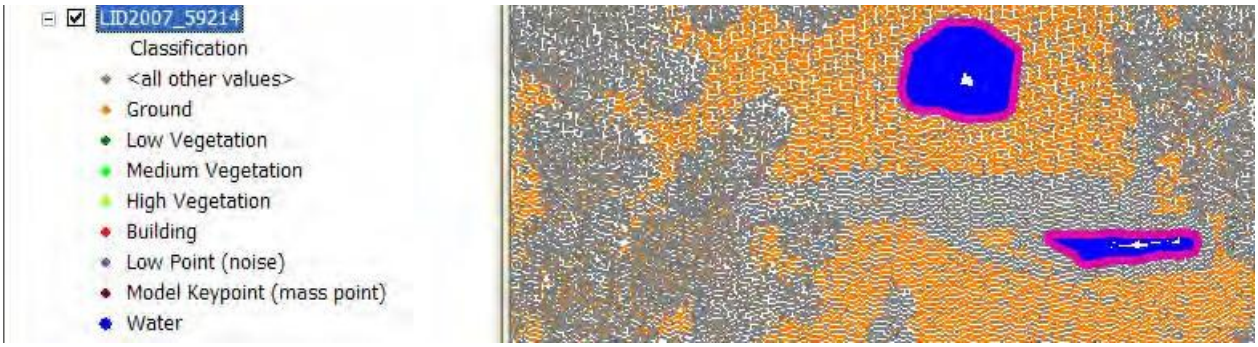
Line Z-values (above) and Polygon Z-values (right)



Step 7 – LiDAR Masspoints in Closed Waterbody Check

LiDAR mass points in closed water bodies should be placed into Class 9 by the LiDAR processor. Using the WATERBODY feature class and the classified LiDAR points visually inspect each water body. It may be necessary to adjust the display properties of LP360 to include the Class 9 points. It also may be helpful to add the SWFWMD Land Cover to the ArcMap document and define a query to display only the LEV1 = 5 (water) polygons. Remember that water bodies in the LiDAR and Land Cover may differ significantly depending on flight date. Flag all areas of error using the LiDAR_QC database.

Lidar data are colored by elevation and only Classes 2, 10, and 11 are visible. The purple polygons are WATERBODY features in the TopographicInformation feature dataset. Note that there are no LiDAR points within the water bodies.



The same area is shown as a classified LiDAR dataset and the Class 9 (Water) masspoints are shown in blue. Note that the water bodies contain only blue (Class 9) postings.

Task 2c – Detailed Inspection of the DEM with GlobalMapper

The DEM should be inspected for holes and other abnormalities which indicate that there are remaining errors in the breaklines and/or point cloud classification or elevations.

Typical errors, including holes and shadowing result from intersecting breaklines or masspoints that are coincident with breaklines. Terracing results from contour lines being interpolated into the DEM. Regular lines (horizontal and vertical) where there are no roads indicate that "tile lines" were interpolated into the DEM.

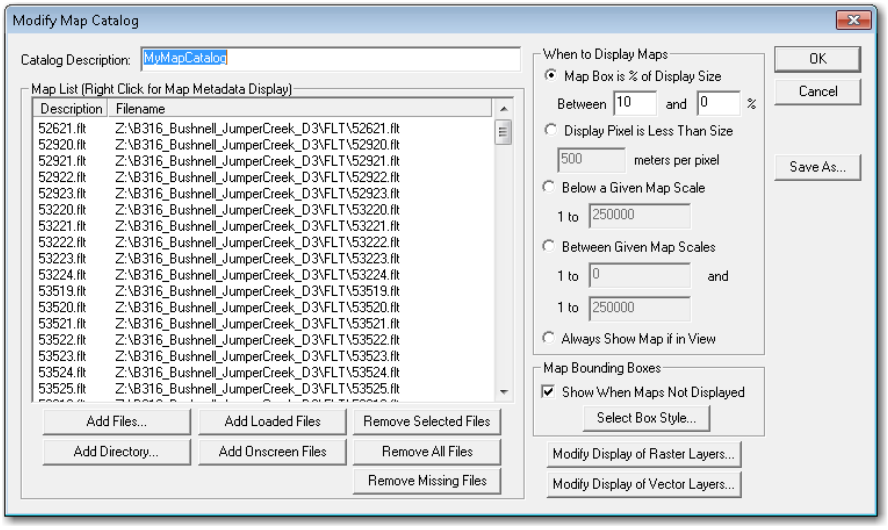
Although GlobalMapper can read many types of elevation data, including the Esri Grid format, this format is very inconvenient because every "data" file is named "W001001" and contained in a separately named folder. The Floating-Binary format is much more convenient because each DEM tile is represented by a family of files (.flt, .hdr, .prj, and .met), much like a shapefile. Most LiDAR processing programs will output the ,flt and dr files, and GlobalMapper will construct the .prj file using user-supplied input.

If the vendor did not provide the DEM tiles in .FLT format, use the "Grid to Float" tool in the DEM Tools, to construct FLTs.

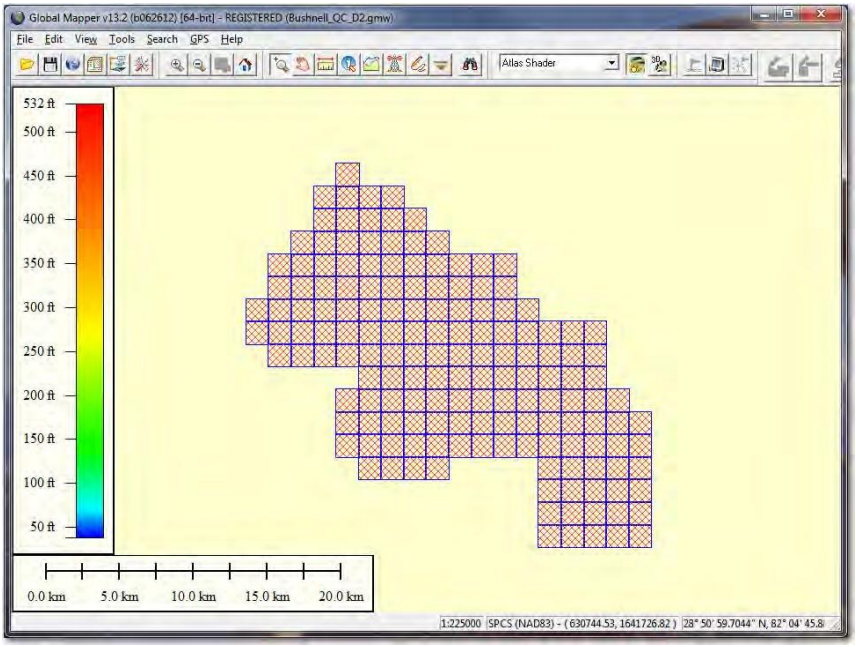
(Note, you can also use the "Float to Grid" tool to construct Esri Grids from .FLT binary files!)

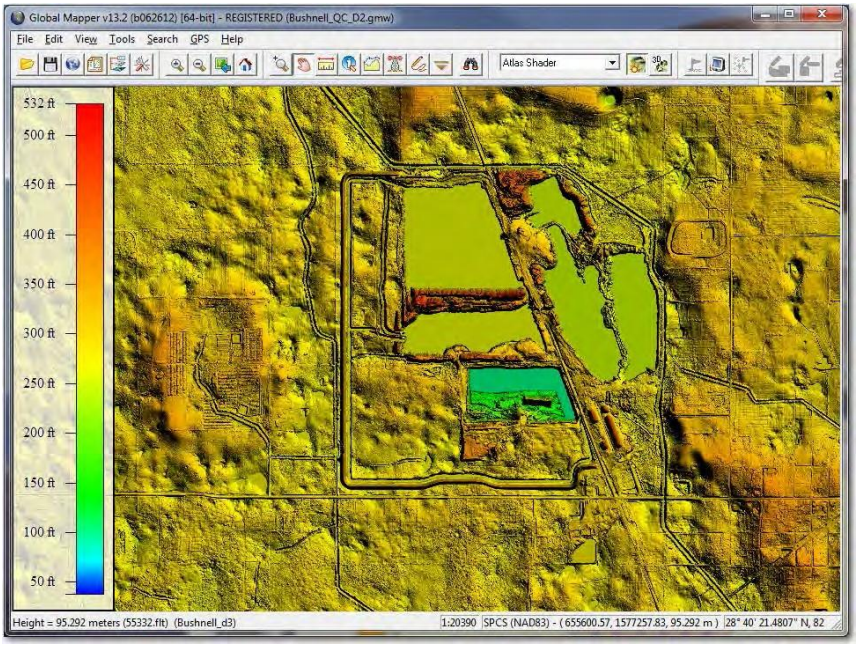
Step 1 - Construct a Map Catalog in GlobalMapper

1. Open GlobalMapper and choose File | Create New Map Catalog.
2. Navigate to a writable directory and provide a name for the Map Catalog.
3. Press the "Add Files" on the Modify Map Catalog dialog and select all the FLT DEM tiles.
4. (Note: you can also use the "Add Directory" button. You can experiment with the Display options or simple accept the defaults. Press "OK" when complete.
5. The map catalog will appear in the GlobalMapper Map window as a wireframe.



6. As you zoom-in, the DEM will be rendered.





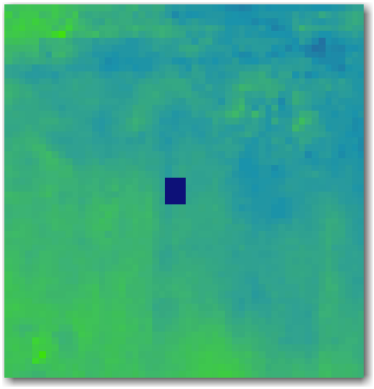
Note: The remainder of this procedure requires general familiarity with GlobalMapper and only illustrates specific recommendations for LiDAR QC.

Step 2 – Carefully Inspect the DEM

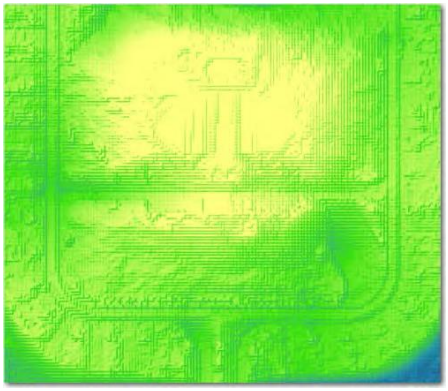
Set the scale to 1:2400 (or 1:3600 whichever you can see best), and systematically pan through the DEM. Remember that you can load imagery, and Esri vectors into the map for guidance.

Checks: Pay special attention for:

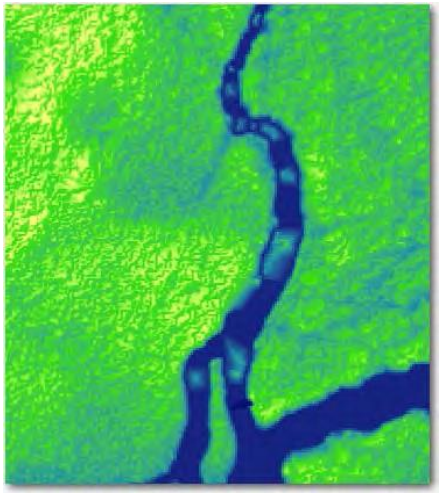
Divots (low spots) in the DEM:



Buildings in the DEM:



Non-Hydroflatteded Hydrofeatures:



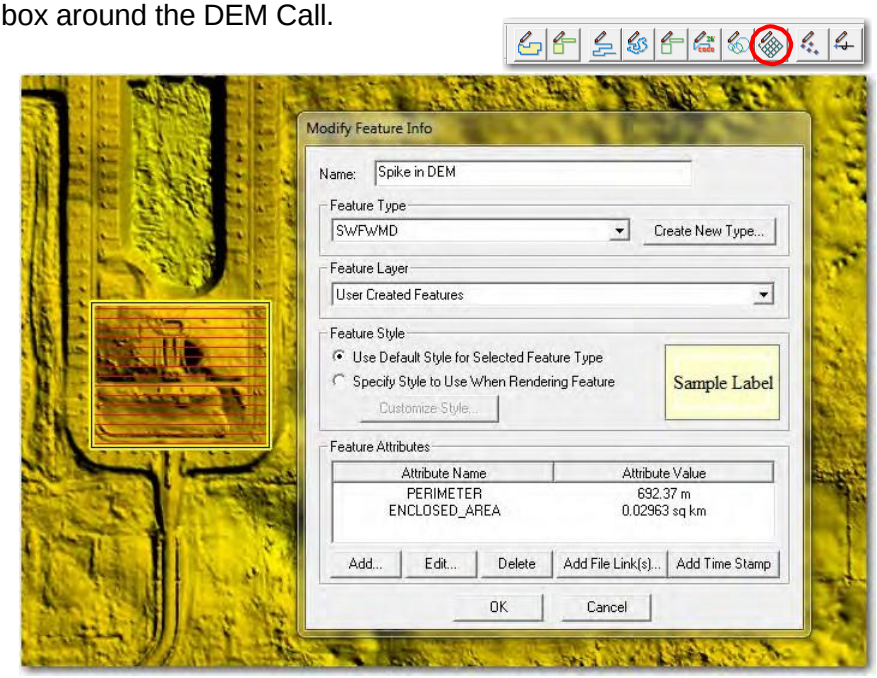
Remember that with GlobalMapper, you CAN see the DEM in 3D, so if there are questionable areas, open the 3D view to inspect. In this example below, from the nadir view I suspected high points were remaining in the DEM. They are confirmed by the 3D viewer.

Nadir View 3D View

Step 3 – Build a DEM Calls file in GlobalMapper

When you see an issue, draw a polygon around it using the digitizing tools. You will export these polygons as an Esri shapefile that can be brought into the QC GDB or sent to the vendor directly.

1 . Using the Digitizing tools (Create Rectangular/Square Area).
2. Draw a box around the DEM Call.

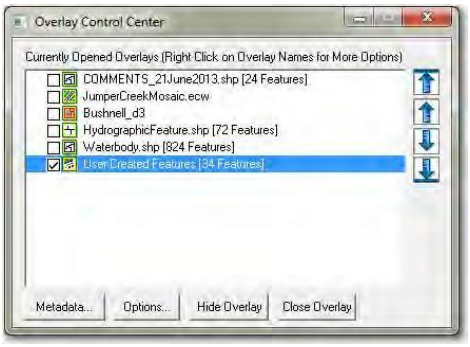


3. Use the “Create New Type”… to make a SWFWMD type. Choose appropriate symbology, etc. (This is only done the first time you make a polygon. Subsequently, SWFWMD will be the “default” and/or you can choose it from the list of types),
4. Enter a comment into the “Name:” box
5. Press “OK”
6. Repeat for all DEM calls.

Step 4- Export the SWFWMD DEM Calls

Once the DEM has been completely examined and the SWFWMD DEM Calls have been digitized:

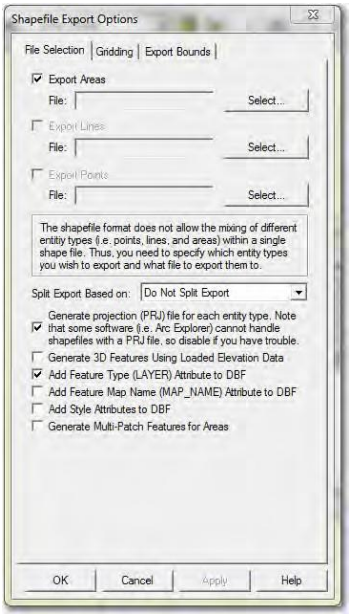
1. Turn off ALL layers in the Overlay Control Center EXCEPT the “User Created Features” (this layer shows the number of digitized polygons)



2. Use File | Export Vector Format and choose Shapefile.

3. Check the “Export Areas” box and use the file browser to name the output shapefile.

4. Inspect the output shapefile in ArcMap. Note: If you had other “types” in the User Define features layer, they will be exported also. You may need to select only the SWFWMD types and export them from the shapefile.



TASK 3 – ARCHYDRO CHECKS

This task requires the latest version of ArcHydro to be loaded onto the workstation.

Esri ArcHydro tools are used to check the DEM (and indirectly the laser elevations and breaklines) for compliance to the SWFWMD GWIS standards. It is only necessary to process the ArcHydro model through preliminary Catchments and SinkPoints. To accomplish this level of processing, a ModelBuilder Model has been constructed. It can be found on:

\\bkvfs03\DCB\Mapping-GIS\MGIS Standards\Aerial Topographic Mapping Standards\Topographic_Data_QC\QA_Tools\ArcHydro_Tools\SWFWMD_QC.tbx

Step 1 – Prepare the DEM

1. In ArcMAP (or ArcCatalog) use ArcToolbox to construct a Raster Mosaic of the DEM tiles. (Data Management Tools | Raster | Raster Dataset | Mosaic To New Raster).

   Use the following parameters:
   a. Spatial Reference – Florida State Plane West, NAD83/HARN, US Feet
   b. Pixel Type – 32-bit float
   c. Cell size – 5
   d. Number of Bands – 1

2. Add the Raster Mosaic to the MXD.
3. Start Spatial Analyst and use the Raster Calculator to calculate a new raster as: Int(((“32-bit DEMName”)+0.05)*10) and save it to a new DEM. This Integer DEM will be used or ArcHydro processing.
4. Add the SWFWMD_QC toolbox to your MXD.
5. Save the MXD in a writable directory.
6. Use the ApUtilities | Set Target Locations to create the ArcHydro Database. Simply by starting this tool, an ArcHydro GDB will be created with the same name as the MXD. It will produce a warning that a layers directory does not exist. Simply dismiss the warning.
7. Open the SWFWMD_QC toolbox and run the “Basic LiDAR QC” script, using the Integer DEM as the parameter.

It may take several hours for the ArcHydro processing to complete. The results will be placed into a GDB with one Feature Dataset (Layers) and the following feature classes:

Catchment (polygons)
SinkDA (polygons)
SinkPoly (polygons)
SinkPoint (points)

You will inspect the Catchments and analyze the SinkPoints.

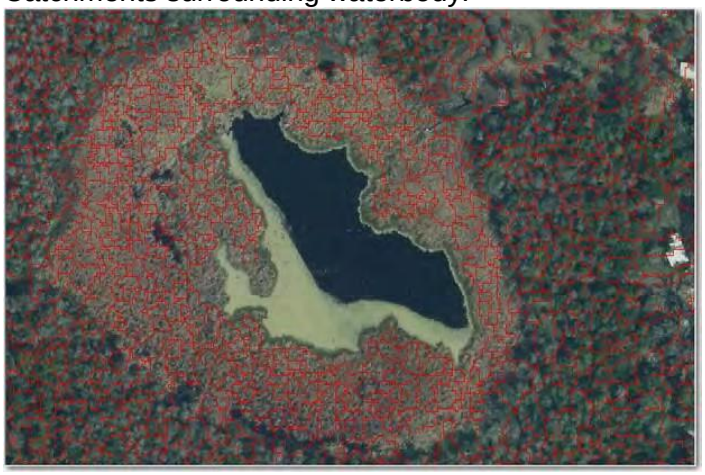
Step 2 – Review the Catchments

Catchments represent the areas around depressions that contribute water to those depressions. Catchments cannot traverse through water bodies; they MUST surround water bodies. Similarly, for roads with crowns, catchments cannot be going up and over the crown.

Add the CATCHMENTS into a MXD and add in appropriate year imagery and inspect. This does not have to be a detailed inspection. Pan around looking for catchments that go through waterbodies (not drains). On major paved roads, the catchments should break along the centerline.

Catchments breaking along road crown:

Catchments surrounding waterbody:



Step 3 – Analyze the SinkPoints

Waterbody breaklines must be both Z-locked (ie. level pool) and the lowest elevation in the vicinity. Hence, each waterbody MUST contain a SinkPoint (the lowest elevation in a catchment.

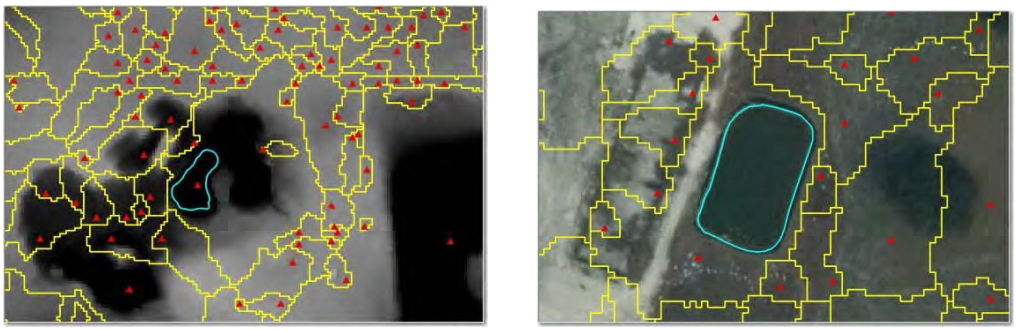
To test that each waterbody has a sinkpoint,

1. Load the WATERBODY breaklines and the ArcHydro SinkPoints into an MXD.
2. Use the "Select by Location" and
   a. Select from WATERBODY (=Target Layer)
   b. Source Layer = SinkPoint
   c. Contain the Source Layer Feature
3. Open the WATERBODY table. All WATERBODY polygons should be selected.
4. If some are not selected, reverse the selection and write those out to a shapefile.
5. Turn on (and make hollow) the SinkDA polygons.
6. Examine each waterbody (from #4) and determine whether it is really missing a sinkpoint and whether there is only one SInkPoint in the SinkDA containing the waterbody.

Checks:

1. If there are multiple SinkPoints within the SinkDA and/or none are within the waterbody, have vendor reevaluate elevations in that SinkDA (there are low points in the LiDAR that need reclassifying);
2. If there is not a SinkPoint within the waterbody, BUT there is only one (1) SinkPoint in the SinkDA, advise the vendor to adjust (lower) the elevation of the waterbody.

Waterbody: Blue, SinkPoint: Red, SinkDA: Yellow



Examples: Left – re-evaluate elevations in the SinkDA to prevent catchments inside of catchments; right – lower waterbody elevation to make a sink in the water body (catchment)

TASK 4 – SUPPORTING DOCUMENTATION REVIEWS

Task 4a – Metadata

Review the metadata for all Feature Classes in the TopographicInformation GDB. When this GDB is supplied to the provider, the feature classes contain "generic" SWFWMD metadata.

Checks:

1 . The vendor edited the project name, extents, dates, and times,
2. The contact information is correct,
3. The methods describe how the data were processed (processing steps)
4. Use the USGS Metadata Parser as needed to assure FGDC compliance
   http://mrdata.usgs.gov/validation/
5. Typographic errors

Task 4b – Survey Reports

Checks:

1. Make sure that the paper document is signed and sealed by a Florida Registered Surveyor. Check that the seal will be visible in a photocopy/scan of the document.
2. Make sure that the document contains the CORRS/NGS datasheets for the control monuments used for the project.
3. Make sure that the horizontal AND vertical accuracies are addressed and in agreement with the project specifications.
4. Make sure that there is sufficient detail in the tables, etc. that we could verify any data and/or methodology as needed.
5. Typographic errors.

Task 4c – Hash Codes

Checks:

1. Both Excel and ASCII files containing SCA codes for all files are present and machine-readable, and
2. The header information has been filled-in correctly

Appendix A SWFWMD LiDAR - Topographic Database Design – Dec 2012 (rev)

Feature Classes:

Simple feature class
ACCURACYCHECKPTS

Geometry Point
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
POINTID	String	Yes					12
DESCRIPTION	String	Yes					250
X_COORD	Double	Yes			0	0	
Y_COORD	Double	Yes			0	0	
Z_COORD	Double	Yes			0	0	
LANDCOVER	String	Yes					36
ELLIPSOIDHEIGHT	Double	Yes			0	0	
NAVD88HEIGHT	Double	Yes			0	0	
TYPE	String	Yes		dCHECKPOINTTYPE			15

Simple feature class
ACTUALFLIGHTLINES

Geometry Polyline
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
FLIGHTDATE	Date	Yes			0	0	8
DIRECTION	String	Yes					50
FLIGHTLINENUMBER	String	Yes					50
SHAPE_Length	Double	Yes			0	0	

Simple feature class
APPARANTSEAMLINES

Geometry Polyline
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
FLIGHTLINENUMBER	String	Yes					25
SHAPE_Length	Double	Yes			0	0	

Simple feature class
COASTALFEATURE

Geometry Polygon
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

Simple feature class
CONNECTOR

Geometry Polyline
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
SHAPE_Length	Double	Yes			0	0	

Simple feature class
CONTOUR_1FT

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
CONTOUR_ELEVATION_MS	Double	Yes			0	0	
CONTOUR_TYPE_DESC	String	Yes					50
DATESTAMP_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	

Simple feature class
CONTOUR_2FT

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
CONTOUR_ELEVATION_MS	Double	Yes			0	0	
CONTOUR_TYPE_DESC	String	Yes					50
DATESTAMP_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	

Simple feature class
FLIGHTPLAN

Geometry Polyline
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
FLIGHTDATE	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	

Simple feature class
FOOTPRINT

Geometry Polygon
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
CELLNUM	String	Yes					15
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

Simple feature class
GROUNDCONTROL

Geometry Point
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
POINTID	String	Yes					12
DESCRIPTION	String	Yes					250
X_COORD	Double	Yes			0	0	
Y_COORD	Double	Yes			0	0	
Z_COORD	Double	Yes			0	0	
ELLIPSOIDHEIGHT	Double	Yes			0	0	
NAVD88HEIGHT	Double	Yes			0	0	

Simple feature class
HYDROGRAPHICFEATURE

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
Shape_Length	Double	Yes			0	0	
HYDROTYPE	String	Yes		dHYDROTYPE			50

Simple feature class
IMPERVIOUSFEATURE

Geometry Polygon
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
Date_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	
DESCRIPTION	String	Yes		dIMPERVIOUS			25

Simple feature class
ISLANDS

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	

Simple feature class
LOWCONFIDENCEAREAS

Geometry Polygon
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

Simple feature class
MARSH

Geometry Polygon
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DEPTH_MS	Double	Yes			0	0	
DATE_DT	Date	Yes			0	0	8
SOURCE	String	Yes		dSOURCE			50
DATA_QUALITY	String	Yes		dQUALITY			50
Shape_Length	Double	Yes			0	0	
Shape_Area	Double	Yes			0	0	

Simple feature class
OVERPASS

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
Shape_Length	Double	Yes			0	0	

Simple feature class
ROADBREAKLINE

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
SHAPE_Length	Double	Yes			0	0	

Simple feature class
SOFTFEATURE

Geometry Polyline
Contains M values No
Contains Z values Yes

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
Shape_Length	Double	Yes			0	0	
SOFTTYPE	String	Yes		dSOFTTYPE			50

Domains

Coded value domain

dACCURACY

Description Relative Accuracy
Field type Confidence
Split policy String
Merge policy Default value
Default value

Code	Description
HIGH	High confidence in spatial accuracy of feature
LOW	Low confidence in spatial accuracy of feature

Coded value domain

dLCATYPE

Description Low Confidence Area
Field type Types
Split policy String
Merge policy Default value

Code	Description
CYPRESS	Cypress heads
FRESHWATERWET	Fresh water wetlands
MANGROVE	Mangrove swamp
PALMETTO	Palmetto
PINE	Pine plantation and forest
SALTMARSH	Salt marsh other than Mangrove
SAWGRASS	Sawgrass marsh
UPLANDSCRUB	Upland scrub

Coded value domain

dIMPERVIOUS

Description Impervious Surface
Field type types
Split policy String
Merge policy Default value
Default value

Code	Description
Roads	Roadways
Rooftops	Building Rooftops
Parking	Parking Lots for major structures
Sidewalks	non-residential sidewalks
Misc	Other impervious surface, ex. clay ball fields, limestone surfaces

Coded value domain

dCHECKPOINTTYPE

Description
Field type String
Split policy Default value
Merge policy Default value

Code	Description
HOR	Horizontal Accuracy Check Point
VERT	Vertical Accuracy Check Point
COMBINED	Horizontal and Vertical Accuracy Check Point

Coded value domain

dLANDCOVERTYPE

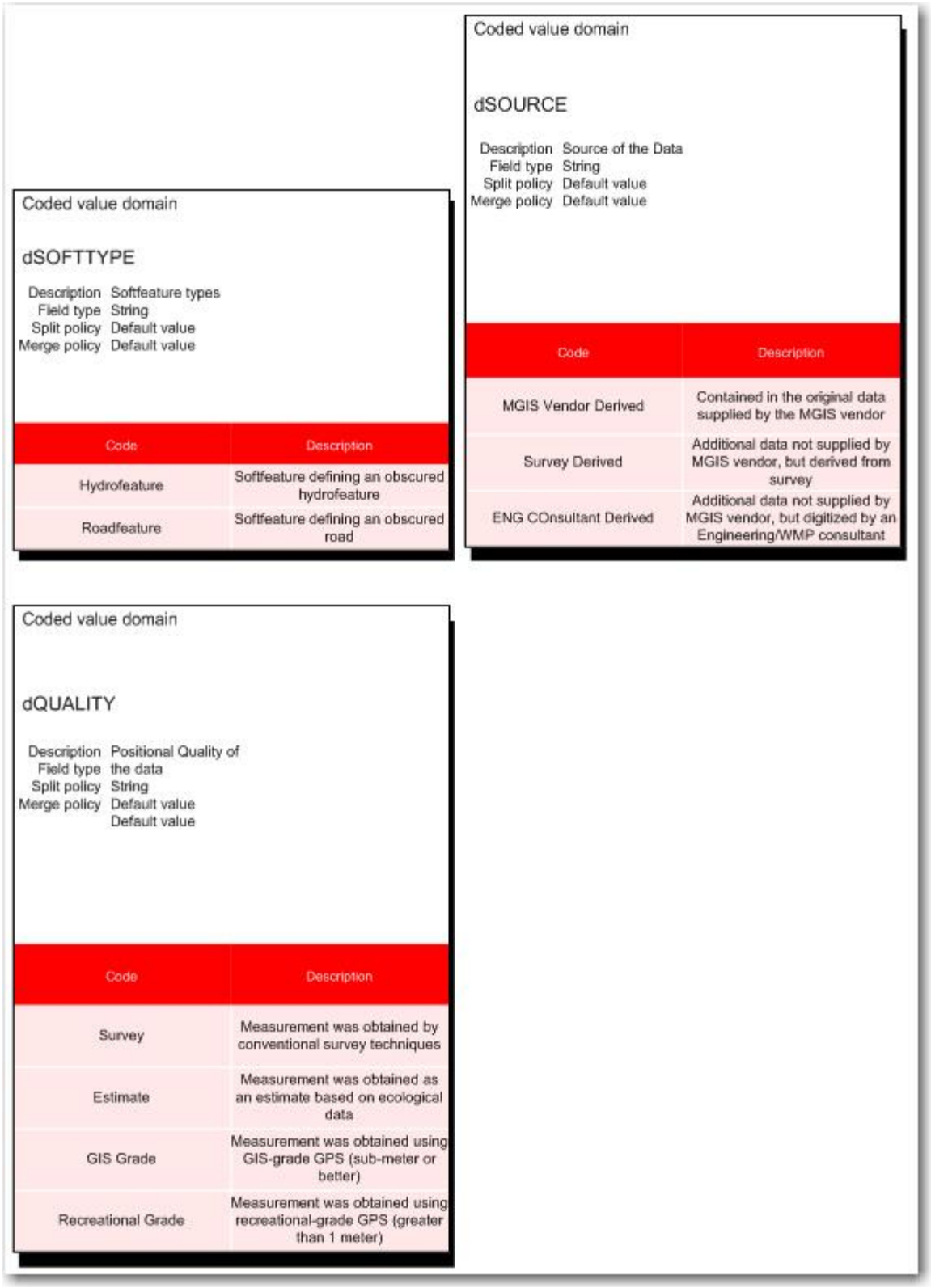
Description Point Type
Field type String
Split policy Default value
Merge policy Default value

Code	Description
1	BARE-EARTH AND LOW GRASS
2	BRUSH LANDS AND LOW TREES
3	FORESTED AREAS FULLY COVERED BY TREES
4	URBAN AREAS

Coded value domain
dHYDROTYPE

Description Classification of
Field type Hydrofeature
Split policy String
Merge policy Default value

Code	Description
CENTERLINE	Centerline of Conveyance
TOB	Top of Bank
TOS	Toe of Slope



NOTE: There are no Relationship classes in the GeoDatabase

Appendix B SWFWMD LiDAR –Data File Structure

The LiDAR data files are maintained on a SWFWMD fileserver with the following structure:

Parent Directory Name: \TerrainData

Under the parent directory, several levels of sub-directories are defined in a hierarchical manner as described sequentially below:

Level 1 \EnhancedLiDAR – for LiDAR that have been reprocessed,
\LiDAR – for non-reprocessed LiDAR surveys

Note: The file structure for these two directories is the same, so only the \LiDAR directory is further defined.

Level 2\FY2XXX – Describes the Fiscal Year of funding for the LiDAR Survey
Level 3\PIMS#_ProjectName
Level 4Data folders:

\Breaklines – contains the Breakline GeoDatabase, contours, etc.
\Compressed_LAS – contains zLAS (or LAZ) compressed LAS files
\Contours – contains cartographic contours (when available)
\DEM – contains the Digital Elevation Model(s) derived from the LiDAR
\Mosaic – contains a mosaic of the DEM tiles
\Tiles – contains individual DEM tiles (5000’ x 5000’ tiles)
\FLT (optional) – for binary FLT versions of the DEMs
\HashFiles – For the Secure Hash information
\Imagery – for the Mission specific imagery (when collected)
\InstrumentData – for the raw laser ranges, GPS and IMU data
\LAS –for the processed LAS data files
\Metadata – for all associated metadata
\SurveyReport – for all third-party survey reports
\SWFWMD_QC – for the files reviewing the internal (SWFWMD) QC

NOTE: Older projects may be missing folders or conventions may have changed.

Creator: T. Mulroney

Date 06/26/13
Revision # V3
Date Last review: 4/19/2016

Loading New Vector Spatial Data to SDE

Purpose

This document defines the Southwest Florida Water Management District's (District) vector spatial data loading standards that are associated with its enterprise geographic information system (GIS). These standards and procedures are to be followed when creating new data layers that are imported into Esri's Spatial Data Engine (SDE).

Scope

The GIS Database & Server Administrators are responsible for the loading, maintenance, and updating of over 200 vector data layers into the District's enterprise SDE instances. These loading standards and procedures have been developed to allow for a consistent and efficient process. Deviation from these procedures may only occur with permission from the GIS Database & Server Administrators.

Standards

A personal Geodatabase (pGDB), file Geodatabase (fGDB), or shapefile are acceptable data types for importing into SDE. Please refer to SDE Physical Object Naming Guideline.docx for data layer naming, attribute column naming, and other data naming conventions. Please refer to SDE Spatial Reference.docx for the spatial reference standards for the data.

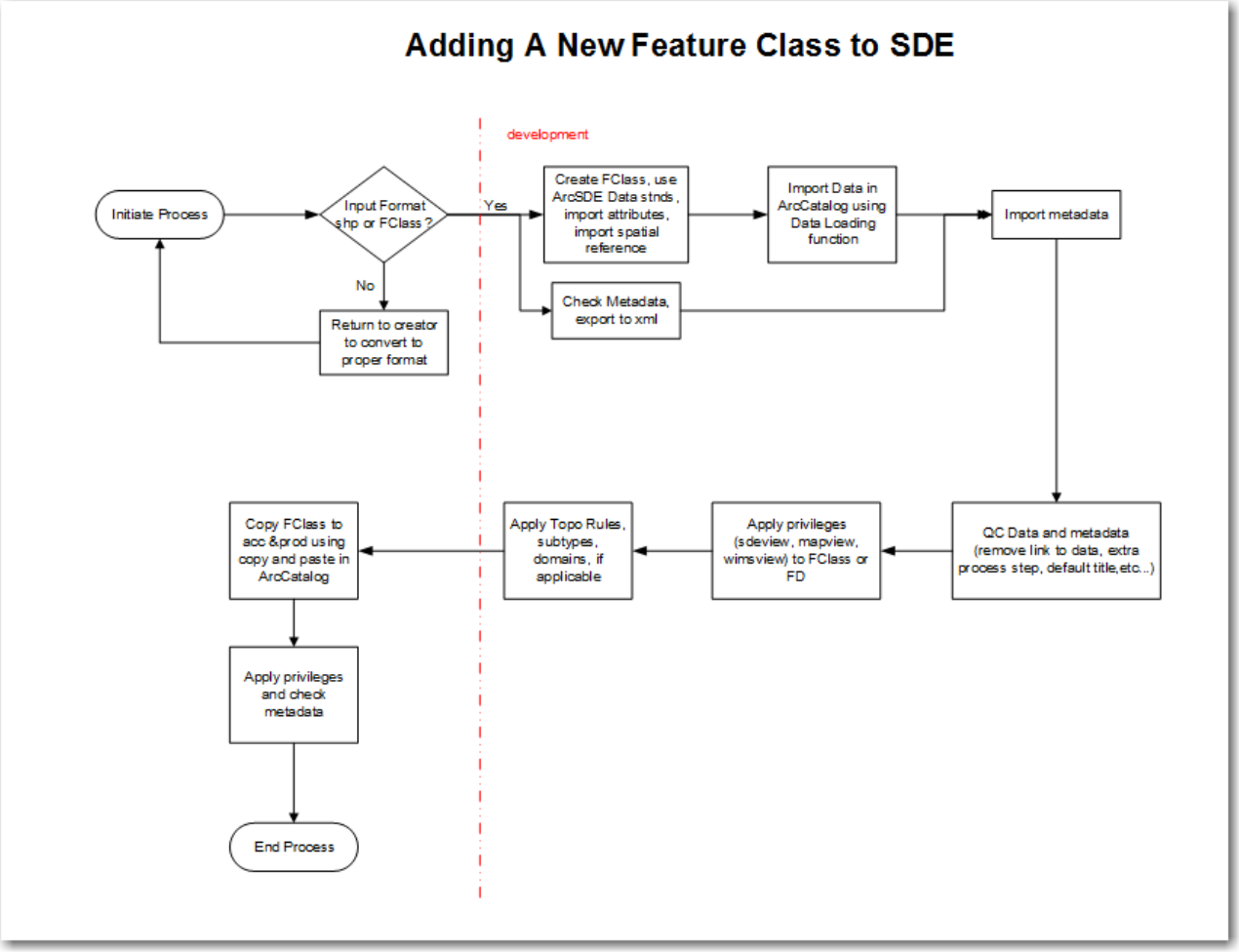
Every data layer is required to have complete metadata. Please refer to GIS Data Metadata.docx for metadata standards.

The feature classes are stored with High Precision using ST_Geometry spatial type (SRID2882).

Procedures

Refer to the following diagram for the procedure to loading new data into SDE. Complete the Updating or Adding data to SDE 2016.xlsx table during the loading process.

Adding A New Feature Class to SDE



Prior to loading new data into SDE, review the GIS Applications Affected by Feature Classes.docx to determine if GIS applications should be updated. After loading into SDE, create stats on the feature class or table. This is done using ArcCatalog and NOT TOAD. This is a change with Oracle 12C. In ArcCatalog, right click on the feature class or table and select Analyze. Also preview the feature class in ArcCatalog. This helps build the spatial domain for the feature class.

References
SWFWMD Guidelines:

SDE Physical Object Naming Guideline.docx

GIS Data Metadata.docx

SDE Spatial Reference.docx

GIS Applications Affected by Feature Classes.docx

Maintaining Reclaimed Water Data

Purpose
The purpose of this document is to provide a standard operating procedure for editing the District's reclaimed water layers.

Scope
The Mapping and GIS (MGIS) section is responsible for maintaining and updating the District's reclaimed water layers. This document was written to describe the editing process and provide guidelines and detailed instructions for editing the reclaimed water layers.

Background
The District began collecting reclaimed water information in the late 1990's and converting it into an electronic database (a single coverage) using ArcEdit software. Early versions were digitized using an Altec digitizing table. The reclaimed water features were hand-drawn on a USGS 7.5 minute quadrangle map provided by the source utility, or by District staff. More recent versions were also digitized manually using ArcView 3.2 with street layers as a guide. Since 2001, reclaimed water features have been digitized using Digital Orthophoto Quarter Quads (DOQQs) as a background source. Currently, the reclaimed water layers are maintained in an ArcSDE geodatabase. Features are provided in electronic form by the utilities that have a GIS system.

In the past, the specifications for reclaimed water GIS deliverables (for project completion/close-out) allowed for various formats: paper map, USGS 7.5 minute quadrangle map with hand-drawn lines, CAD data, GIS data (ESRI coverage or shapefile). Current specifications for reclaimed water projects require GIS data (geodatabase).

Schedule:
Reclaimed water feature classes are updated in the SDE database upon completion of a project. Also, projects that are in a phase prior to completion (proposed, design/construction) will also be entered and updated in the SDE database. Updates usually take place approximately twice per year but can be performed as needed.

Process:
Before final payment is made to the cooperator, GIS data of the reclaimed water project/infrastructure must be submitted to the MGIS section of the SWFWMD as specified in the Reclaimed Water Specifications document (see link below). This must include attribute information.

U:\Fin\Contr_Purch\Exhibit A for Reclaimed Water.doc

Final payment is made (by the District's project manager) to the cooperator when the GIS files have been approved by a MGIS staff member and the Water Supply Section's project manager.

Standards
Reclaimed water lines are placed in their actual location based on GIS deliverables/as-builts or by consulting with the District's project manager. If their exact location is not known then they should be placed along road right-of-ways until more accurate data becomes available.

Treatment plants (point features) are usually visible on the DOQQs and placed in their actual location using the DOQQs.

Storage facilities (point features) are also located using DOQQs. Storage tanks and ponds are usually visible on DOQQs and placed in their actual location when visible. If their exact location is not known (not constructed yet), consult with the District's project manager to get an approximate location.

Aquifer Storage and Recovery wells (ASR; point features) are placed in the general area of the ASR well, but often cannot be accurately placed due to the difficulty of locating the well/storage system on DOQQs. If necessary, get an approximate ASR location from the District's project manager.

Metadata is updated when a new field or new value is added or modified. Metadata is typically not updated when features and attributes are added/modified unless deemed to be significant enough of a modification that it should be noted in the metadata.

Guidelines
Most public supply reclaimed water systems are included in the SDE database, but not all. All reclaimed water projects that are cooperatively funded by the District should be included in the SDE database. This includes transmission mains greater than 4" in diameter and storage facilities. Residential lines (generally 2" or less in diameter) are typically not funded by the District, therefore are not generally included in our GIS layers, although there are exceptions, such as Hillsborough County Utilities. There are some private utility companies included in our layer, most of which serve a single user, such as a golf course.

Treatment plants are not cooperatively funded by the SWFWMD, but are the source of the reclaimed water. Treatment plants included in the database should have a reuse capacity of 100,000 gallons/day or greater. Prior to January of 2006, the minimum reuse capacity was 1 million gallons/day.

Storage facilities are also digitized as a separate layer. The District provides cooperative funding for these as well.

Procedures
All editing is done in ArcMap utilizing an ArcSDE versioned editing environment. The four reclaimed water feature classes are as follows:

1. *RECLAIMEDWATERTREATMENTPLANTS*
   Wastewater treatment plants that produce reclaimed water
2. *RECLAIMEDWATERSTORAGE*
   Storage facilities for reclaimed water
3. *RECLAIMEDWATERLINES*
   Reclaimed water lines / transmission mains

4. *RECLAIMEDWATERREGIONALLINES*
   Regional reclaimed water lines / transmission mains

Scenarios which can prompt updating the reclaimed water (RW) layers:

1. A reclaimed water Cooperative Funding project is either under consideration by District staff or is in the design/construction phase. In either case, a utility will not have created GIS data for the project. In this scenario, the Water Supply Section's project manager will work with the MGIS staff member to enter the reclaimed water into the SDE database. For new features (points or lines) this involves digitizing the features in ArcMap and populating the necessary attributes. In some cases, the update(s) may just be a status/attribute change of features already in the databases (i.e. from "Proposed" status to "Design/Construction" status).
2. The reclaimed water project has been completed and the utility is required to provide the District with GIS "as-built" data to be used to update the reclaimed water layers. In this scenario, once the deliverables are found to be satisfactory, the new data will replace any pre-existing features that were entered for that specific project. In an ideal scenario, the editor would delete the old data (from the SDE feature class) based on the Cooperative Funding project number (e.g. N344) and then copy/paste the features from the deliverables into the SDE feature class being edited and then update any attributes in the newly copied features.

Establishing the initial ArcSDE Database Connection for editing reclaimed water data in a versioned editing environment:

Note: The steps below are only required to be performed once, to establish the database connection used for versioned editing.

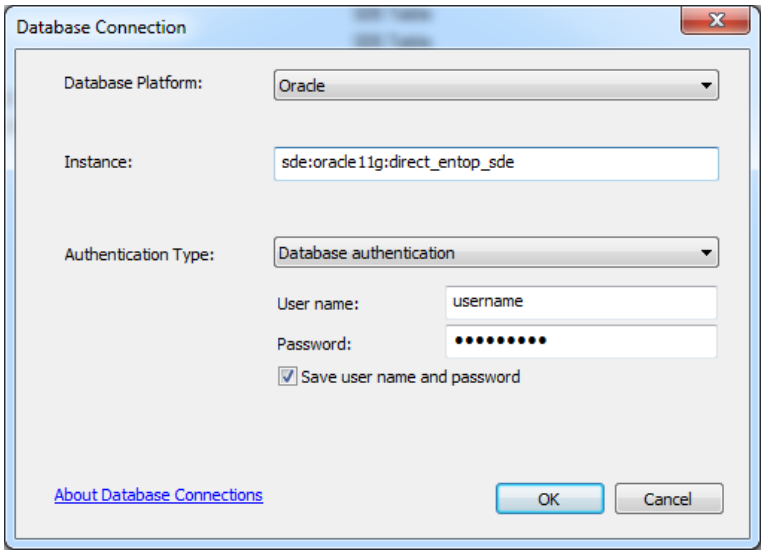
1. Go to ArcCatalog > Database Connections > Add Database Connection Enter the following information:

   Database Platform: *Oracle*

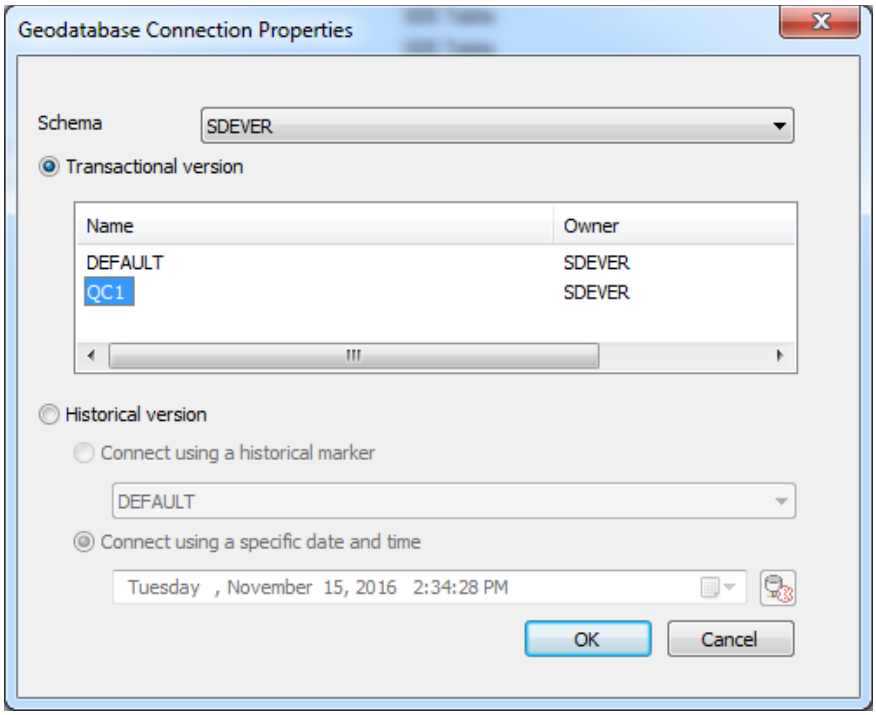
   Instance: *sde:oracle11g:direct_entop_sde*

   Authentication type: *Database authentication*

   NOTE: User-specific accounts are now used for versioned editing of reclaimed water data. The user name and password for a new SDE connection will have to be set up/coordinated with the GIS Database Administrator.



2. Click OK.
3. Right click on the new geodatabase connection and choose *Geodatabase Connection Properties*.
4. Change the Schema drop-down from *SDE* to *SDEVER*.



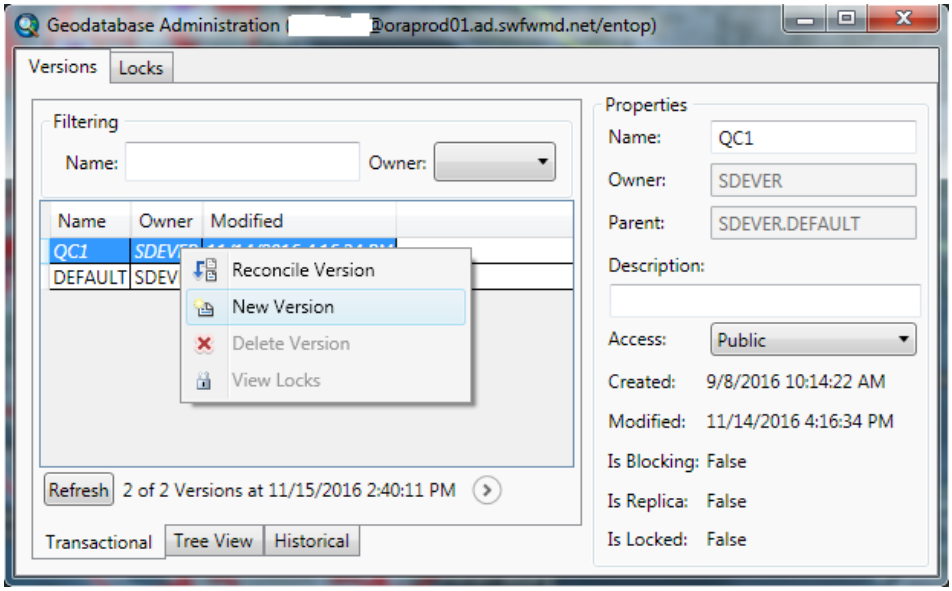
5. Click on OK and close ArcCatalog.

The following is the detailed editing process:

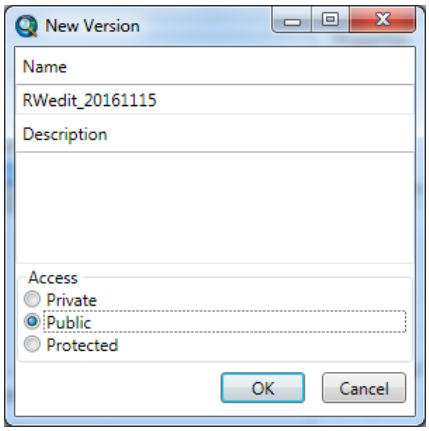
1. Open an ArcMap project, click Add Data and navigate to the SDE Database Connection that has been established for editing reclaimed water. See information in the section above.

2. Double-click into the "*SDEVER.RECLAIMED*" feature dataset and add all four reclaimed water feature classes.
3. Activate the Versioning toolbar.

4. Click on the Version Manager button .
5. Right click on the "*QC1*" version and choose "*New Version*". Do not create your new version from "*DEFAULT*".

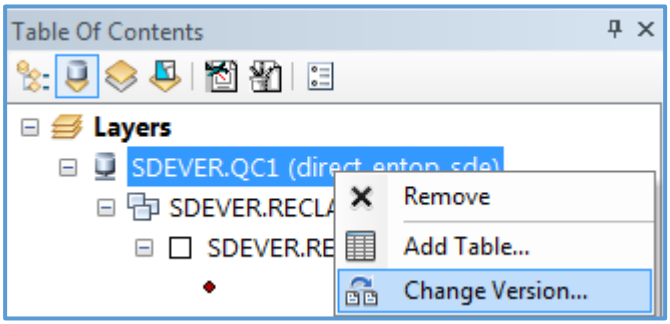


6. Give your new version a unique name and make sure to choose "*Public*" Access then click OK and close the Version Manager (Geodatabase Administration) dialog.

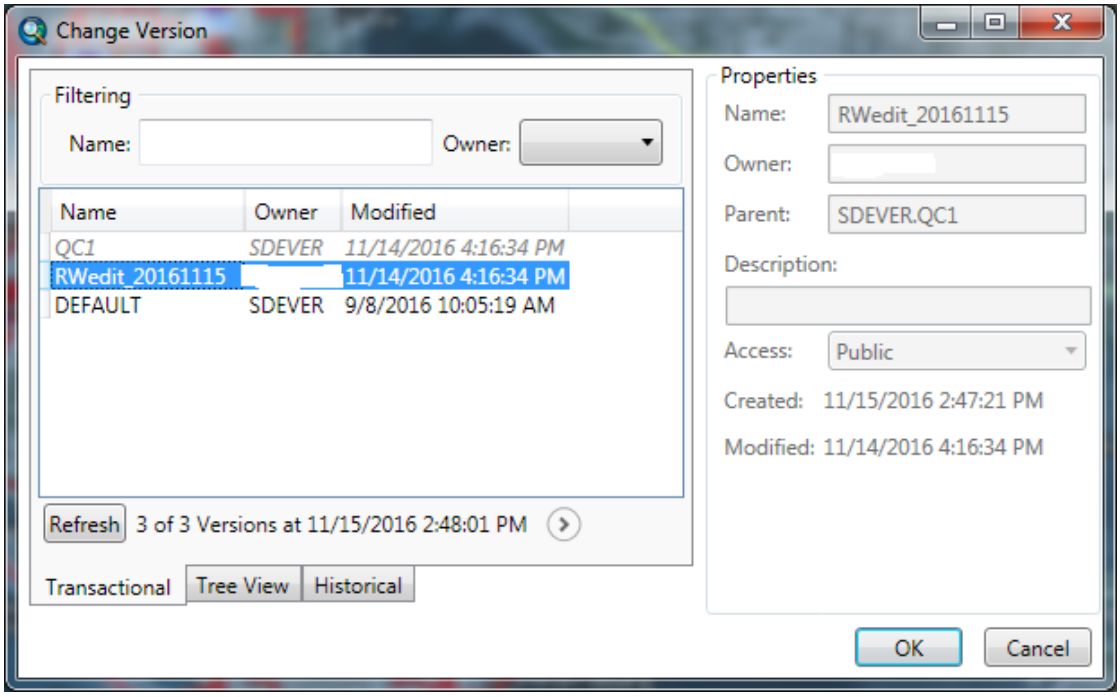


7. On ArcMap's Table of Contents (TOC), click the List By Source button .
8. Find the 4 reclaimed water layers added from above (they are grouped under the

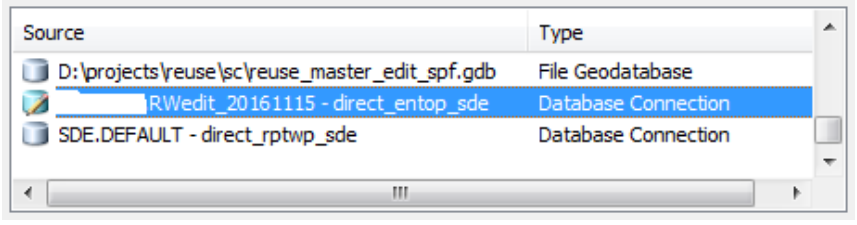
"*SDEVER.QC1*" heading), then right click on "*SDEVER.QC1*" and choose "Change Version".



9. In the "Change Version" dialog, select your newly created version then click OK.



10. Switch the TOC back to List By Drawing Order  .
11. On the Editor toolbar, click the Editor dropdown and choose Start Editing.
12. In the lower part of the Start Editing dialog select the Source that shows your newly created version (e.g. *USERNAME.RWedit_20161115*) then click OK.



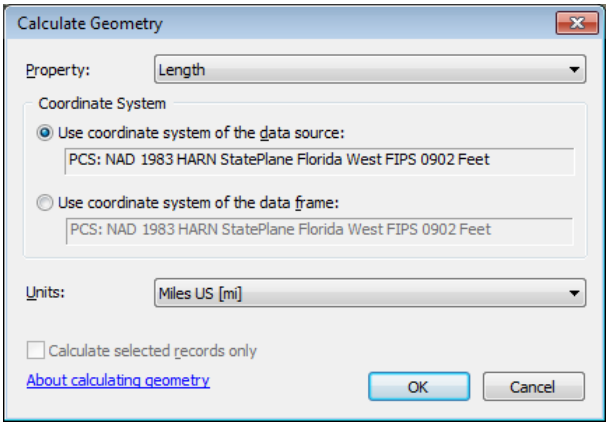
13. If you get a warning that other layers within the map have a spatial reference that does

not match the data frame, just click Continue.

NOTE: Regarding spatial reference, the data frame should be in the same coordinate system as the 4 reclaimed water feature classes being edited on SDE. Also, if GIS data from a utility/consultant is going to be used as a source for updating features, those feature classes also need to be in the same coordinate system as the SDE feature classes. Currently the District is using "*NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet*".

14. At this point the editing is the same as with any shapefile/feature class. As mentioned earlier with the two scenarios, if new features are being added (scenario A), digitize as needed, getting input from the Water Supply Section's project manager when necessary.

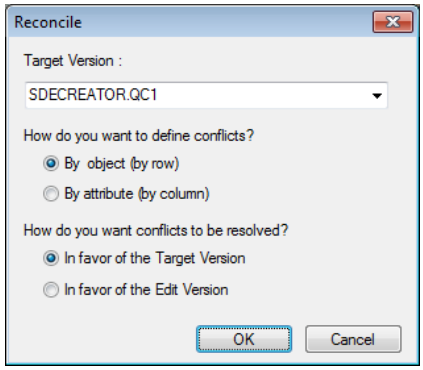
    If a utility/consultant has provided as-built data for GIS deliverables (scenario B) then carefully delete the outdated features for that RW project only and copy/paste the features from the GIS deliverable into the SDE feature class.
15. For details on which fields must be populated for each feature class refer to Appendix A.
16. Click Save Edits regularly throughout the editing process, but only at times when you are satisfied with the edits.
17. Once you are completely finished with editing for a period of time and while still in Edit mode, perform the following steps:
    a. Perform a "*Calculate Geometry*" on the RWLINEMILE field within the two line feature classes (*RECLAIMEDWATERLINES* and *RECLAIMEDWATERREGIONALLINES*). This will update the mileage values within that field for all records. Do this by right-clicking on the field header "*RWLINEMILE*" then choosing "*Calculate Geometry*".



    Save edits after this step.

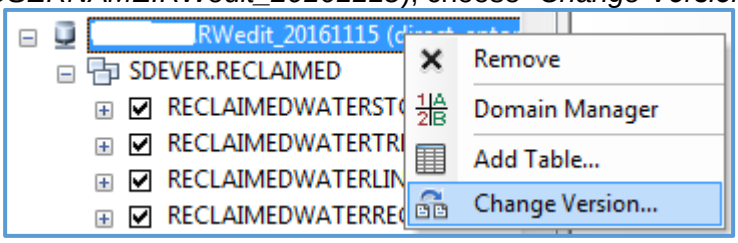
    b. Click Reconcile  on the Versioning toolbar.
    Make sure the options in the dialog are set to the following:

Target Version:	SDEVER.QC1
Define conflicts:	By object (by row)
Resolve conflicts:	In favor of the Target Version

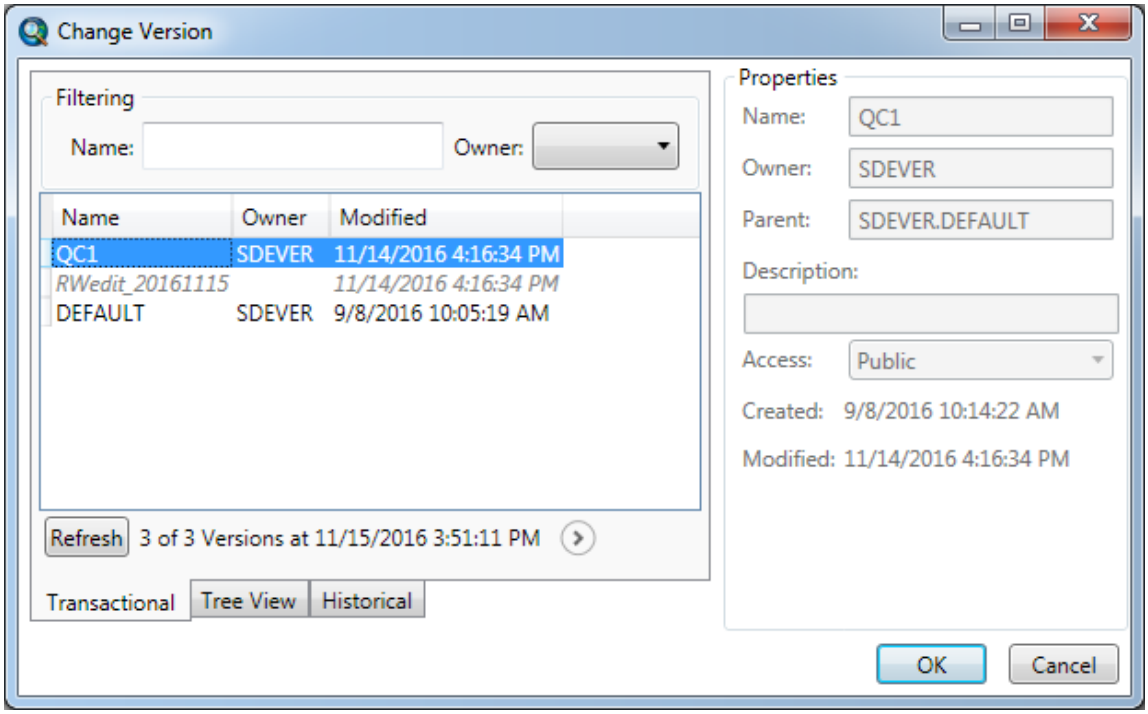


c. Click Post  on the Versioning toolbar, then Stop Editing.

18. In the Table on Contents, click on the "List by Source" button. Find the grouping of the four layers that were edited, right-click on the SDE version name (in this case: *USERNAME.RWedit_20161115*), choose "*Change Version"*.



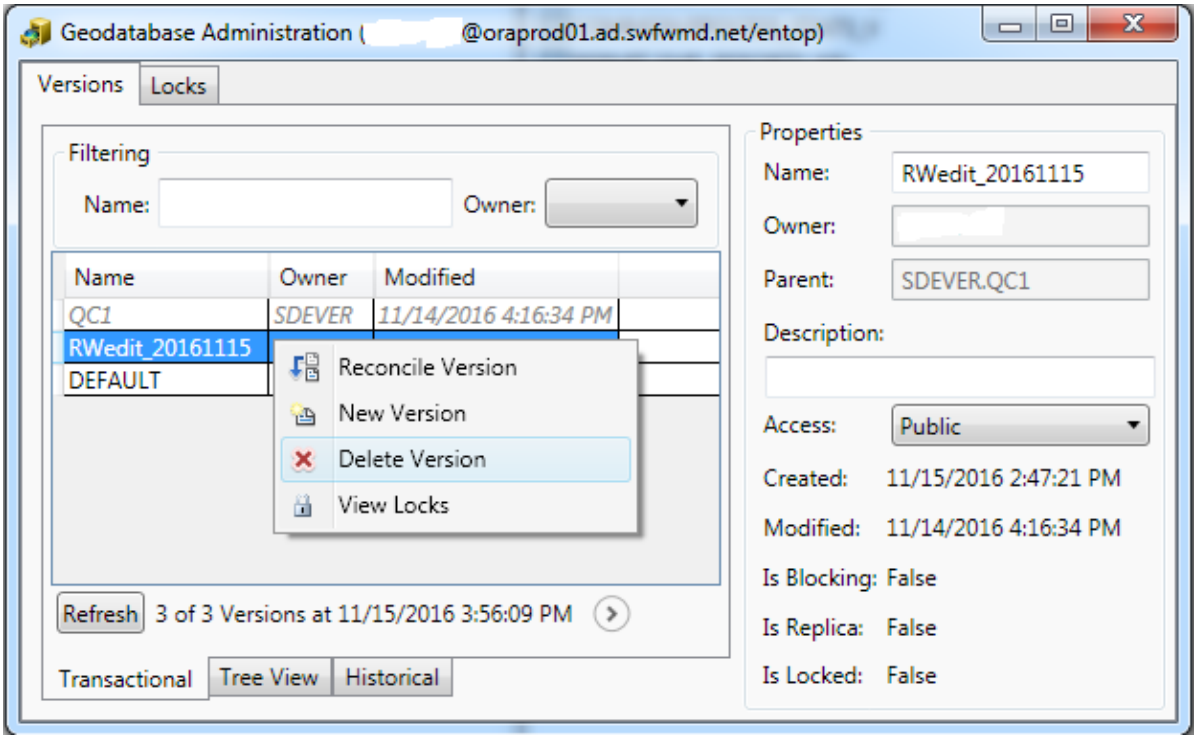
19. Select "QC1" then click OK.



20. Switch the Table of Contents back to "List by Drawing Order", then save the MXD

project and close ArcMap.

21. Launch ArcCatalog.
22. Right-click on the Database Connection that was established in the beginning of this process, then choose Administration > Administer Database.
23. Right-click on the version that was created/edited, then select "*Delete Version"*.



24. Click OK to the question "*Are you sure you want to delete the version*…" then close the Geodatabase Administration dialog. Close ArcCatalog.
25. At this point you are finished with the editing process. Now you need to coordinate with the GIS Database Administrator to get the updates "pushed" to the production/dissemination database that all District staff use via ArcGIS.

Appendices

Appendix A: Fields within the reclaimed water layers that need to be populated.

See Appendix B for fields which require specific values and the definition of those values.

Reclaimed Water Lines (*RECLAIMEDWATERLINES*)	
Field name	**Definition**
RWSTATUS	Status of construction: EX, DC, PR, or CP
RWFUNDING	A Y/N flag indicating if there is District funding for the project.
RWOWNER	The name of the utility or agency that owns the infrastructure.
RWCOUNTY	County that the reclaimed water facility/line is located in.
RWLINESIZE	The diameter of the reclaimed water line in inches.
RWYEAR	The estimated or actual year the reclaimed water project will be completed.
RWREGION	The District region in which the reclaimed water lines are located.
RWLINEMILE	Length in miles of pipeline.
PROJECTNUMBER	Project number if cooperatively funded by the District.
PROJECTNAME	Project name if cooperatively funded by the District.
GIS_UPDATE_DT	The date the feature was last edited or entered into the geodatabase by SWFWMD staff.
COMMENTS	Comments

Regional Reclaimed Water Lines (*RECLAIMEDWATERREGIONALLINES*)	
Field name	**Definition**
RWSTATUS	Status of construction: EX, DC, PR, or CP
RWFUNDING	A Y/N flag indicating if there is District funding for the project.
RWOWNER	The name of the utility or agency that owns the infrastructure.
RWCOUNTY	County that the reclaimed water facility/line is located in.
RWLINESIZE	The diameter of the reclaimed water line in inches.
RWYEAR	The estimated or actual year the reclaimed water project will be completed.
RWREGION	The District region in which the reclaimed water lines are located.
RWLINEMILE	Length in miles of pipeline.
PROJECTNUMBER	Project number if cooperatively funded by the District.
PROJECTNAME	Project name if cooperatively funded by the District.
GIS_UPDATE_DT	The date the feature was last edited or entered into the geodatabase by SWFWMD staff.
COMMENTS	Comments

Reclaimed Water Storage (*RECLAIMEDWATERSTORAGE*)	
Field name	**Definition**
RWSTORAGETYPE	Reclaimed water storage facility type: POND, TANK or ASR
RWSTATUS	Status of construction: EX, DC, PR, or CP
RWFUNDING	A Y/N flag indicating if there is District funding for the project.
RWOWNER	The name of the utility or agency that owns the infrastructure.
RWCOUNTY	County that the reclaimed water facility/line is located in.
RWYEAR	The estimated or actual year the reclaimed water project will be completed.
RWREGION	The District region in which the reclaimed water facility is located.
PROJECTNUMBER	Project number if cooperatively funded by the District.
PROJECTNAME	Project name if cooperatively funded by the District.
GIS_UPDATE_DT	The date the feature was last edited or entered into the geodatabase by SWFWMD staff.
COMMENTS	Comments

Reclaimed Water Treatment Plants (*RECLAIMEDWATERTREATMENTPLANTS*)	
Field name	**Definition**
WWTFCAPACITY	The permitted capacity or maximum amount of wastewater that a WWTF can treat, in million gallons per day (MGD).
REUSEFLOW	The actual flow or amount of reclaimed water being distributed to a reuse system or utilized for a reuse activity, in million gallons per day (MGD).
WWTFFLOW	The actual flow or amount of wastewater that flows through a WWTF, in million gallons per day (MGD).
REPORTINGYEAR	Year data were reported.
RWPLANTNAME	Reuse treatment plant name.
TREATLEVEL	Treatment level.

DISINFLEVEL	Disinfection level of reclaimed water.
RWOWNER	The name of the utility or agency that owns the plant.
RWCOUNTY	County that the reclaimed water facility/line is located in.
RWREGION	The District region in which the reclaimed water facility is located.
RWSTATUS	Status of construction: EX, DC, PR, or CP
RWYEAR	The estimated or actual year the reclaimed water facility will be completed.
REUSECAPACITY	The permitted capacity or maximum amount of reclaimed water that a reuse system can accommodate or distribute, in million gallons per day (MGD).
PROJECTNUMBER	Project number if associated with a Cooperative Funding project.
GIS_UPDATE_DT	The date the feature was last edited or entered into the geodatabase by SWFWMD-MGIS staff.
WAFRID	"**WA**ter **F**acilities **R**egulation **ID**entification": A unique ID number assigned by the FDEP to each domestic wastewater treatment facility or master reuse system.
COMMENTS	Comments

Appendix B: Fields which require specific values and their definitions

RWSTATUS

1. EX = Existing
2. DC = Design/Construction
3. PR = Proposed
4. CP = Conceptual
5. CA = Cancelled
6. DL = Deleted
7. WD = Withdrawn

RWFUNDING

1. Y = Yes
2. N = No

RWREGION (from the *Regional Water Supply Plan*)

1. HEARTLAND Hardee, Highlands, and Polk counties.
2. NORTHERN Citrus, Hernando, Lake, Levy, Marion and Sumter counties.
3. SOUTHERN Charlotte, DeSoto, Manatee and Sarasota counties.
4. TAMPA BAY Hillsborough, Pasco and Pinellas counties.

RWSTORAGETYPE

1. ASR = Aquifer Storage and Recovery well
2. POND = Pond
3. TANK = Tank

TREATLEVEL

1. ADV =Advanced treatment
2. PRI = Primary treatment
3. SAD =Secondary Advanced treatment
4. SEC =Secondary treatment
5. TER = Tertiary treatment

DISINFLEVEL

1. BA = Basic disinfection
2. HB = Combination of high-level and basic disinfection
3. HI = High-level disinfection
4. IM = Intermediate disinfection
5. LL = Low-level disinfection

Creator: C. Denninger

Date 5/24/2015
Revision # V2l
Last Review Date: 8/26/2015

Maintaining the Public Supply Service Area Layer

Purpose

The purpose of this document is to provide a standard operating procedure for editing and updating the Public Supply Service Area (PS_SERVICEAREAS) GIS layer.

Scope

The MGIS section is responsible for updating, on an as-needed basis, the District's PS_SERVICEAREAS layer, including all attribute information. This document was written to describe and provide a detailed explanation for editing this layer; which is currently edited in a versioned editing environment.

This dataset is a compilation of all water utility retail service area boundaries within the Southwest Florida Water Management District and is used primarily to estimate population and public supply water use projections. It is essential to Regional Water Supply Planning efforts, as well as numerous District permitting functions. By rule, the service areas must be maintained for calculating population and demand projections for water supply planning purposes.

Guidelines

Scenarios that Trigger Edits

The PS_SERVICEAREAS layer is usually edited because of one of the following reasons:

- New Public Supply Permit Application received
- Renewal of an existing Public Supply Permit
- Data received from the Public Supply Annual Report (PSAR) survey
- General layer maintenance initiated by District staff

Edits to the PS_SERVICEAREAS GIS layer can be to the attribute table only, the polygon features only, or both.

Small General Public Supply permits are now added to the PS_SERVICEAREAS feature class. The addition of these permits helps to improve the layer by: 1) removing areas otherwise erroneously claimed by another utility, 2) helps better calculate domestic self-supply water use for the Regional Water Supply Plan (RWSP), and 3) assists in more accurately determining water use districtwide. Small General public supply permits must be researched and reconciled with the WUP layer, which is where they are pulled from. It is recommended that is done twice a year. It is redundant to capture them in both layers, however it allows for a more seamless and comprehensive analysis and modeling by not only the District, but our cooperators and customers ('one-stop-shop').

Rules

A public supply utility permit applicant must define the entire area proposed to be serviced by the public supply system or utility with potable water *during the term of the permit*. A public water supply utility may have separate, discreet service areas; however, if water is routinely transferred between service areas, the service areas are counted as one.

An applicant's public supply service area is composed of the following (unless the applicant demonstrates that factors unique to its utility make one or more of these situations inapplicable to the determination of the applicant's service area):

1. The current and projected geographic retail area for which a public water supply utility intends to provide and bill for potable water for the duration of the permit.
2. The current and projected geographical retail areas of a public water supply utility that is not required to have a Wholesale Water Use Permit but which purchases water wholesale from the applicant.
3. Areas where the applicant bills for water use although another entity or utility has a Wholesale Water Use Permit for distribution of the water to the population.

More information on this can be obtained here (summarized from the WUP Basis of Review B2-2 through B2-3):
https://www.swfwmd.state.fl.us/files/database/site_file_sets/14/WUP_BOR_Effective_12-12-11_OGC_2011053_-_Number_of_Submittals[1].pdf#page=14

The PS_SERVICEAREA layer can not contain any spatial overlaps, where both overlapping polygons contain an AREAFLAG = Y. In these cases, both utilities involved in the overlap must be contacted and a resolution reached before a permit can be approved and/or population can be counted in said area for either utility involved. (See Appendix) When such an overlap occurs, the polygon data are only added to the PS_PENDING layer awaiting resolution. Once the overlap is resolved the polygon is removed from the PS_PENDING layer and the correct boundary(ies) added to the PS_SERVICEAREAS layer. Often during this process, the applicant will recognize the error and revise their boundary submittal to resolve the overlap without involving other utilities.

Note: If edits to the layer result in minor spatial overlaps (e.g. slivers, etc.), then the GIS analyst should use best practices to resolve the issue. These practices may include, but are not limited to the use of parcel data, aerial imagery, municipal and/or county boundaries in the reconciliation process.

There are scenarios, however, where overlaps may be allowed. Although not common, if the District is made aware of areas where one utility wholesale supplies water to another utility they both can claim those areas. However, the utility wholesaling water must be AREAFLAG = N, whereas the utility serving the water to the customers (and subsequently billing those customers) receives an AREAFLAG = Y. This ensures that both utilities receive credit for their water supply use, yet does not result in an error during the layer's post-processing/editing QA/QC efforts. (See Figure 8 for Error Checking model diagram)

Procedures

Versioned editing in ArcGIS 10

Versions are Esri's method for allowing multiple users to edit the same feature class simultaneously. They are not copies of the data, but rather are stored edit caches where the system keeps track of each user's edits and displays the data that results from those edits. In this way, it is possible for many users to edit in the same geographic area and each to have their own changes.

Versions can be accessible to other users through the permissions established when a version is created. There are three options:

- Public, where all users can see and edit the version.
- Protected, where all user can see the edits, but only the owner of the version can edit the version.
- Private where only the owner of the version can see and make changes to the edits.

  Be sure to make all your versions public.

Reconciliation is the process by which the system checks to determine if any of the users edited existing features in such a manner that they conflict with an edit that another user made. Posting is the process of committing the edits within a version (child) to the original data set (parent) from which that version was created. The figure below illustrates the versioning scheme that is implemented on our existing data.

General Spatial Editing Process

1. Open ArcMap
2. Open the .mxd project that has your data (if you've saved one). It can be revised like any other ArcMap project.
3. To create a new version, click the source tab on the table of contents (TOC). Make sure the database source to be edited is listed on the top of the list. If it is not, drag it to the top of the TOC.
   a. Select Version Manager from the Versioning Toolbar

   b. Right click the SDE_REG.DEFAULT (sde_reg_p_direct_*username*) version and select "New". (see Figure 1)
   c. Enter layer name, your last name followed by today's date in the Name box, and select "Public" in the Permission box. Click "OK". Close Version Manger. (see Figure 2)
4. Change the version of the Geodatabase: (If an edit session is open, close it first.)
   a. On source tab, right click on database name, and choose "Change Version..." (see Figure 3)
   b. Another box opens (see Figure 4). The versions attached to the database are listed (except for the version it is currently set at).
   c. Choose your personal version to perform edits on and click "OK". The table of contents now shows the correct version and the feature classes under it (see Figure 5). Any time you are making edits, it is important to make sure that you are editing the correct version.
5. Start the edit session by clicking on **Editor > Start Editing**.
6. Before doing any editing, reconcile to the Default version. Performing the

reconcile at this point will bring in any changes other editors have posted.

7. Edit as you normally would. Save edits.
8. Run Error Check Model (see Figure 8) and inspect error report for overlaps (see Figure 9)
9. Reconcile the edit version to the Default version once again (see Figure 6). This needs to be in edit mode. If no errors, continue to the next step.
10. Post back to Default version

11. Close edit session
12. Delete your personal version.
    a. Change the version to Default to verify your edits posted properly (see step 4 in this section to change versions).
    b. Save your map and close.
    c. Open ArcCatalog, and navigate to Database Connections.
    d. Double-click the database your version was created in to open the connection.
    e. Right click the database name, and chose **Administration**
    f. Select **Administer Geodatabase**
    g. Right click your version in the Version tab, and select **Delete Version > ok**.

Attribute Fields

In addition to all the utility specific information within the attribute table (see Figure 7), there exist two fields that the editor must determine if new identifiers need to be created:

1. UTILITYINFORMATIONID
2. SVCAREAID

The UTILITYINFORMATIONID and the SVCAREAID fields are edited and utilized in different ways. The UTILITYINFORMATIONID is a sequential, unique identifier for the UTILITYNAME field. It is a quick means for determining the total number of unique utilities contained within the entire layer without the added step of creating a Frequency table. For example, AQUA UTILITIES FLORIDA, INC. has multiple permit numbers located throughout the SWFWMD, yet all of their records within the PS_SERVICEAREAS layer contain the same UTILITYINFORMATIONID number “2”.

In contrast, the SVCAREAID field must contain a unique identifier for each separate and discreet service area within the layer. However, these numbers can be random and do not have to be sequential, but must be unique to a particular service area. Using the previous example, AQUA UTILITIES FLORIDA, INC has ten separate and distinct service areas, which are not interconnected in any way other than that they have the same utility owner, and therefore each of the ten records within the layer has ten separate and distinct SVCAREAID numbers.

These SVCAREAID numbers are used by our consultants to aggregate population projections by service areas and are necessary due to the fact that there is not always a one-to-one relationship between SERVICEAREANAME and SVCAREAID. For instance, as is sometimes the case, a utility may wish to refer to two (or more) areas by different SERVICEAREANAMEs, yet they are connected and are part of the same WUP_PERMIT_NBR. In this example, we would have two records within the attribute table, with two different SERVICEAREANAMEs,

yet contain the same SVCAREAID numbers. It is important to note that service areas do not have to be contiguous polygons to be considered part of the same system.

Whenever possible, the SVCAREAID numbers should not change for any reason other than when service areas merge (bringing together two or more previously separate and distinct service areas) or are deleted (rarely transpires). In the former case, one of the two SVCAREAIDs should be retained. In this scenario, best judgment applies.

Perhaps retaining the SVCAREAID with the larger area might make sense. For example, if Pasco County Utilities service area is revised to now include a smaller, formerly private utility, that 'new' area's SVCAREAID should be revised to match the County's ID.

Below is a list of the attribute fields within the PS_SERVICEAREAS layer that require further explanation, and their use. See layer's metadata for additional elucidation of each field's definition:

PS_SERVICEAREAS	
FIELD	**EXPLANATION OF USE**
UTILITYNAME	Common name or WMIS name used by the permitee (utility).
SERVICEAREANAME	Name used by permitee for their distinct areas of service.
SVCAREAID	Unique identifier given to separate, distinct, and disconnected service areas. Can have the same ID for different SERVICEAREANAMEs as long as they share the same pipes and WUP_PERMIT_NBRs. (many-to-one possible)
UTILITYINFORMATIONID	Sequential, unique identifier for each utility. Use the next available number. Quick way to determine count of all the unique utilities within the layer. They last, and highest, number is the total utilities.
AREAFLAG	Y = Currently served by the utility; N = not currently served, but within the utility's defined service area.

NUMBEROFPERMITS	Total number of SWFWMD WUP_PERMIT_NBRs that serve a particular service area. (many-to-many possible)
ALLPERMITS	List of all the unique WUP_PERMIT_NBRs that serve this particular service area. Number of unique records here should match the total in the NUMBEROFPERMITS field.
WUP_PERMIT_NBR	Main, or largest quantity District WUP number for this service area.
SOURCE	Domain list describing how data received from most recent edit.
TYPE	Domain list for how the utility receives and/or supplies its water.
GIS_UPDATE_DT	Enter date of most recent edit (spatial, tabular, or both).

Related Tables
The PS_SERVICEAREAS GIS layer also contains relationships to 3 tables via SDE relationship classes. The updates to these tables are usually provided by SWFWMD Economist staff. Since 2006, this information has not been well maintained do to a variety of reasons, including, but not limited to the very low level of consumption of this information. At this point, the data is updated as provided, until a determination can be made to either update or remove its existence from the feature class. Although these data are rarely used, there is reluctance by some staff to remove these relationships.

The PWSI table had a mass update in 2010 and a current version of the source file can be found on FDEP's website. The three tables and their relationships () are named as follows:

1. SDECREATOR.PS_SALES (PSToSale)
    - Relationship maintained using WUP_PERMIT_NBR field
2. SDECREATOR.PS_PWSI (PSToPWSI)
    - Relationship maintained using WUP_PERMIT_NBR field
3. SDECREATOR.PS_PURCHASES (PURCHASESToPS)
    - Relationship maintained using WUP_PERMIT_NBR field

References
PS_SERVICEAREAS shapefile download from District's Demographics site:
http://www.swfwmd.state.fl.us/data/demographics/public-supply-service-area.php

PS_SERVICEAREAS shapefile download from District's GIS Data download site:
http://www.swfwmd.state.fl.us/gisdata/regulatory/ps_serviceareas.exe
SWFWMD WUP Basis of Review, Part B:

http://www.swfwmd.state.fl.us/files/database/site_file_sets/14/WUP_Basis_of_Review-20-year_permit-2007086_eff_063010.pdf

FDEP PWSI Database: http://www.dep.state.fl.us/water/drinkingwater/download.htm

Appendices
SWFWMD WUP Basis of Review - Public Supply Service Area documentation:
According to the District's Water Use Permit Information Manual Part B Basis of Review, "public water supply applicants and their wholesale customers that operate 'community water systems' as that term is defined by the Florida Department of Environmental Protection in Rule 62-550.200, F.A.C., shall be considered public water supply 'utilities'" (p. B2-2). The Florida Department of Environmental Protection in Rule 62-550.200, defines a community water system as "a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year."

As part of this designation, section 2.5 of the District's WUP Infromation Manual document, a public supply permit applicant *must define the entire area proposed to be serviced by the public supply system during the term of the permit*. This area includes both the service area in which the supplier has the ability and legal right to distribute water, as well as other areas where an entity purchases water wholesale from the applicant. Requested quantities for areas proposed to be supplied must be supported

with detailed demand information and plans of the supply system proposed to accomplish this service. In cases where the applicant does not have political control over a portion or portions of the area supplied (e.g., a county utility supplies a city), detailed demand information for the entire area will be required from the wholesaler. Wholesalers must provide the District with a written agreement from the water purchasers to abide by the conditions of the wholesaler's permit.

Other useful information for utilities in the resolution of overlaps: (return)
Please note that we are unable to make changes to public supply service area boundaries if they would result in overlaps with that of another utility. For us to incorporate new boundaries into our GIS layer, we would need supporting documentation that would address any potential overlapping areas. It is important that changes made to the applicant's public supply service area are made relative to the District's public supply service area layer found on our website (see link below).

Examples of supporting documentation are:

1. a Chapter 180 Florida Statutes Service Area Ordinance (Municipalities),
2. a distribution system map demonstrating service to the overlapping area,
3. an inter-local service agreement,
4. an approved service area capital expansion plan,
5. an agreement with a developer to provide service for the area in question,
6. or any other relevant information.

You may find other helpful information regarding public supply service areas on our Demographics website found here:
http://www.swfwmd.state.fl.us/data/demographics/public-supply-service-area.php

Figures

Figure 1 (return)

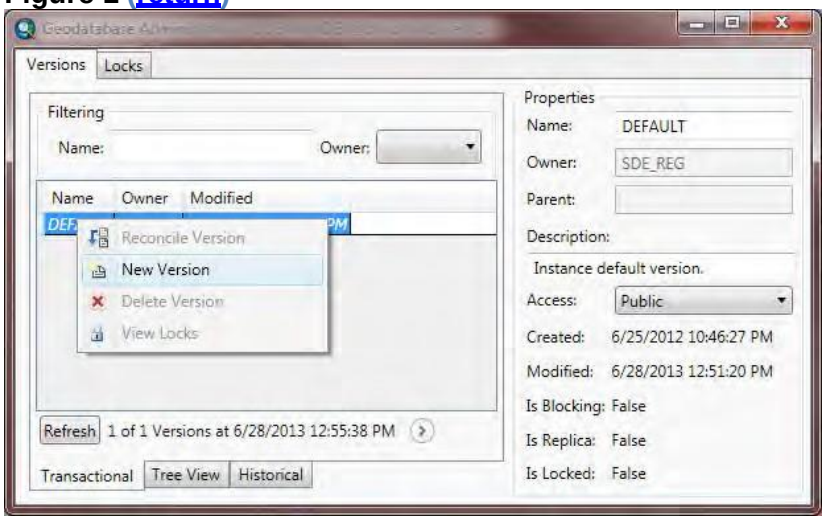


Figure 2 (return)

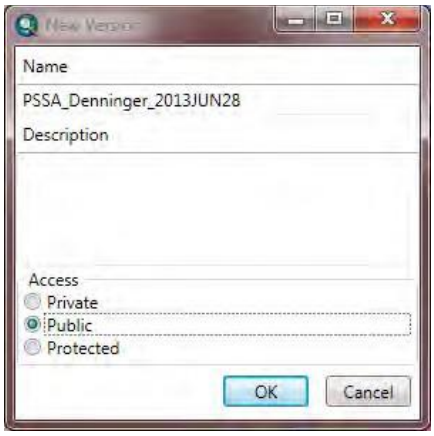


Figure 3 (return)

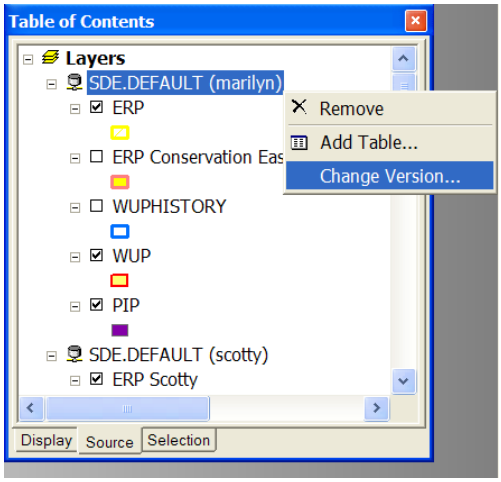


Figure 4 (return)

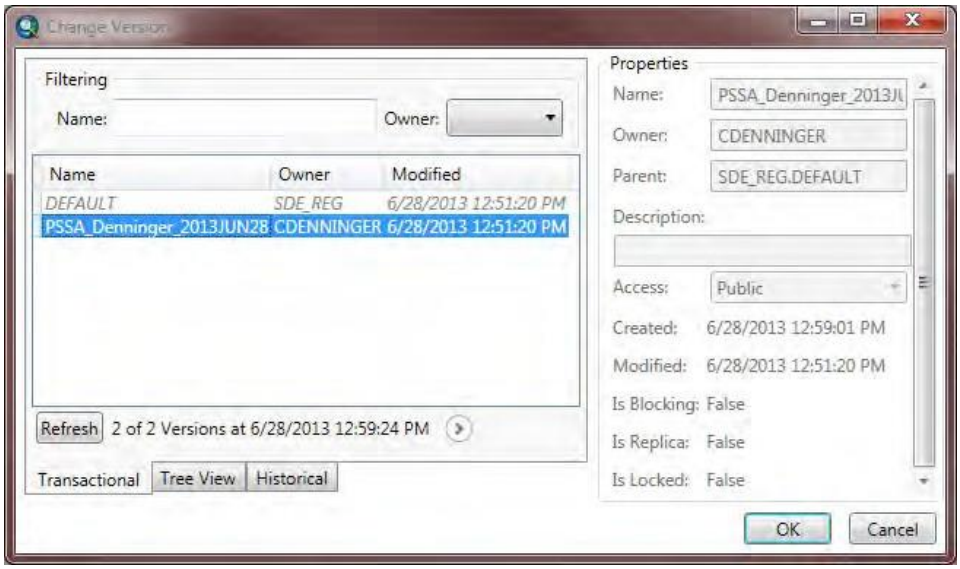


Figure 5 (return)

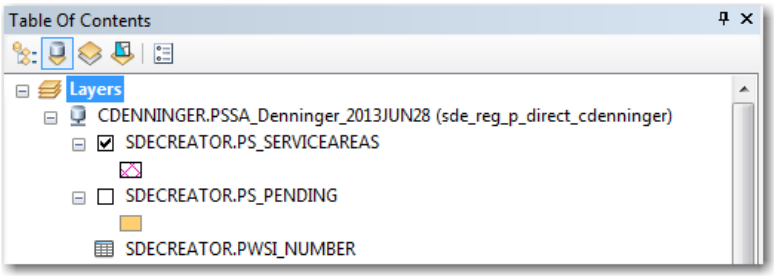


Figure 6 (return)

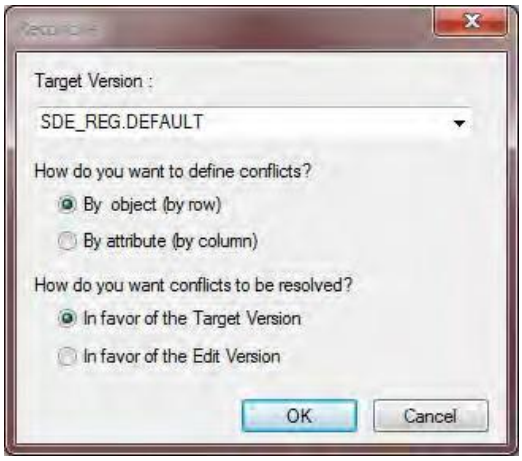


Figure 7- Example of the PS_SERVICEAREAS attribute table (return)

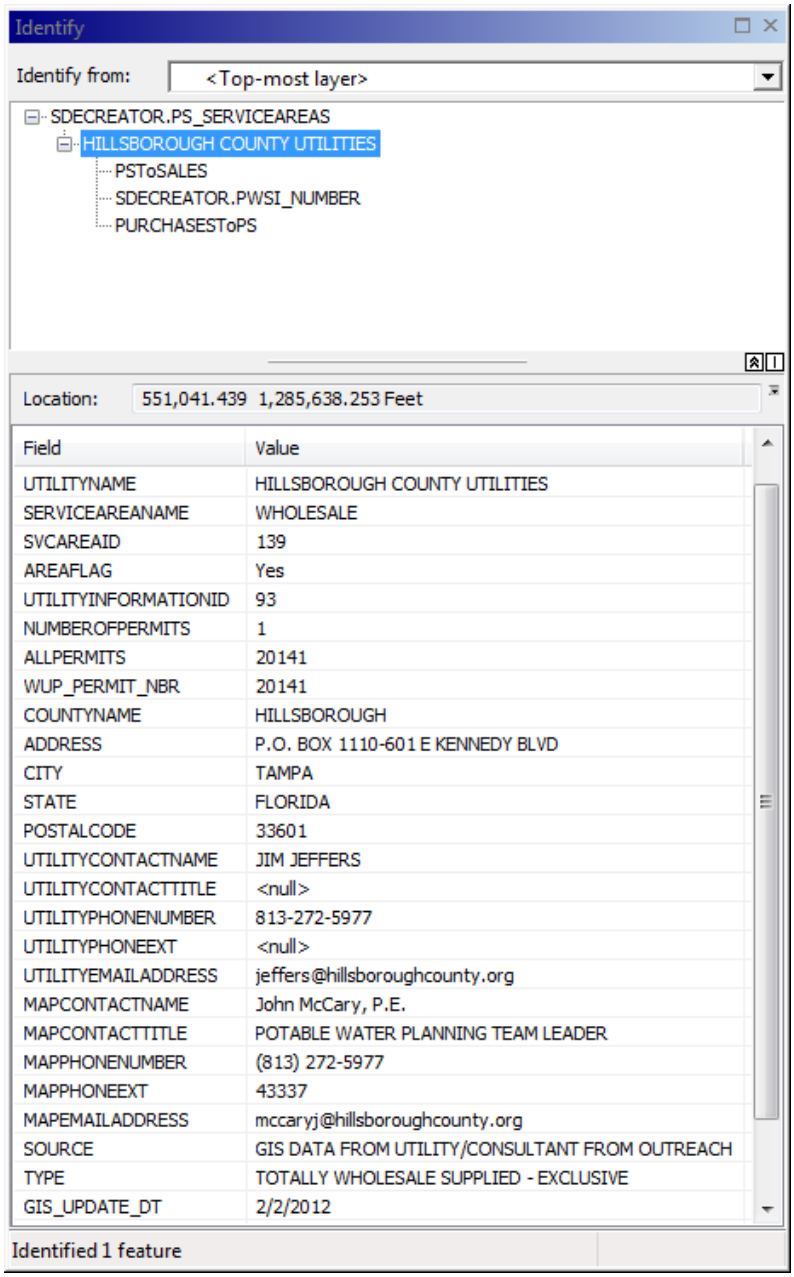
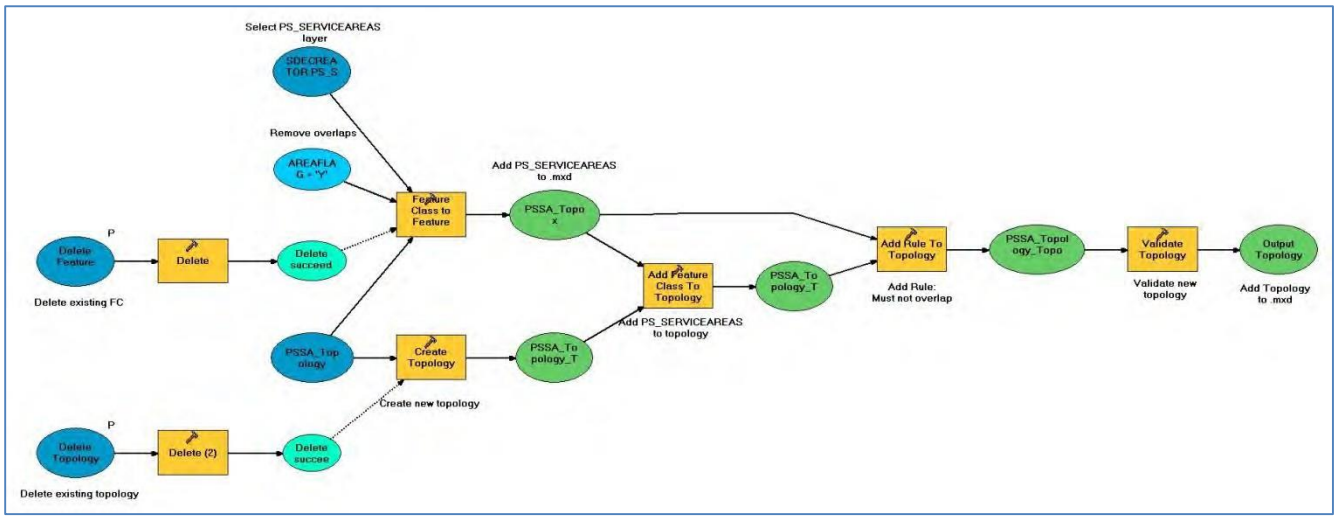


Figure 8 - PS_SERVICEAREAS error check model ^ (return)



ArcGIS Toolbox containing error model located on MGIS L:\ drive, found here: L:\Mapping-GIS\PLN\GIS\Toolboxes\Public Supply Error Checks.tbx

Figure 9 - Error Report Summary (return)

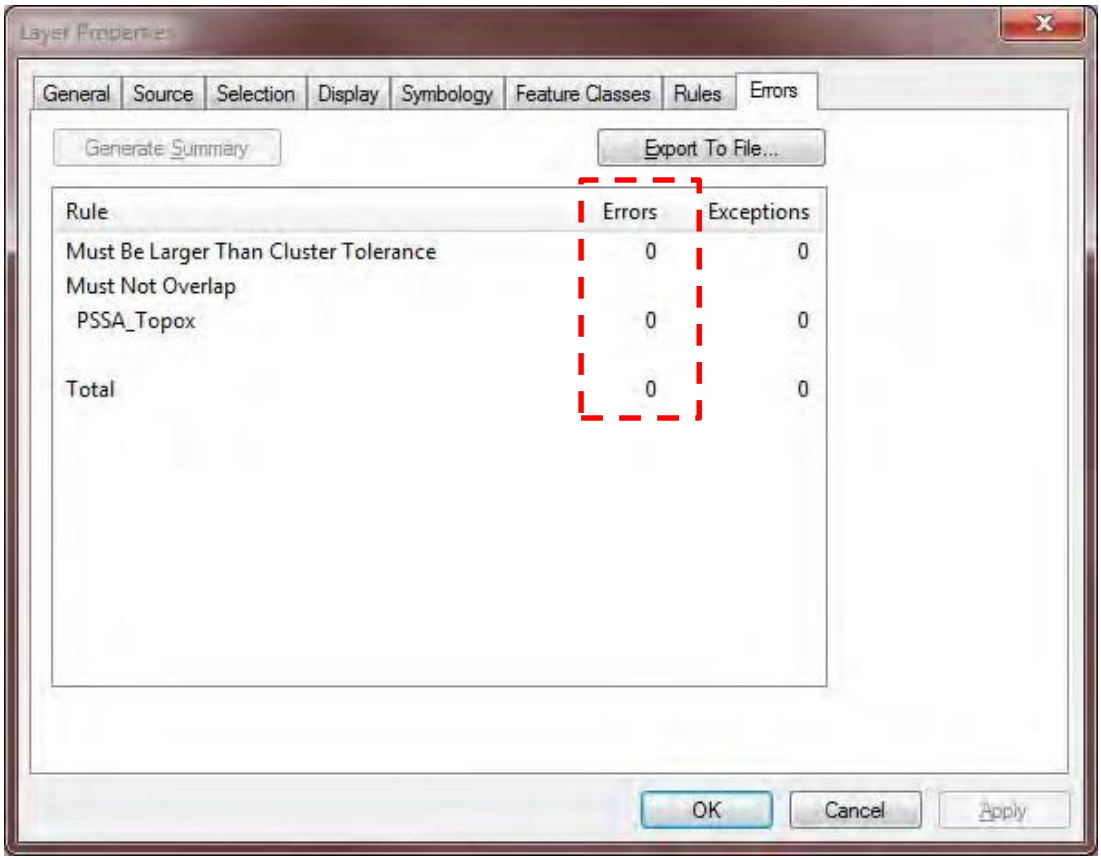
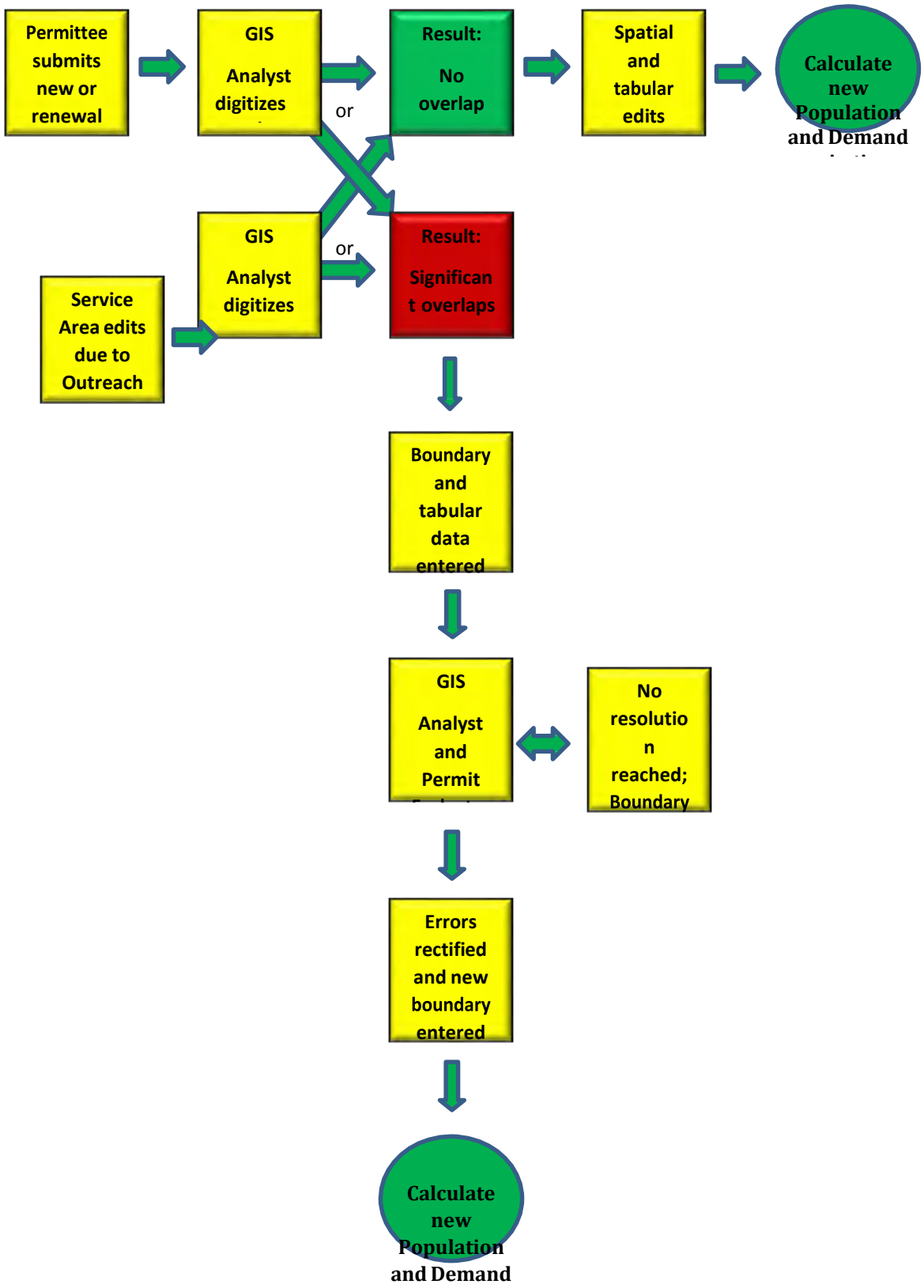


Figure 10 - General PS_SERVICEAREAS editing workflow



Creator: C. Glenn
Date 07/19/13
Revision # 2
Date last reviewed: 5/5/2016

MFL Layer Maintenance

Purpose

The purpose of this document is to provide a standard operating procedure (SOP) for performing maintenance on Minimum Flows and Levels (MFL) data layers.

Scope

This document covers the responsibilities of the Mapping & GIS Section when updating MFL data.

Feature classes and tables – these feature classes and tables depict the location/boundary, adopted flows or levels, compliance info, and tracking information of the MFL. They are separated by waterbody type. The options are:

1. MFL_PRIORITY_LIST - this table has two purposes. It is used to track the MFL waterbodies and ensure that all associated tables and feature classes are updated at the appropriate time. It is also used to reconcile the GIS MFL list to the Authorized Priority List that is approved by the Governing Board each October.
2. Aquifers
   a. MFL_AQUIFER_BOUNDARY – Surface location of aquifer MFL
   b. MFL_AQUIFER_WELL_SITES – Wells used in study of MFL
   c. MFL_ADOPTED_AQUIFER_LEVELS – Adopted levels of the MFL
3. Lakes
   a. MFL_LAKES – Location of MFL lakes
   b. MFL_ADOPTED_MFL_LAKE_LEVELS – Adopted levels of post-2000 MFLs
   c. MFL_ADOPTED_GUIDANCE_LAKE_LEV – Adopted levels of pre-2000 MFLs
   d. MFL_YEAR_ASSESS_GUIDANCE_LAKE – Compliance data of pre-2000 lakes
4. Rivers
   a. MFL_RIVER – Location of MFLs
   b. MFL_ADOPTED_RIVER_FLOWS – Adopted flows of MFLs
   c. MFL_EXPECTED_RIVER_FLOWS – Expected flows of MFLs
   d. MFL_RIVER_SITES – Monitor sites used in study of MFLs
   e. MFL_RIVER_WATERSHED_AREAS – Location of watershed area used in study of MFLs – no longer maintained
5. Springs
   a. MFL_SPRINGS – Polygon location of MFLs
   b. MFL_SPRINGS_PNT – Point location of MFLs
   c. MFL_ADOPTED_SPRINGS_FLOW – Adopted flow of MFLs
6. Wetlands
   a. MFL_WETLAND – Polygon location of MFLs
   b. MFL_WETLAND_LOCATION – Point location of MFLs
   c. MFL_ADOPTED_WETLAND_LEVELS – Adopted levels of MFLs
7. Stressed Lakes

a. STRESSED_LAKES for years 2006 to 2015 – Feature class created yearly to show those lakes with adopted levels pre 2000 that did not meet adopted levels
b. STRESSEDLAKESBUFFER – the current stressed lakes feature class with a predefined buffer that is used in WMIS to determine those permits that fall near a stressed lake
c. STRESSEDLAKES<YEAR>BUFFER – Previous versions of the STRESSEDLAKESBUFFER feature class
d. MFL_LAKES_STRESSED_5_YEARS – A feature class that depicts those lakes that were stressed for 5 concurrent years. Historic feature class only.

8. MFL_COMPLIANCE_FDEP_Report – a table that is updated yearly that shows whether all MFL waterbodies have met the adopted flows or levels.

PROCEDURES

MFL Priority List Reconciliation

In October of every year the Board approves a revised "Board Approved Minimum Flows and Levels Priority List and Schedule." GIS has a version of this PRIORITY_LIST, which is named MFL_PRIORITY_LIST. When the new version of the official copy is available, it is reconciled to the GIS version to determine if GIS needs to add new proposed MFLs or update the status of a proposed MFL.

1. Copy the Priority List and Schedule from http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php
2. Create File geodatabase and import the "MFL_PRIORITY_LIST" table into it, if necessary
3. Open ArcMap project and add the newly created "MFL_PRIORITY_LIST" to it. Put in edit mode. As edits are made, put the current date in the "GIS_UPDATE_DT" field. It helps to sort by waterbody type and then MFL name. Enter "PRIORITY <year>" in the comments field as each is reviewed. This helps track what ones are done.
4. Reconcile the new Priority List to the GIS version
   a. Check waterbodies that are adopted
      i. Make sure they are on the GIS Priority List and are complete.
      ii. If any waterbody in adopted status is marked as proposed in GIS, update the GIS records. Follow the "Adopted MFLs" section to update. Put checkmarks in the MFL_PRIORITY_LIST as updates are made. Use the table in the appendix as a guide.
      iii. If a reevaluated waterbody has been adopted, the prior one will not be on the priority list, but remains on the GIS version. The field "PRIORITY_LIST_ADOPT_OR_PROPOSED" field will have "HISTORIC" added to it.
   b. Check for new MFLs that are not on the current GIS version of the MFL_PRIORITY_LIST. Follow the "New Proposed MFLs" section to add the new water body.
   c. Check for any removed MFLs. Follow the "Remove MFLs" section to remove the water body.
   d. Check for any MFL that has a different proposed year. Change the proposed year to the current year. (Note: not all feature classes have a field for the proposed year any more.

Add a New Proposed MFL

1. Pull in required feature classes and/or tables
   a. Create a file geodatabase and name it MFL_UPDATES_MONTHYEAR
   b. Import the MFL_PRIORITY_LIST table
   c. Import appropriate feature class or table the type of waterbody the MFL is for.
2. Open an ArcMap project and add any feature classes or tables from step 1 to it.
3. Start an edit session on the MFL_UPDATES_MONTHYEAR geodatabase.
4. Add a record to the MFL_PRIORITY_LIST and populate the fields in the table. The table has some fields that apply to every type of waterbody, and other fields that apply to specific waterbody types. If a field does not apply, write "N/A" in it. See the table in appendix 1 for details.
5. Enter the MFL boundary and/or location into the appropriate feature class, depending on what type of waterbody the MFL is grouped into (i.e. aquifer, lake, river, spring, or wetland). Also fill in the tabular data, see the tables in the appendix for details.
   a. Aquifers – use feature class "MFL_AQUIFER_BOUNDARY"
      i. Map the boundary. Size is regional in scope, and usually has one of the water use caution areas as a boundary.
      ii. Populate the fields of the MFL_AQUIFER_BOUNDARY feature class. Use the table in the appendix as a guide.
   b. Lake – use feature class "MFL_LAKES"
      i. If the lake is already adopted under the pre-2000 guidelines, and is now proposed under the post-2000 guidelines, use the existing boundary, and only update the fields. If it does not exist as a guidance lake, use the boundary contained in the NHD feature class as the lake boundary. (Note: there is only 1 polygon for the lake, do not add a second one even if the lake is covered under the two rules.)
      ii. Populate the fields of the MFL_LAKES feature class. Use the table in the appendix as a guide.
   c. Rivers – use feature class "MFL_RIVER"
      i. Rivers usually have separate minimum flows assigned to the freshwater and estuarine parts of the river, and may include tributaries. These are referred to as "upper and lower" or "freshwater and estuarine" segments of the river. This distinction is not usually finalized until the MFL is adopted, so proposed MFL boundaries are preliminary. When proposed, map the river with the best information available. Once adopted, the features will be adjusted to match the actual MFL limits.
      ii. Use "Named SWFMD Hydrographic Features" or "NHD Streams and Canals Group" to create the feature for a river. Select all features that participate in the MFL and copy them into the MFL_Rivers feature class. Merge them all into one feature.
      iii. If there are springs that are a part of the river MFL, then the Springs MFL feature classes are also updated. The same MFL_ID will be used for the spring. See the section below for adding a proposed spring.
      iv. Populate the fields for the river. If any of the information is not known when proposed, leave that field blank or put "n/a" in it.
   d. Springs – Use feature classes "MFL_SPRINGs" and "MFL_SPRINGS_PNT"
      i. Most springs are part of a River MFL study, but a few are independently done. All springs associated with the MFL are entered into both MFL_SPRINGS feature classes, but are attributed differently based on if they are independent or not. When they are independent, they have their own MFL ID number assigned to them. Those that are part of the River MFL will retain the River's MFL ID number.
      ii. Map the springs into the point and polygon feature classes.
      (1) There are usually more than one spring included for a springs MFL. Enter a

separate record for each spring, and assign each one the same MFL_ID. The unique number for springs will be springs_id.

(2) For the point feature class, use the Springs feature class to locate the location of the spring. Copy all springs that participate in the MFL to the MFL_SPRINGS_PNT feature class.

(3) If boundary of spring is known, enter a polygon feature depicting it in the "MFL_SPRINGS" feature class. If it is unknown, enter a circle in the general area. The area is not generally known when proposed.

iii. Populate the fields. Use the table in the appendix as a guide.

e. Wetlands - Use feature classes "MFL_WETLAND" and "MFL_WETLAND_LOCATION"

i. Wetlands are stored as point locations in SDE and are usually depicted at one of the gage stations monitoring it. Wetland monitoring sites are a part of the 'Surfacewater Sites" layer in the Data Collection group, and classified as type "wetland." The polygon boundary of the wetland will be provided by the Resource Evaluation Section.

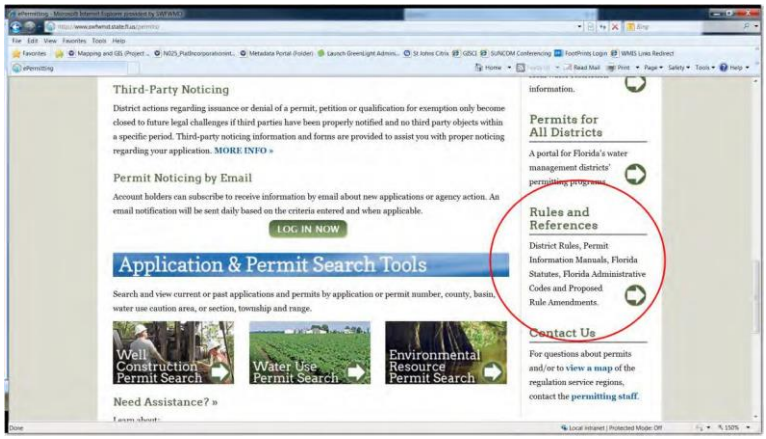
ii. Copy and paste the point to the GIS point feature class and the polygon into the polygon feature class.

iii. Populate fields in both feature classes. Use table in appendix as a guide.

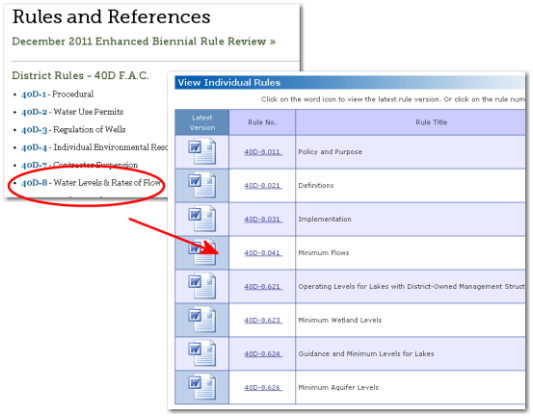
Update Adopted MFLs

When a MFL is adopted, the Resource Evaluation section will notify Mapping & GIS. An alternative way to find adopted MFLs is during the reconciliation of the MFL Priority List. Most of the steps for the types of water bodies (aquifer, lake, river, springs, and wetlands) are the same, but there are a few differences.

1. If the adopted flows or levels were provided by Resource Evaluation, go directly to step 2 below and update appropriate feature classes and tables. If they were not provided, follow the steps below to obtain adopted flow or level values.
   a. Open "watermatters.org," and click on "ePermitting & Rules"
   b. The "Rules and References" section is near the bottom; click the green arrow.



   c. Click on the 40D-8 link, and open the Word document for the waterbody type (i.e. aquifers, lakes, rivers, springs, or wetlands). The adopted flow or level is included in the rule language.



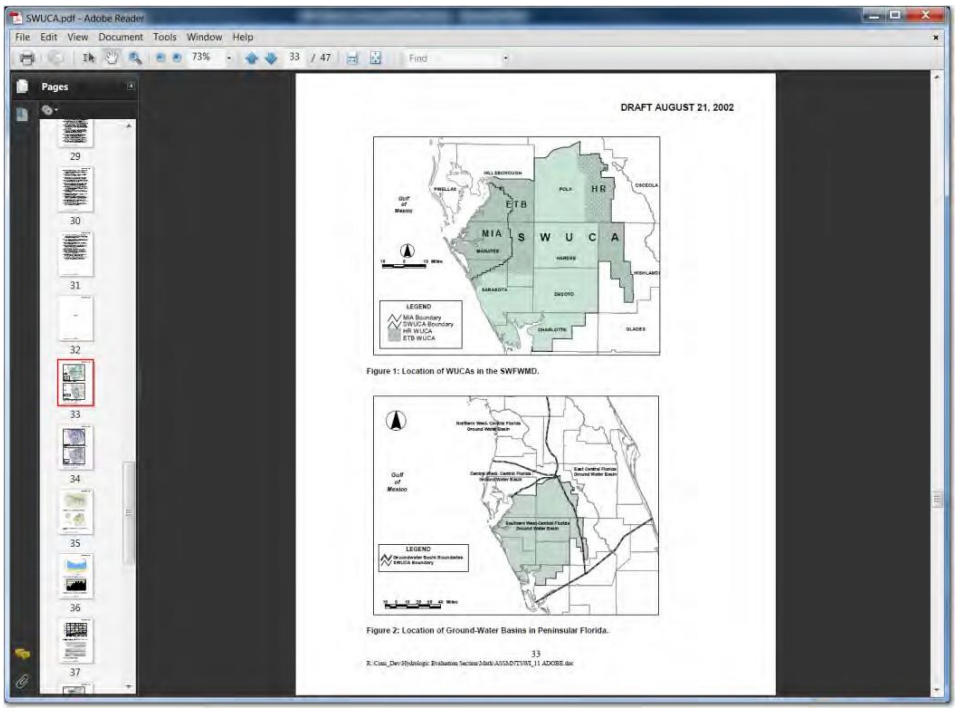
2. Update the MFL Waterbody types
   a. Aquifers
      i. Retrieve the MFL report on the following the link: http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php, and click on the "Groundwater Systems" tab. Save the report for the new MFL to the P:\SpecialProjects\MFLReports\Aquifers folder. This will be linked to the aquifer feature class.
      ii. Update the boundary of the surface area, if required, based on what rule 40D-8 specifies or what the evaluator has provided. The maps in the MFL report are a good source to use.
         (1) For example, the SWUCA Salt Water Intrusion Minimum Aquifer level rule in 40D-8 states that the boundary for the MFL is the Most Impacted Area of the SWUCA.

(2) SWUCA Salt Water Intrusion Miimum Aquifer Level.

(a) The District has determined that ground water withdrawals in the SWUCA have contributed to water level declines that advance saltwater intrusion. The coastal portion of the SWUCA in southern Hillsborough, Manatee and northern Sarasota counties (the Most Impacted Area or MIA) is a priority area for the establishment of minimum aquifer levels because of its proximity to the saltwater interface and the large effect on interface movement caused by lowering of the potentiometric surface in this area. The Salt Water Intrusion Minimum Aquifer Level (SWIMAL) is established to stabilize regional water level declines so that long-term management efforts can slow the rate of regional saltwater intrusion in the MIA. This is based on an average value to address the regional nature of the problem and avoids the potential for localized lowering of a minimum level.

(b) The SWIMAL over the surface of the MIA is 13.1 feet (National Geodetic Vertical Datum of 1929 or NGVD 1929). The SWIMAL is derived using the method set forth in paragraph (2)(c) below.

         (2) Various sources can be used to update the boundary, if necessary. Existing features in SDE can be used, such as the WUCA. The evaluator may provide the boundary, or it may be digitized by hand.
         (3) Often, the MFL Report can be referenced to receive clarification of what the MFL boundaries should look like. The easiest way to find the correct page in the MFL Report is to expand the "pages" option and review any maps that appear on it.



iii. Update the fields in the MFL_AQUIFER_BOUNDARY feature class. Use the table in the appendix as a guide.

iv. Update the "MFL_AQUIFER_WELL_SITES" feature class to include any gauge sites that are listed as part of the rule specifications and were not added while proposed.
   (1) Create a file geodatabase for updates and import MFL_AQUIFER_WELL_SITES to it.
   (2) Open ArcMap project and add MFL_AQUIFER_WELL_SITES just created to it.
   (3) Add the data collection "Groundwater sites" to ArcMap, and select the sites that are associated with the MFL being adopted. The rule will list them by name and site number. Select sites used in the MFL determination, and copy/paste them into the MFL_AQUIFER_WELL_SITES feature class.

v. Update the table for the MFL_AQUIFER_WELL_SITES feature class. Some Aquifer MFLs will have the adopted levels down to the well level, but others will have them only at the boundary level. If they are applied to the individual wells, update the MFL_AQUIFER_WELL_SITES with the adopted levels. Use the table in the appendix as a guide.

vi. Update the "MFL_ADOPTED_AQUIFER_LEVELS" table
   (1) Add the adopted levels
   (2) If adopted levels are for the entire boundary of the MFL, enter one record.
   (3) If the adopted levels are for the well levels, enter a record for each well and enter the level for that particular well.

vii. Update MFL_PRIORITY_LIST to reflect all changes that were just made. Use table in the appendix as a guide.

b. Lakes

i. Retrieve the MFL report by following the link: http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php, and click on the

"Adopted Minimum & Guidance Lake Levels" tab. Save a copy to the P:\SpecialProjects\MFLReports\Lakes folder.

ii. Update the boundary of the lake area in the "MFL_ _LAKES" feature class, if needed. Lakes do not usually need to be updated.

iii. Update the table for "MFL_LAKES." Use the table in the appendix as a guide.

iv. Update the 'MFL_ADOPTED_MFL_LAKE_LEVELS" table with the adopted levels. There is a separate rule section in 40D-8 for post-2000 lakes and another for pre-2000 lakes. If using the rules to enter the adopted levels, make sure it is the post-2000 rules, located in table 8-2. See appendix for more details

v. Update MFL_PRIORITY_LIST. Use table in the appendix as a guide.

c. Rivers

i. Retrieve the MFL report by following the link: http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php, and click on the "Rivers Systems & Springs" tab. Save the report to the P:\SpecialProjects\MFLReports\Rivers folder. End the name in "mfl" because rivers also get an "adopted" report placed in this folder.

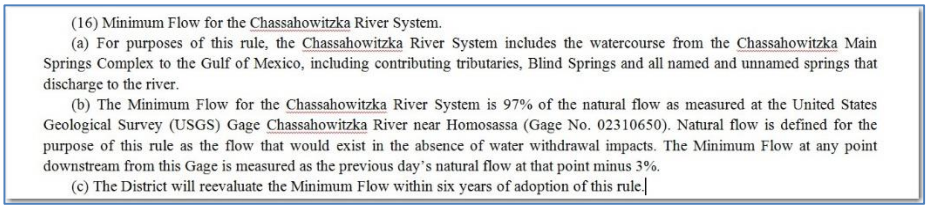
ii. Update the boundary of the MFL feature class, if necessary. Because the boundaries are preliminary when proposed, they will normally need to be updated when adopted.

(1) Tributaries and springs are often included with a river MFL. Tributaries are merged into the main river, and springs are added to the springs feature class. See the "Springs" section for details.

(2) The new boundary information may be obtained by the evaluator, the MFL report, or the 40D-8 rule. The rule section is usually the best source to find contributing tributaries and springs unless they are provided by the evaluator. The MFL report is usually the best source to obtain an overview of the boundaries of the river MFL.

(3) Use "Named SWFMD Hydrographic Features" or "NHD Streams and Canals Group" to create or modify the feature for a river. Select all features that participate in the MFL and copy them into the MFL_Rivers feature class. Merge them all into one feature.

For example, the Chassahowitzka River System is composed of the Chassahowitzka River as the main component. There are several stream tributaries that participate: Crab, Lone Cabbage, Baird, Salt, Potter, Crawford, Blue Run, Ryle, and May. In addition, there are several Springs that participate in the MFL. These are Blind Springs, Crab Creek Spring, Chassahowitzka Main Spring, Chassahowitzka # 1 Spring, Ruth Spring, and Potters Creek Spring.



(16) Minimum Flow for the Chassahowitzka River System.

(a) For purposes of this rule, the Chassahowitzka River System includes the watercourse from the Chassahowitzka Main Springs Complex to the Gulf of Mexico, including contributing tributaries, Blind Springs and all named and unnamed springs that discharge to the river.

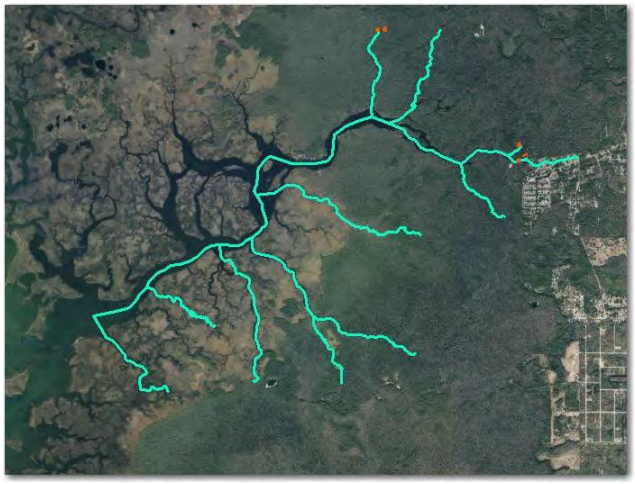
(b) The Minimum Flow for the Chassahowitzka River System is 97% of the natural flow as measured at the United States Geological Survey (USGS) Gage Chassahowitzka River near Homosassa (Gage No. 02310650). Natural flow is defined for the purpose of this rule as the flow that would exist in the absence of water withdrawal impacts. The Minimum Flow at any point downstream from this Gage is measured as the previous day's natural flow at that point minus 3%.

(c) The District will reevaluate the Minimum Flow within six years of adoption of this rule.

(a) The linear parts of the River MFL should be referenced in the MFL rule. However, as can be seen in the example above, the reference may be

generalized and not provide enough information to map the MFL. In this case, the MFL report for the river will need to be referenced. Good places to look on this report are:
(i) Executive Summary (right after table of contents)
(ii) Table of contents
(iii) Maps
(iv) Conclusions and/or recommendations section.

(b) If the contributing tributaries are still not clear, the evaluator will need to provide the areas that should be mapped. Below is a map of the Chassahowitzka River with its tributaries.



ii. Update the table for the MFL_RIVERS feature class. Use the table in the appendix as a guide.

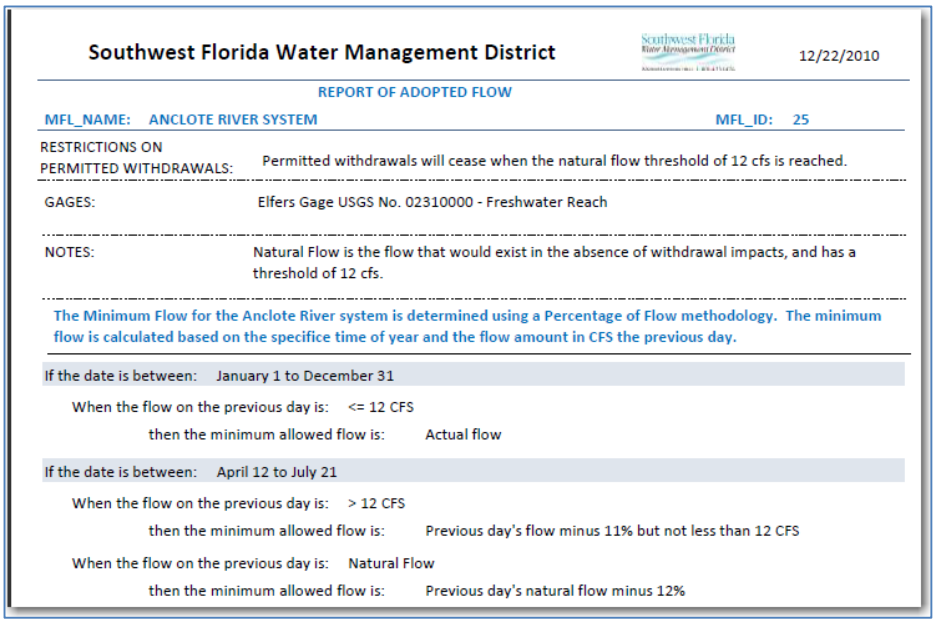
iii. Update the MFL_RIVER_SITES to include monitoring sites that participate in the MFL rule, if any. Often, the MFL flow for rivers are assigned to a gauge site, and these are copied into this feature class.
(1) Import MFL_RIVER_SITES in SDE to the file geodatabase if not done already.
(2) Add the data collection "Surfacewater Sites" to ArcMap, and select the sites that are associated with the MFL being adopted. Copy and paste these sites into the MFL_RIVER_SITES feature class if needed.
(3) Fill in the table for the MFL_RIVER_SITES feature class. Use the table in the appendix as a guide.

iv. Update the "MFL_ADOPTED_RIVER_FLOWS" table based on the MFL flows contained in 40D-8. The fields populated in the table will depend on what type of methodology is applied when determining the minimum flow. Use the best fit, and word it so that it will flow naturally in any report created in the next step. If necessary, add a new field to hold any new types of data. When completely filled in, the fields in this table should narrow down the "specifications" of the minimum flow so that every criteria are accounted for. These will be formatted in a report to make them easier to understand. Below are a few scenarios, which are often combined together
(1) If gages used, list each one in the "GAUGES" field.
(2) If seasonal blocks are used (i.e. periods representing spring, summer, fall, and winter) then the "SEASONAL_BLOCK_DIVISIONS" and "SEASONAL_TIME_BLOCKS" will also be used.

(3) Use the “MINIMUM_FLOW” field to enter the lowest minimum flow for the adopted flows. This field cannot be empty.
(4) If there is a reference to permitted quantities regarding any permit, put the explanation in this field. Sometimes it may be a restriction to a withdrawal, or at other times it may state that the permit withdrawals are considered in compliance.

v. Create a report of adopted flows and place a link in the MFL_RIVER feature class.
(1) Most rivers and springs do not just have one simple value assigned as a minimum flow. Environmental conditions impact the river daily, and the minimum flow is adjusted to take these conditions into account.
(2) The MFL_ADOPTED_RIVER_FLOWS table explained above is used to create the MFL Adopted Report. It has all the criteria and resulting minimum flows for the River MFL.
(3) Use a reporting facility to generate a report. All River and Spring MFLs have a report even if the minimum flow is simple enough to show in a different way. This provides a consistent look and feel to the data, and simplifies the presentation aspect of MFL data.
(4) Helpful hint: use the grouping functions of the report generator to reflect the criteria categories from the largest set to the smallest set that restricts the associated minimum flow. If new types of criteria are introduced, add a new field to the table. DO NOT try to fit “similar” types of data in the fields because this will cause confusion in the long run and be impossible to track.
(5) Export the adopted flow report and copy it to the P:\SpecialProject\MFLReports\Rivers folder. Name it with the word “adopt” at the end so that it is distinguished by the MFL report.

vi. Some examples of formatting that have been used are shown below.
(1) Example with title, permitting restrictions, gage list, notes, and MFL description. The main section shows how the minimum flows are set based on the previous day’s flow within segmented date ranges.



Southwest Florida Water Management District 12/22/2010

REPORT OF ADOPTED FLOW

MFL_NAME: ANCLOTE RIVER SYSTEM MFL_ID: 25

RESTRICTIONS ON PERMITTED WITHDRAWALS: Permitted withdrawals will cease when the natural flow threshold of 12 cfs is reached.

GAGES: Elfers Gage USGS No. 02310000 - Freshwater Reach

NOTES: Natural Flow is the flow that would exist in the absence of withdrawal impacts, and has a threshold of 12 cfs.

The Minimum Flow for the Anclote River system is determined using a Percentage of Flow methodology. The minimum flow is calculated based on the specifice time of year and the flow amount in CFS the previous day.

If the date is between: January 1 to December 31

When the flow on the previous day is: <= 12 CFS

then the minimum allowed flow is: Actual flow

If the date is between: April 12 to July 21

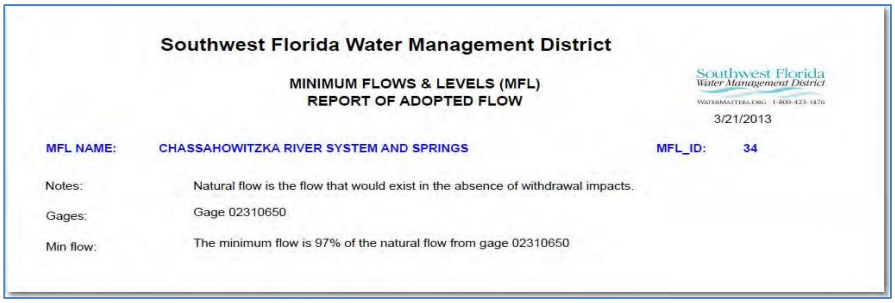
When the flow on the previous day is: > 12 CFS

then the minimum allowed flow is: Previous day's flow minus 11% but not less than 12 CFS

When the flow on the previous day is: Natural Flow

then the minimum allowed flow is: Previous day's natural flow minus 12%

(2) Example of a minimum flow based on the natural flow recorded at a particular gauge site.



Southwest Florida Water Management District

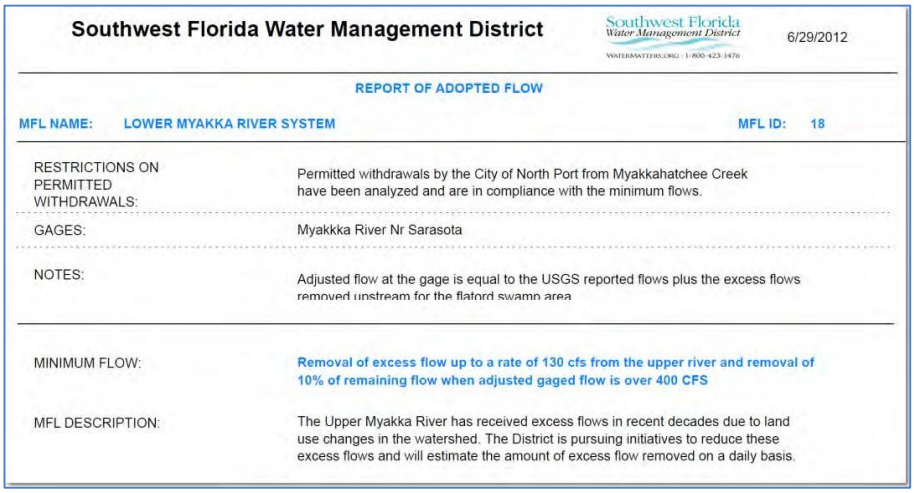
MINIMUM FLOWS & LEVELS (MFL)
REPORT OF ADOPTED FLOW

Southwest Florida Water Management District
WATERMATTERS.ORG · 1-800-423-1476

3/21/2013

MFL NAME:	**CHASSAHOWITZKA RIVER SYSTEM AND SPRINGS**	**MFL_ID:**	**34**
Notes:	Natural flow is the flow that would exist in the absence of withdrawal impacts.		
Gages:	Gage 02310650		
Min flow:	The minimum flow is 97% of the natural flow from gage 02310650		

(3) Example of a minimum flow that involves excess flow.



Southwest Florida Water Management District

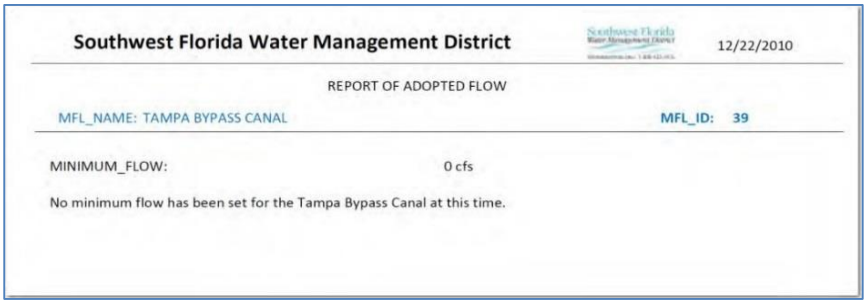
Southwest Florida Water Management District
WATERMATTERS.ORG · 1-800-423-1476

6/29/2012

REPORT OF ADOPTED FLOW

MFL NAME:	**LOWER MYAKKA RIVER SYSTEM**	**MFL ID:**	**18**
RESTRICTIONS ON PERMITTED WITHDRAWALS:	Permitted withdrawals by the City of North Port from Myakkahatchee Creek have been analyzed and are in compliance with the minimum flows.		
GAGES:	Myakkka River Nr Sarasota		
NOTES:	Adjusted flow at the gage is equal to the USGS reported flows plus the excess flows removed upstream for the flatford swamp area		
MINIMUM FLOW:	**Removal of excess flow up to a rate of 130 cfs from the upper river and removal of 10% of remaining flow when adjusted gaged flow is over 400 CFS**		
MFL DESCRIPTION:	The Upper Myakka River has received excess flows in recent decades due to land use changes in the watershed. The District is pursuing initiatives to reduce these excess flows and will estimate the amount of excess flow removed on a daily basis.		

(4) Example of river with no minimum flow set.



Southwest Florida Water Management District

12/22/2010

REPORT OF ADOPTED FLOW

MFL_NAME: TAMPA BYPASS CANAL		**MFL_ID:**	**39**
MINIMUM_FLOW:	0 cfs		

No minimum flow has been set for the Tampa Bypass Canal at this time.

vii. There is a table for “MFL_EXPECTED_RIVER_FLOWS” that has historical data in it. This table was meant to hold values that represent when and if the MFL River met the expected flows in order to be declared in compliance with the MFL

rule. However, this table has never been used, and is no longer updated.

viii. Update the MFL_PRIORITY_LIST. Use the table in the appendix as an example.

b. Springs
   i. Determine if the spring MFL is independent or a part of a River MFL. Open 40D-8, and go to the "Minimum Flows" section. If the spring is assigned its own number, it means that the minimum flows stand alone. If it is not listed on its own, it means that it is incorporated with the River MFL. Don't use the priority list because this data is not always final.
      (1) If independent, retrieve the MFL report by following the link: http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php, and click on the "River Systems and Springs" tab. Save a copy to the P:\SpecialProjects\MFLReports\Springs folder.
      (2) If it is part of a river MFL, the river MFL report will also be linked to the Springs feature class.
   ii. Update the "MFL_SPRINGS" and "MFL_SPRINGS_PNT" feature classes, if necessary. Each spring is mapped, but is categorized differently based on whether it is independent or part of a River MFL.
      (1) Use the MFL report to map the polygon feature of the MFL. Many times the spring area is not completely known. When this happens, leave a general area outlined around the spring.
      (2) Use the "SPRINGS" feature class to determine the general location of the spring, if necessary. It is usually mapped when proposed, so probably not necessary.
   iii. Update the "MFL_SPRINGS" and 'MFL_SPRINGS_PNT" tabular data. Use the table in the appendix as a guide.
      (1) Every spring that participates in the MFL will be mapped separately, so the MFL_ID will not be unique for springs. They cannot be merged together because the spring names are different.
      (2) If the Spring MFL is independent, it will have its own MFL report in the "MFL REPORT" field. If it part of a River MFL, the river's MFL report name will be in this field.
   iv. Update the MFL_ADOPTED_SPRINGS_FLOW table. Only those springs that have independent MFL values will be listed in this table. All others are included as part of the river adopted flows table.
   v. U Update the MFL_PRIORITY_LIST. Use the table in the appendix as a guide.
c. Wetlands
   i. Retrieve the MFL report by following the link: http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php, and click on the "Lake & Wetlands" tab. Save the report to the P:\SpecialProjects\MFLReports\Wetlands folder. Note: at this time there are no proposed wetlands on the priority list.
   ii. Update the boundary and location for the "MFL_WETLAND" and "MFL_WETLAND_LOCATION" feature classes, if necessary. Wetlands are stored as point locations in SDE and are usually depicted at one of the gage stations monitoring it. Wetland monitoring sites are a part of the 'Surfacewater Sites" layer in the Data Collection group, and classified as type "wetland." The polygon boundary of the wetland will be provided by the Resource Evaluation Section.
   iii. Update the table for the MFL_WETLAND_LOCATION feature class. Use the

table in the appendix as a guide.

iv. Update the "MFL_ADOPTED_WETLAND_LEVELS" with the adopted minimum level.
v. Update the MFL_PRIORITY_LIST table. Use the table in the appendix as a guide.

Removal of Proposed MFLs

MFLs should only be removed if they are in proposed status and taken off the Board approved MFL priority list. Remove record from every feature class and table it appears in. If there has been a reevaluation of an adopted flow or level, a new record is added and a new MFL_ID number assigned as in any other proposed MFL. The original MFL is marked as "Historic" in the "MFL_ADOPTED_STATUS" field.

Stressed Lakes

Every year a list of stressed lakes is created by the Water Resource Evaluation section and forwarded to GIS. GIS uses this list to create the Stressed Lakes feature class for that year. The stressed lakes feature classes only apply to pre-2000 adopted lakes.

General overview: First the "MFL_YEAR_ASSESS_GUIDANCE_LAKE" table is updated, second the stressed lake feature class is created, and third the "STRESSEDLAKESBUFFER" feature class is created.

Example of Stressed Lakes List

2013 Stressed Lakes in the Southwest Florida Water Management District

CITRUS COUNTY	WMIS Site ID(s)
1. Bradley	23624
2. Cato	23487
3. Connell	23587
4. Hog Pond (Nina)	23499
5. Holden (Inverness)	23452
6. Little (Consuella)	23628
7. Magnolia	23560
8. Rush (Williams)	23561
9. Twin	23488

HERNANDO COUNTY	WMIS Site ID(s)
1. Elizabeth	23551
2. Francis	23551, 783344
3. Geneva	23551
4. Nicks	20864
5. St. Clair	18292, 741468

Step 1: Update the "MFL_YEAR_ASSESS_GUIDANCE_LAKE" table to include the new year of data in the Stressed Lakes Report. In the method described below, a working copy of the previous year's data will be created, and then changed to match the current year. It is then appended back into the original table.

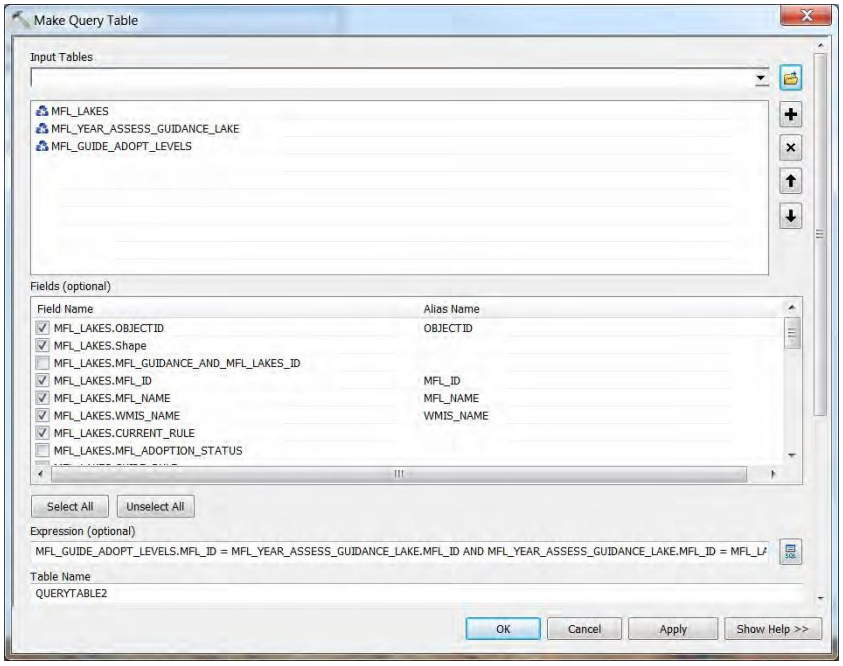
1. Create a file geodatabase named "STRESSED_LAKES_<YEAR>"
2. Import "MFL_<YEAR>_ASSESS_GUIDANCE_LAKE" table from SDE into geodatabase. Leave the name the same.
3. Create an ArcMap project
   a. Add MFL_ LAKES feature class to ArcMap. The SDE version can be used because there will not be any changes done.
   b. Add data collection groundwater sites to the ArcMap project.
   c. Add the imported version of MFL_YEAR_ASSESS_GUIDANCE_LAKE table to ArcMap.

4. Create table for the new year 's "Yearly stressed info"
   a. Select all of the previous year's records from "MFL_YEAR_ASSESS_GUIDANCE_LAKE", and export them into a new table. Name the file "<year>_assess" Put in edit mode.
   b. Select and remove all the values under the field "STRESSED_FLAG"
   c. Change "EVALUATION_YEAR" to current year.
   d. Change the "DATESTAMP_DT" to current date.
5. Open MFL_LAKES table and sort by County and MFL_NAME using the Advanced Sort function. This is done because the stressed lakes list is grouped by county.
6. Relate the "MFL_LAKES" feature class to the "<year>_assess" table just created using the MFL_ID.
7. Select each MFL lake from MFL_LAKE feature class that appears on the stressed lakes list, using this select criteria:
8. In the cases where there is more than one lake with the same name in the county, use the SITE_ID number in the data collection groundwater sites to verify
9. Use only those that are active under the pre-2000 guidance lake levels.
10. Once entire list is selected, relate back to the "year_assess" table, and mark all of these records as being stressed.
11. Switch the selection in the "year_assess" table and mark all of these as not being stressed.
12. Use the append geoprocessing tool to add these records into the 'MFL_YEAR_ASSESS_GUIDANCE_LAKE" table.

Step 2: Create the "STRESSED_LAKES_<YEAR> feature class

1. Use the Stressed_lakes model to join the MFL_LAKES feature class with the "YEAR_ASSESS_CURRENTYEAR" and the "MFL_ADOPTED_GUIDANCE_LAKE_LEV" tables. Have the fields in the same order as the other Stressed Lakes feature classes so that there will not be any schema conflicts. The Stressed lakes model uses the "Make Query Table" geoprocessing tool to pull out the records needed. Make sure there is a value for the alias, otherwise the table name and field name will be joined together to name the field in the new dataset, and the size of the name will be extremely long.

   Dialog Box for "Make Query Table" tool



Other fields selected on the above list are:

Field Name	Alias Name
MFL_LAKES.DATE_GUIDE_APPROVED	DATE_GUIDE_APPROVED
MFL_YEAR_ASSESS_GUIDANCE_LAKE.EVALUATION_YEAR	EVALUATION_YEAR
MFL_YEAR_ASSESS_GUIDANCE_LAKE_STRESSED_FLAG	STRESSED_FLAG
MFL_GUIDE_ADOPT_LEVELS.GUIDE_TEN_YR_LEV_DS	GUIDE_TEN_YR_LEV_DS
MFL_GUIDE_ADOPT_LEVELS.GUIDE_HIGH_LEV_DS	GUIDE_HIGH_LEV_DS
MFL_GUIDE_ADOPT_LEVELS.GUIDE_LOW_LEV_DS	GUIDE_LOW_LEV_DS
MFL_GUIDE_ADOPT_LEVELS.GUIDE_XLOW_LEV_DS	GUIDE_XLOW_LEV_DS
MFL_GUIDE_ADOPT_LEVELS.DATESTAMP_DT	GIS_DATE_STAMP

The query string: First 2 lines sets the joins, and next 2 sets the criteria

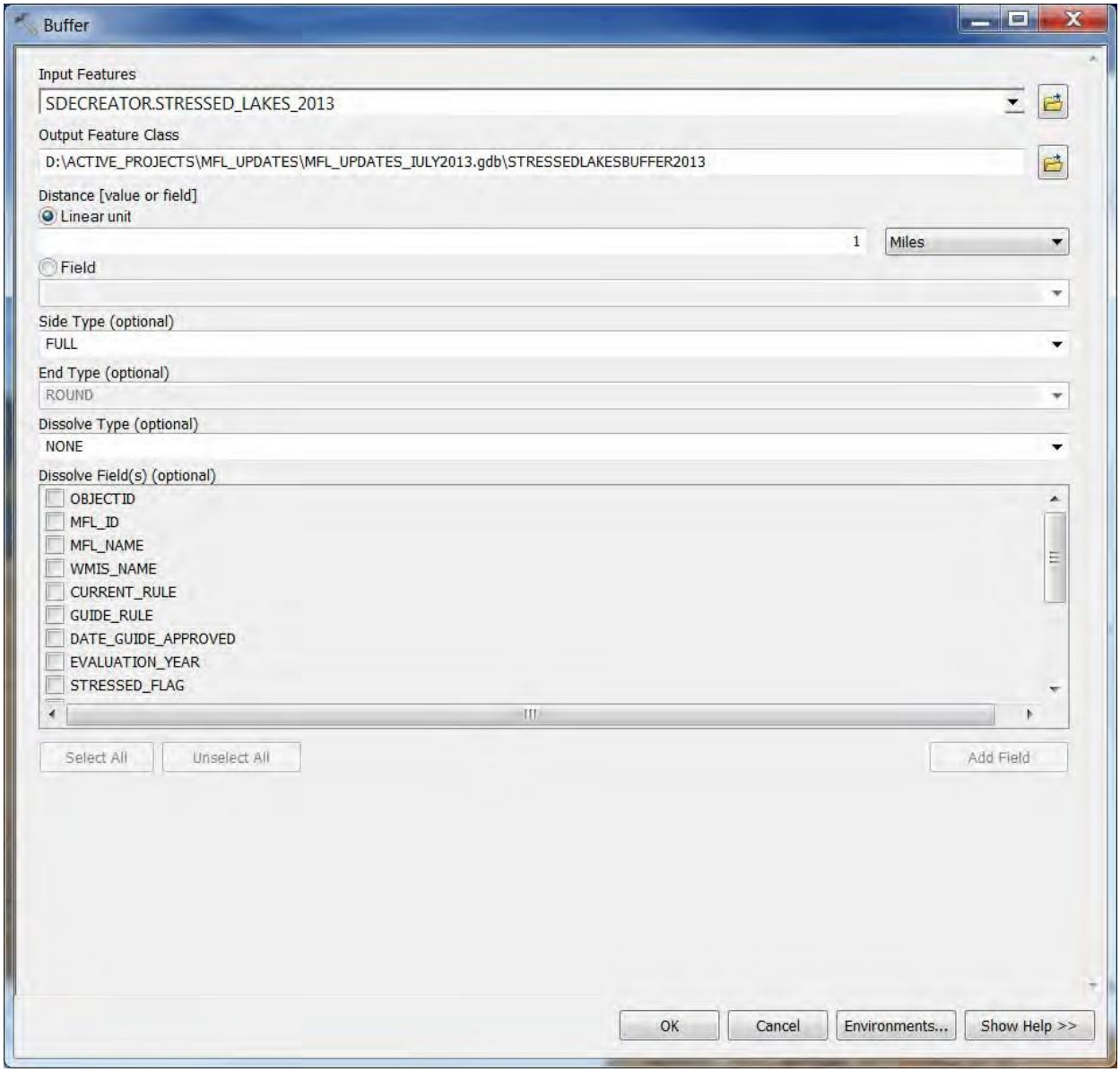
MFL_GUIDE_ADOPT_LEVELS.MFL_ID

= MFL_YEAR_ASSESS_GUIDANCE_LAKE.MFL_ID
AND
MFL_YEAR_ASSESS_GUIDANCE_LAKE.MFL_ID = MFL_LAKES.MFL_ID
AND
MFL_YEAR_ASSESS_GUIDANCE_LAKE.EVALUATION_YEAR =2013
AND
MFL_YEAR_ASSESS_GUIDANCE_LAKE.STRESSED_FLAG = 'Y'

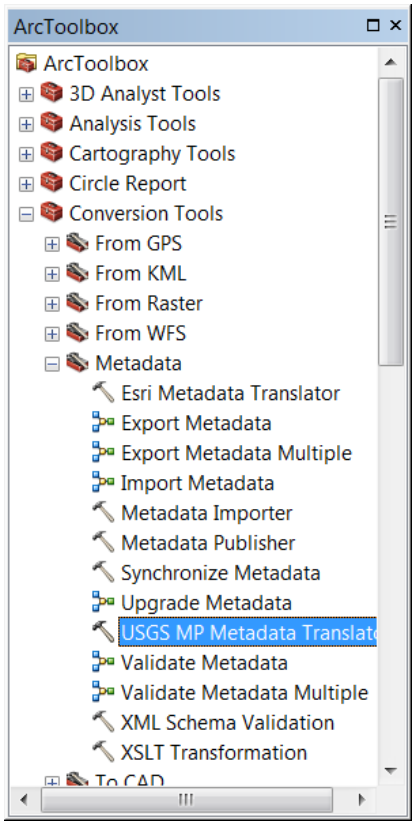
2. Use the "Copy Features" tool to save the temporary output of the Query Tool into a file geodatabase.
3. Add metadata to the new stressed lakes feature class. Detailed instructions are included in the metadata section in the "Stressed Lakes Buffer" section of this SOP. Assistance with metadata can be obtained at: http://bkvvmweb01p/gis/Metadata/MetadataStandards/MetadataStandardsMain.htm
   a. Export metadata from the previous year's stressed lake feature class.
   b. Import to current year's stressed lake feature class.
   c. Make revisions to update to match this year's feature class, and save.

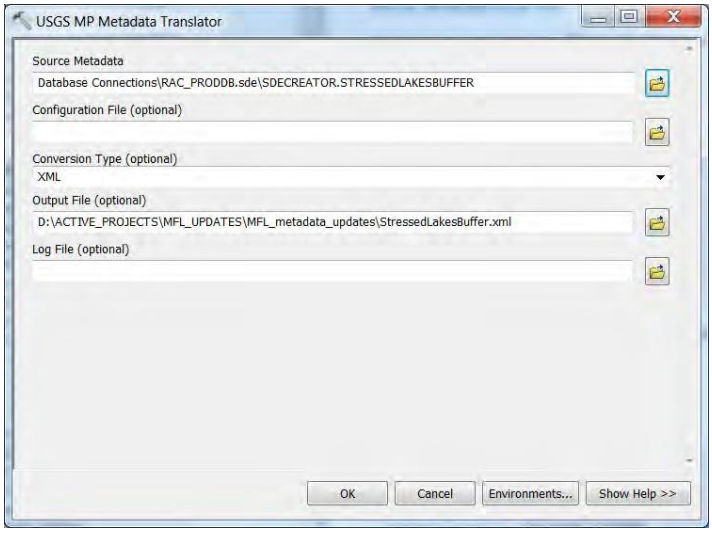
Step 3: Create the "STRESSEDLAKESBUFFER" feature class
Once the stressed lakes feature class is created, a feature class showing a 1-mile buffer is also created. This is used in the permitting process to determine which permits are near a lake that is stressed.

1. Add the most recent version of the stressed lakes feature class into ArcMAP, if it is not already there
2. Open the buffer geoprocessing tool, and fill out the dialog as below, and click OK.

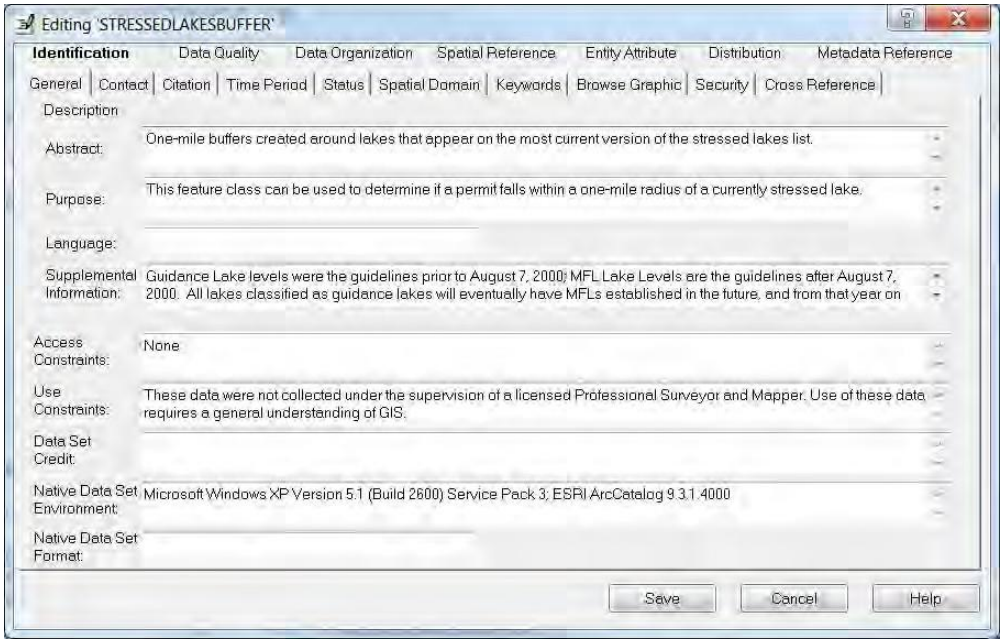


3. Create metadata for new feature class
   Note: for help on metadata, go to:
   http://bkvvmweb01p/gis/Metadata/MetadataStandards/MetadataStandardsMain.htm
   a. Export existing metadata from previous year
      ArcToolbox > Conversion Tools > Metadata > USGS MP Metadata Translator Note: Make sure the output file ends with an .xml





4. Go to ArcCatalog to edit metadata to fit current buffered feature class. Click on the "FGDC Add-in Edit Metadata" button. Go through the tabs and make required changes.



5. Send to the GIS Database and Server Administrator or to the GIS Database and Server Analyst to enter into SDE. The feature class is used by WMIS programs to identify any permit applications that are within 1 mile of a lake that is currently designated as stressed.
   b. Request to rename the current version of "STRESSEDLAKESBUFFER" that is in SDE to add the previous year to the end of file name. For example, when the 2013 stressed lakes list comes out, the 2012 year will be renamed from "STRESSEDLAKESBUFFER" to "STRESSEDLAKES12BUFFER"
   c. The new version should be added as a new file because the previous version has been renamed.

Compliance MFLs

Starting in 2012, each MFL is evaluated yearly for compliance to adopted flows or levels. The exception are lakes adopted prior to 2000, which are evaluated in the stressed lakes process described above. This data is contained in the "MFL_COMPLIANCE FDEP_REPORT" table.

1. The Resource Evaluation Section will notify GIS when the FDEP Compliance Report is finalized. GIS will then obtain the supporting spreadsheet from Collaboration. The link will be provided by the Resource Evaluation Section.

   Portion of FDEP Compliance Spreadsheet

A	B	C	D	E	F	G
Resource Type	WUCA	County	# Met	Name - Met	# Not Met	Name - Not Met
	SWUCA	Hillsborough, Manatee, Sarasota			1	SWUCA SWIMAL
	DPC	Hillsborough			1	DPC MAL
Groundwater	NTB	Hillsborough	3	RMP-13D** RMP-8D** Sheldon Road**		
		Pinellas	4	201-M EW 2S Deep SWI-18S Tarpon Road Deep**		
		Hillsborough	7	CBRWF #32 CR1* CR2 CR3 CR4** CR6 MBWF X-4	7	COSME WF WETLAND CR5** EWWF NW-44** MBWF CLAY GULLY CYPRESS MBWF ENTRY DOME MBWF UNNAMED* S21 WF NW-53 EAST
						CBARWF O-1

Note: The compliance report calls the resource types by different names than the rest of GIS feature classes and tables. Below is a list of the differences:

FDEP Report Name	GIS Name
Groundwater	Aquifers
Rivers	Rivers – freshwater segment
Estuaries	Rivers – Estuarine segment

2. Format the spreadsheet to be compliant to database standards.
   Background: The spreadsheet is grouped by resource type, WUCA, and county. For each group, there is one column for those MFLs that met their adopted levels and another for those that did not. The "Name – Met" column is not necessarily the MFL name, but the source name used to track compliance to the adopted flows or levels.
3. If there is a section below the list that contains statistics, delete it. (Note: it would usually be at the bottom of the data, if present.)
4. Enter a field for MFL_ID, MET_FLAG, "EVALUATION_YEAR", and COMMENT. Change the name of Name-Met to WATERBODY_NAME.
5. Enter "YES" in the "MET_FLAG" field for every waterbody listed in the "Name – Met" column.
6. The waterbodies in the "Name – Not Met" column need to be moved into an independent row. Make sure that the groupings our Resource type, WUCA, and county are maintained. If there is a blank line in the "Waterbody_name" column, then this can be used. Enter "NO" in the "MET_FLAG" column. Once done, delete the column named "Name – Not Met"
7. Water body names cannot be in all CAPs. Make any corrections as necessary. If in doubt, use existing compliance table to determine how the name has been formatted in the past.
8. The resource type, WUCA, and County are all grouped in the spreadsheet. Fill in all blank cells with the appropriate information.
9. Any characters such as "**, #" need to be removed from the Waterbody name.
10. Use the # met and # not met columns to ensure all information has been manipulated correctly. After this step is done, both columns can be deleted.
11. The table should now appear as in the figure below.

A	B	C	D	E	F	G
Resource_Type	WUCA	County	WATERBODY_NAME	MFL_ID	MET_2012	COMMENT
Groundwater	SWUCA	Hillsborough, Manatee, Sarasota	SWUCA SWIMAL	1	NO	
Groundwater	DPC	Hillsborough	DPC MAL	511	NO	
Groundwater	NTB	Hillsborough	RMP-13D**	2	YES	
Groundwater	NTB	Hillsborough	RMP-8D**	2	YES	

Once the spreadsheet has been formatted it will need to be imported into GIS and assigned the ID numbers for the fields in the figure below (the example above has the MFL_IDs, but they will not exist at this stage). These fields are used to join the FDEP compliance report to the GIS layers.

	MFL_ID	MFL_SPRING_ID	MFL_AQUIFER_WELL_SITES_ID	MFL_RIVERS_ID
d	25	<Null>	<Null>	5
d	545	<Null>	<Null>	42
8	8	<Null>	<Null>	43
8	8	<Null>	<Null>	24
8	8	<Null>	<Null>	44
	1	<Null>	<Null>	<Null>
	511	<Null>	24	<Null>
	2	<Null>	23	<Null>

12. Import spreadsheet into a new file geodatabase and name it “Compliance<year>”.
    Note: Even though Excel spreadsheets can be viewed in ArcMap, a join needs to be done so the ObjectID numbers created with the import are necessary
13. Do a summary on the “WATERBODY_NAME” field in the “Compliance<year> table and add the resulting table to ArcMap. Take note of counts over 1 because the join conducted below will not work for these, and they will have to have the ID numbers assigned separately.

Table

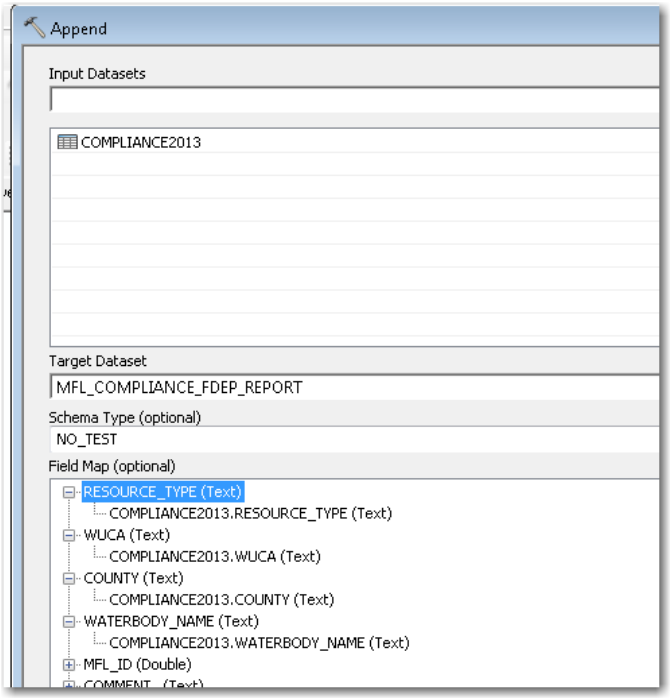
Sum_Output_2

OID	WATERBODY_NAME	Count_WATERBODY_NAM
6	Bird Lake	2
199	Weeki Wachee	2
0	201-M	1

14. Join “Compliance<year>” to “MFL_COMPLIANCE FDEP_REPORT” using the “WATERBODY_NAME” field.
    a. For any of those that had a count of above one in the summary, locate the appropriate MFL using the water resource type, county, and waterbody name and comparing it to any existing data. Enter the values for the ID fields manually. This should only be required for lakes.
    b. Save the joined table, making sure all the “ID” fields are visible
        i. MFL_ID
        ii. MFL_SPRINGS_ID
        iii. MFL_AQUIFER_WELL_SITES_ID
        iv. MFL_RIVERS_ID
15. Import SDE version of “MFL_COMPLIANCE FDEP_REPORT” table into a file

geodatabase, if not already done.

16. Use the Append Geoprocessing tool to append “compliance<year> table into ‘MFL_COMPLIANCE_FDEP_REPORT” table. Choose Schema Type to no test to review that all fields are mapped correctly.



17. Provide the GIS Database and Server Administrator or the GIS Database and Server Analyst the new table to enter into SDE

Appendix 1 – Field definitions for MFL feature classes and tables

MFL_PRIORITY_LIST	
FIELD	**EXPLANATION OF USE**
MFL_ID	Unique identifier that links all MFL components together. Use next available number. This number will be associated with all other feature classes and tables to link all aspects of MFL data together.
MFL_NAME	The name of the MFL as close as it appears on the official Priority List as possible.
WATERBODY_TYPE	Category for MFLs. Choices are aquifer, lake, wetland, river, or spring.
GIS_UPDATE_DT	Enter the date of the most recent edit.
PRIORITY_LIST_ID	The unique identifier for the priority list; use the next available number.
PRIORITY_LIST_ADOPT_ OR_PROPOSED	Indicates if the MFL is proposed or adopted.

BOUNDARY_PRELIM_OR_ COMPLETE	An indicator of whether the MFL boundary is complete or preliminary. Preliminary boundaries usually appear in river or spring MFLs because the boundary cannot be finalized until the study area has been selected.
ADOPTED_LEVEL_FLOW_ UPDATED	A yes/no field that indicates if the adopted flow or level table has been updated. Enter “yes” once the table has been updated.
ADOPT_REPORT_CREATED	A yes/no field that indicates whether the report was created. At the current time, this field only applies to rivers and springs.
WELL_SITES_ADDED	Aquifer and rivers often assign adopted flows or levels at a specific monitor site. Enter “no” when proposed; once adopted and the appropriate wells have been added to one of the well site feature classes, this will be changed to “yes”.
RULE_HISTORY	This field is for Lakes only. Provides the history of the Pre-2000 and Post-2000 adopted lakes. The options are: 1) Guidance Only 2) Guidance and MFL 3) MFL only
COMMENTS	Used to clarify any information

MFL_AQUIFER_BOUNDARY	
Identifies the surface area of an aquifer with assigned minimum levels.	
FIELD	**EXPLANATION OF USE**
MFL_AQUIFER_BOUNDARY_ID	Unique identifier for the MFL Aquifer Boundary feature class
MFL_ID	Unique identifier that links all MFL components together. Use next available number. This number will be associated with all other feature classes and tables to link all aspects of MFL data together.
MFL_NAME	The name of the MFL as close as it appears on the official Priority List as possible.
ADOPTED_STATUS	A flag to indicate whether the MFL has been adopted, or is still proposed.
DATE_BOARD_APPROVED	Add the month and year the Governing Board approved the minimum flow for the spring.
ADOPTED DATE	Date the MFL rule is filed with the Department of State.
EFFECTIVE_DATE	The date the MFL rule becomes final; 20 days after the adopted date, unless a later date is specified in the rule, or as provided by law.

MFL_REPORT_NAME	The name of the MFL Report written as an assessment of the study conducted on the aquifer to determine what the natural water levels should be.
DATE_STAMP_DT	Enter the date of the last edit.
PROPOSED_YEAR	The year the proposed MFL is slated to be adopted on the MFL Priority List.
PARCEL NAME	Name of the area on the ground that corresponds to the aquifer boundaries.

MFL_AQUIFER_WELL_SITES	
Location of the wells used to determine minimum levels of the aquifer.	
FIELD	**EXPLANATION OF USE**
MFL_AQUIFER_WELL_SITES_ID	Unique identifier for this feature class.
MFL_ID	Use the MFL ID number that is assigned.
USGS_NUMBER_ID	USGS number, which should be included in the transfer from the “Groundwater site” layer.
ALTERNATE_WELL_NAME1	If the well is known by another name, enter it here.
AQUIFER_ID	The code value for an aquifer. This corresponds to the “WM_AQUIFER_CD” field in the “Groundwater Site” feature class.
SURFACE_LOCATION	Area on the surface that corresponds to the aquifer with the MFL assigned to it. Example would be a Water Use Caution Area.
WELL_NAME	Name of the well used in analysis. This should correspond to the “SITE_NAME” field in the “Groundwater Site” feature class.
USE_OF_WELL	A short description on how the well was used during MFL establishment.
WUP NUMBER	Water Use Permit number associated with the MFL waterbody
WUP WELL	Name of the well site used in calculating MFL levels
DATE_STAMP_DT	Enter the current date of the most recent edit.
SITE_ID	The unique site id assigned to a point of interest at the District. This is automatically assigned by the WMIS application, and will be transferred from the “Groundwater site” layer.
MFL_MIN_LEV_DS	The minimum water level the aquifer can reach and sustain the ecosystem. This value will be filled in when the minimum level is set over the well system, but left blank when the minimum level is set over the polygon area of the surface location.

MFL_ADOPTED_AQUIFER_LEVELS	
Contains the adopted levels of the aquifer water body type.	
FIELD	**EXPLANATION OF USE**
MFL_AQUIFER_WELL_SITES_ID	The id number of the corresponding aquifer monitor well site used to calculate MFL.
MFL_ADOPTED_AQUIFER_LEVELS_ID	The ID number of the table
WELL_NAME	Name of well, if any, that the minimum level is set at.
MFL_MIN_LEVEL_DS	The minimum water level the aquifer can reach and sustain the ecosystem.
MFL_ASSESSMENT	Description of how the minimum level is distributed over the designated MFL area. Choices are over the polygon area or over the well system.
COMMENTS_TXT	Text providing additional information about the MFL.
DATE_STAMP_DT	Enter the current date of the most recent edit.
MFL_GOAL	A brief description of how the MFL is meant to improve the ecology of the surrounding water system.

MFL _LAKES	
Contains the boundaries of lakes with MFL rules attached to them.	
FIELD	**EXPLANATION OF USE**
MFL_LAKES_ID	Unique identifier for this feature class. Enter the next available number.
MFL_ID	Unique identifier that links all MFL components together. Use next available number. This number will be associated with all other feature classes and tables to link all aspects of MFL data together.
MFL_NAME	Use the name assigned on the MFL_PRIORITY_LIST.
CURRENT_RULE	Describes what rule the lake is governed by. Choice is Guidance or MFL
MFL_ADOPTION_STATUS	A flag to indicate whether the MFL has been adopted, or is still proposed.
GUIDE_RULE	Yes or no flag indicating if a lake is, or ever has been, covered under the “Guidance” rule (pre 2000). Once a guidance lake has existed, the value will always be “yes” so that historical information will be preserved.
MFL_RULE	If MFL has guidance rules associated with it, leave as “No” until adopted; otherwise mark as “Yes.”

DATE_MFL_BOARD_APPROVED	Enter the month and year that the MFL was approved at the Governing Board.
MFL_REPORT_NAME	Enter the name of the MFL report.
DATE_GUIDE_APPROVED	The month and year that the MFL was approved at the Governing Board.
MFL_REPORT_PATH	A hyperlink that opens the MFL report created by Ecologic Evaluation. See the other adopted MFL Lakes for the full path name. Add the name of the report after the path.
DATESTAMP_DT	The date record last modified.
COUNTY	The name of the county the MFL lake is located in.
ADOPTED_DATE	Date the MFL rule is filed with the Department of State.
EFFECTIVE_DATE	The date the MFL rule becomes final; 20 days after the adopted date, unless a later date is specified in the rule, or as provided by law.

MFL_ADOPTED_MFL_LAKE_LEVELS	
This table is used to obtain the MFL levels established for lakes.	
FIELD	**EXPLANATION OF USE**
MFL_ADOPTED_MFL_LAKE_ LEVELS_ID	The unique identifier for the MFL_ADOPTED_MFL_LAKE_LEVELS table. Use the next available number.
MFL_ID	Enter the number assigned on the MFL_PRIORITY_LIST.
MFL_MIN_LEVEL_DS	Obtain the value from the “Minimum Lake Level” column in Table 8-2 of the 40D-8 rule.
MFL_HIGH_MIN_LEVEL_DS	Obtain the value from the “High Minimum Lake Level” column in Table 8-2 of the 40D-8 rule.
MFL_HIGH_GUIDANCE_LEVEL_DS	Obtain the value from the “High Guidance Level” column in Table 8-2 of the 40D-8 rule.
MFL_LOW_GUIDANCE_LEVEL_DS	Obtain the value from the “Low Guidance Level” column in Table 8-2 of the 40D-8 rule.
TEN_YEAR_FLOOD_LEVEL_DS	Do not fill in. No longer used.
HIST_NORMAL_POOL_DS	Do not fill in. No longer used.
COMMENTS_TEXT	Text providing additional information about the MFL.
DATESTAMP_DT	The date of the last edit.

MFL_RIVERS	
Contains the linear features and the watershed areas of rivers with rules attached to them.	
FIELD	**EXPLANATION OF USE**
MFL_ID	Enter the number assigned on the MFL_PRIORITY_LIST.

MFL_NAME Use the name of the MFL as close as it appears on the Priority List as possible.MFL_RIVER_ID Unique identifier for this feature class.GAGE	The name of the gage used in the study
MFL_ADOPTED_STATUS	A flag to indicate whether the MFL has been adopted, or is still proposed.
PROPOSED_YEAR	The year the proposed MFL is slated to be adopted on the MFL Priority List.
DATE_BOARD_APPROVED	The month and year that the MFL was approved at the Governing Board.
MFL_REPORT_NAME	Enter the name and location of the MFL report that are contained in the p:\special projects folder. This is available once the MFL is adopted. See other records in field to see correct path name.
TRIBUTARIES	The tributaries include only those that are used during the evaluation.
GIS_UPDATE_DT	The date record last modified.
END_POINTS	The beginning or ending points of the river.
MFL_DESCRIPTION	Describes the purpose of the MFL regarding what it is meant to accomplish.
COMMENTS	Any miscellaneous information that users need to know.
ADOPTED_FLOW_REPORT_NAME	A report that depicts the adopted flows in an easy-to-understand format. See other records in field for path name.
ADOPTED DATE	Date the MFL rule is filed with the Department of State.
EFFECTIVE DATE	The year the proposed MFL is slated to be adopted on the MFL Priority List.

MFL_RIVER_SITES	
This data layer was created to reflect the location of the wells used in calculating the minimum flows for rivers as set forth in 40D-8.	
FIELD	**EXPLANATION OF USE**
MFL_RIVER_SITES_ID	The unique identifier for the MFL_RIVER_SITES feature class.
MFL_ID	A unique identifier that links the MFL between the feature classes and tables. Use the next available number. This number will be used for every component of the MFL.
SITE_ID	The unique site id assigned to a point of interest at the District. This is automatically assigned by the WMIS application, and will be transferred from the “Groundwater site” layer.
SITE_NAME	The District's site name. A unique name for a specific site that was chosen by the individual originally requesting the site.
WATER_BODY_NAME	The name of the water body the minimum flow is being set for.

DEP_SITE_NBR	The unique identifier assigned by DEP site number, if associated with DEP.
USGS_SITE_NBR	The unique identifier assigned by the USGS.
GIS_UPDATE_DT	Enter the current date of the most recent edit.

MFL_ADOPTED_RIVER_FLOWS	
This table is used to obtain the MFL levels established for Rivers and Estuaries	
FIELD	**EXPLANATION OF USE**
MFL_ADOPTED_RIVER_FLOWS_ID	A unique identifier for the MFL_ADOPTED_RIVER_FLOWS_ID table.
MFL_ID	Enter the number assigned on the MFL_PRIORITY_LIST.
GAGES	Identifies the gages utilized in gathering data for use in study and research.
SEASONAL_BLOCK_DIVISIONS	Name given to designate time divisions in the data study. Examples are: Annual, Seasonal Blocks 1, 2, and 3.
SEASONAL_TIME_BLOCKS	Includes the beginning day and ending day of the related Seasonal Block Divisions.
PREVOUS_DAY_FLOW	The rate of the water flowing through the gage during the previous day. Usually used to determine the daily available flow.
MINIMUM_FLOW	The minimum flow amount that can be withdrawn from a MFL waterbody.
PERMITTED_WITH_RESTRICTIONS	Specific withdrawal limitations set on Water Use Permits utilizing a waterbody with a MFL set on it.
DEFINITIONS_AND_COMMENTS	Provides clarification on terms or calculations used with any aspect of the minimum flow values set for river.
DATE_STAMP_DT	Enter the current date of the most recent edit.
MFL_DESCRIPTION	Describe the purpose of the MFL regarding what it needs to accomplish.

MFL_SPRINGS

This feature class contains all springs that have, or will have, Minimum Flows established and published in Chapter 40D-8, FAC.

FIELD	EXPLANATION OF USE
MFL_ID	Enter the number assigned on the MFL_PRIORITY_LIST. If spring is part of a River MFL, then that MFL ID is used. If it is independent, then it is assigned its own number. In some cases the status may not have been know when proposed, so this field may need to be updated. If so, then the Spring MFL information must be adjusted through all tables and feature classes associated with it.
MFL_NAME	Use the name of the MFL as close as it appears on the Priority List as possible. If spring is part of a River MFL, use that; if independent, use the Spring name
SPRING_NAME	The name of the spring.
MFL_DESCRIPTION	Describes the purpose of the MFL regarding what it is meant to accomplish. When the Spring is part of a River MFL, enter: “Main study is conducted under <name> MFL in the River Estuary MFLs.”
MFL_ADOPTION_ STATUS	A flag to indicate whether the MFL has been adopted, or is still proposed.
DATE_BOARD_ APPROVED	The month and year that the MFL was approved at the Governing Board.
MFL_SIZE_ACRES_MS	The size in acres of the spring.
END_MEMBERS	Features that start or end the area of influence for the spring area.
COMMENTS_TXT	Any miscellaneous information that users need to know.
DATE_STAMP_DT	The date record last modified.
ADOPTED_FLOW_ REPORT_NAME	Enter the path name of the MFL report that is contained in the p:\special projects folder. This becomes available once the MFL is adopted. If part of a River MFL, then reference that report. If independent, reference the Spring MFL report. Note: one will be in the River folder and the other in the Spring folder.
MFL_REPORT_NAME	Enter the path name of the MFL report that is contained in the p:\special projects folder. This becomes available once the MFL is

	adopted. If part of a River MFL, then reference that report. If independent, reference the Spring MFL report. Note: one will be in the River folder and the other in the Spring folder.
PROPOSED_YEAR	The expected year to set MFL priorities on the waterbody.
MFL_SPRINGS_ID	Unique identifier for this feature class

MFL_ADOPTED_SPRINGS_FLOW	
This table is used to obtain the adopted levels established for springs.	
FIELD	**EXPLANATION OF USE**
MFL_ADOPTED_SPRINGS_LEVELS_ID	The unique identifier for the MFL_ADOPTED_SPRINGS_LEVELS table.
MFL_ID	A unique identifier that links the MFL between the feature classes and tables. Use the next available number. This number will be used for every component of the MFL.
MIN_FLOW_CFS_MS	The minimum flow per cubic feet per second.
DATE_STAMP_DT	Date of last edit.
COMMENTS_TXT	Text providing additional information about the MFL.
CRITERIA_1	Description of site-specific criteria that must be met to meet adopted flow.
CRITERIA_2	Description of a second set of site-specific criteria that must be met to meet adopted flow.

MFL WETLAND_LOCATION **MFL_WETLAND**	
Contains the locations and boundaries of the MFL wetlands.	
FIELD	**EXPLANATION OF USE**
MFL_ID	Enter the number assigned on the MFL_PRIORITY_LIST.
MFL_WETLAND_LOCATION_ID	Unique identifier for this feature class.
ADOPTION_STATUS	Adopted or proposed.
DATE_BOARD_APPROVED	If proposed, put in N/A; if adopted, put in month/year of adoption.
GROUND_ELEVATION_MS	The elevation of the wetland's water level.

LATITUDE	The latitude the wetland is located.
LONGITUDE	The longitude the wetland is located.
WETLAND_TYPE	How the wetland is categorized.
MFL_NAME	Use the name of the MFL as close as it appears on the Priority List as possible.
MFL_REPORT_PATHThe name of the MFL Report written as an assessment of the study conducted on the wetland to determine what the natural water levels should be.ALTERNATIVE NAME	A second name the wetland is commonly referred to.
DATE_STAMP_DT	The date record last modified.
ADOPTED_DATE	Date the MFL rule is filed with the Department of State.
EFFECTIVE_DATE	The date the MFL rule becomes final; 20 days after the adopted date, unless a later date is specified in the rule, or as provided by law.

MFL_ADOPTED_WETLAND_LEVELS	
This table is used to obtain the MFL levels established for wetlands.	
FIELD	**EXPLANATION OF USE**
MFL_ID	A unique identifier that links the MFL between the feature classes and tables. Use the next available number; this number will be used for every component of the MFL.
MFL_ADOPTED_WETLAND_LEVELS_ID	The unique ID for the MFL_ADOPTED_WETLAND_LEVELS table.
MIN_LEVEL_MS	The minimum level set for a wetland area.
DATE_STAMP_DT	The date of the last edit.

MFL_COMPLIANCE_FDEP_REPORT	
This table is used to provide results of the yearly assessment of waterbodies	
FIELD	**EXPLANATION OF USE**
RESOURCE_TYPE	The type of waterbody found in the report. For this report, the types are groundwater, rivers, estuaries, lakes, springs, and wetlands.
WUCA	A geographic region with special rules or orders designated due to water concerns.

	If a MFL falls within a WUCA, it is listed here.
COUNTY	The county the MFL is located in.
WATERBODY NAME	The name of the Minimum Flow and Level waterbody.
MFL_ID	A unique identifier that links the MFL between the feature classes and tables. Use the next available number; this number will be used for every component of the MFL.
COMMENT	Area to place miscellaneous information
MFL_SPRINGS_ID	Unique identifier for the MFL_SPRINGS feature class. Used to link table to the springs.
MFL_AQUIFER_WELL_SITES_ID	Unique identifier for the MFL_AQUIFER_WELL_SITES feature class. Used to link table to aquifer wells.
MFL_RIVERS_ID	Unique identifier for the MFL_AQUIFER_WELL_SITES feature class. Used to link table to river gages.
EVALUATION YEAR	The year the evaluation was studied.
MET FLAG	Flag to indicate whether or not the minimum flor or level was met fot the specified year.
MFL_COMPLIANCE_STATUS_REPORT	Link to the original report generated on a yearly basis.

Creator: C. Glenn
Date: 6/13/2013
Revision # Original
Date of last review: 5/4/2016

MFL Layer Update Schedule

Purpose
The purpose of this document is to provide a SOP for scheduling updates on MFL data layers.

Scope
This document covers the responsibilities between the Mapping & GIS Section and the Resource Evaluation Section for following a schedule for updating MFL feature classes

Procedures
1. Once a year the *Board Approved Minimum Flows and Levels Priority List and Schedule* is updated (usually October). When this list is approved and posted on the District's Web page, the following steps will be conducted by the Mapping & GIS Section:
   a. Update GIS's MFL_PRIORITY_LIST to match new list. If a new water body appears on the Board's list, it is added to the GIS list. Likewise, if a water body is removed from the Board list, it is removed from the GIS list.
   b. Map new proposed MFLs to the appropriate feature class.
   c. Remove project boundaries for any MFL that has been removed from the priority list.
   d. Look for previously proposed MFLs that have been moved to the "adopted" portion of the list. If there is one, Mapping and GIS will update the appropriate GIS tables.
2. When MFL levels or flows have been adopted by the Board for any proposed water body, the following steps will be conducted:
   a. The Resource Evaluation Section will notify Mapping & GIS within two weeks that the water body has been adopted. A copy of the written rule will be forwarded.
   b. Mapping & GIS will update the MFL records as appropriate for each MFL type.
   c. Mapping & GIS will create an "Adopted Flow Report" for rivers and springs, which is approved by the Springs and Environmental Flows and Resource Evaluation Sections.
3. Once a year in January the list of stressed lakes is produced for the lakes adopted under the pre-2000 guidance lake rules. The Resource Evaluation Section will forward this list to Mapping & GIS, and Mapping & GIS will update the MFL records as appropriate.

Parcel Data QC Procedures

Purpose

The purpose of this document is to provide a SOP of the quality control (QC) process for the parcel data that the District receives as a result of the Parcel Acquisition Project.

Background

In past years, the Northwest Florida Water Management District (NWFWMD), South Florida Water Management District (SFWMD), St. Johns River Water Management District (SJRWMD), Southwest Florida Water Management District (SWFWMD), and Suwannee River Water Management District (SRWMD) have all, independently, used vendors to collect and standardize parcel data for internal business processes. Each water management district (WMD) utilizes these data to support internal permitting, land acquisition, engineering and other activities. More recently, the WMDs have coordinated with each other to create a common/standardized schema that is used by a single vendor to deliver to each District their respective counties, while also splitting the cost for those counties that are shared by more than one District. When all WMDs are able to participate, a statewide parcel dataset is usually produced (semiannually and when funding is available) and provided to agencies such as Florida Resources and Environmental Analysis Center (FREAC), Florida Division of Emergency Management (FDEM), and University of Florida's GeoPlan Center.

Scope

The vendor/contractor gathers updated parcel data for SWFWMD and the other participating WMDs on a semiannual basis. Each WMD has varying attributes they are interested in, and the dataset contains the comprehensive attribute set for all five WMDs. When performing QC on the parcel dataset, the highest QC priority should be given to attribute data that are currently integrated into SWFWMD's ArcSDE geodatabase, but it is also necessary to QC the other attributes in the deliverable due to the nature of the coordination of this project and since the data is to be shared with other agencies.

Guidelines

The general process of parcel data QC is as follows:

1. Receive data from vendor/contractor.
2. Perform QC of both spatial and tabular aspects of data.
3. Document any issues that need to be fixed.
4. After reviewing all 16 feature classes, notify vendor/contractor if there are issues to be fixed (email with Word/PDF document attached).
5. Receive revised deliverables, repeat QC steps.
6. Provide geodatabase with 16 feature classes to GIS Database Administrator for loading to SDE.

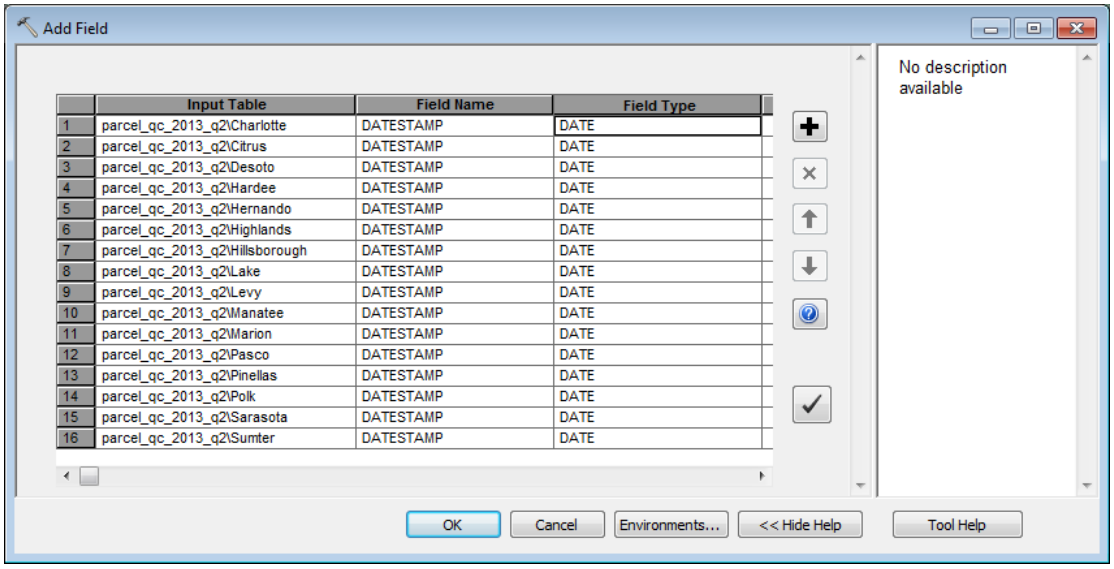
Procedures

1. Download or copy the parcel data geodatabase(s) from the media it was delivered on (flash drive, FTP, DropBox, etc.).
2. Uncompress the geodatabase(s), if compressed.
3. Add all county parcel data feature classes to an ArcMap project to begin the QC process.

4. Optional: Open the *Parcel_data_record_count.xlsx* file and enter the number of records in each county's feature class for the deliverable being QC'ed. This is just to watch for patterns with increases or decreases in the number of records for a particular county.
5. Verify that all 16 feature classes are in the following projected coordinate system: "*NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_Feet*"
6. Add a field to the attribute table for all 16 feature classes.

   Field name: *DATESTAMP*
   Field type: Date

   ArcToolbox > Data Mgmt Tools > Fields > Add Field (right-click > Batch)



7. Add *PARCELID_SWF* field to the Pasco County attribute table.
   a. Operations, Lands & Resource Monitoring Committee

      Field name: *PARCELID_SWF*
      Field type: Text
      Field length: 25
      Calculation expression:

      PARCELID_SWF = Mid ([PARCELID],5,2) + Mid ([PARCELID],3,2) + Left ([PARCELID],2) + Mid ([PARCELID],7,13)

      The history of this field: Pasco County is a case where the county stores the parcel ID in one format (captured in the *PARCELID* field) but displays it in map viewers in another format (reformatted via this step into the *PARCELID_SWF* field). Eventually the *PARCELID_SWF* field will go away since the vendor/contractor now includes a field in the deliverables that accomplishes this same end goal.

Each of the steps below should be performed on all 16 feature classes individually.

1. While performing each of the steps below, document any errors with the data. Use the Word document template at the following location to document the issues for each county:

   ..\..\..\Projects\FY_2016_Projects\P610_Parcel_Acquisition\Project

Management\Issues\Parcel_QC_comments_template.docx

Open this Word document then save it to a new file with a new name such as "*Parcel_QC_comments_2016_v1.docx*" for the deliverable being QC'ed. If an error can easily be fixed "in-house", then fix the error but enter a description of the issue into the QC Comments document so that the vendor can be notified to fix it in the next deliverable. If there are any errors that cannot easily be fixed in-house, enter a description of the issue in the QC Comments document.

2. Starting with the first county (Charlotte, if going alphabetical), open the attribute table of the deliverable and also the attribute table from the previous deliverable's data (from SDE database).
3. Make both attribute tables visible. Look at the field names in the new data to make sure they are the same as the field names in older data. Spelling is the important thing; the order of the fields is not important. If there are any spelling errors in the field names you will need to add a new field to the attribute table using the correct spelling (and type/length) and calculate the values from the incorrectly spelled field to the new, correctly spelled field. Also, you will need to make note of the error in the QC Comments document for the vendor to fix the issue. These types of errors have not occurred yet with the current vendor.

   See ***Appendix A*** for the complete list of fields that are in the parcel data schema and those that should be populated with data (*Populated=Y*).

   NOTE (for this step and the step below): Generally, all fields should be checked, however highest priority should be given to those fields that are in the parcel data feature classes on SWFWMD's ArcSDE database. You will see many more fields in the deliverables than there are in the SDE database. Many are part of the FGDC Cadastral NSDI Parcel schema and some are present due to the requirements of other Water Management Districts. The vendor/contractor populates those fields that all Districts requested to be populated (see Appendix A).

4. Examine the contents of the data in each attribute table to make sure the data in each field looks like the appropriate data for that field and similar to what is in the older data on SDE (e.g., *OWNERCITY* should have a city name not an address). A thorough "spot-checking" is what is recommended (i.e. use scroll bar on right side of attribute table to quickly scan each column, looking for errors or inconsistencies within the data).

   This is where you will spend the most time in the QC process. The following are examples of things to look for in the data:
   a. City names should be in a city field and state abbreviations should be in state fields. Foreign addresses are usually an exception to this rule.
   b. Sometimes there are leading spaces in a field. This can usually be fixed in-house with VB Script (*trim*) or Python (*strip*) functions in the Field Calculator.
   c. Missing data in a field that should be populated.
5. Zoom to a small portion of each county, use the Identify tool on a parcel then click on each of the hyperlink fields (*PAWEBPAGE* and *PALINK*) to make sure both hyperlinks work properly.

   Note: All 16 counties should have a valid/working URL in both the

PAWEBPAGE and *PALINK* field. The *PALINK* field should hyperlink to the respective county's website for that specific parcel record.

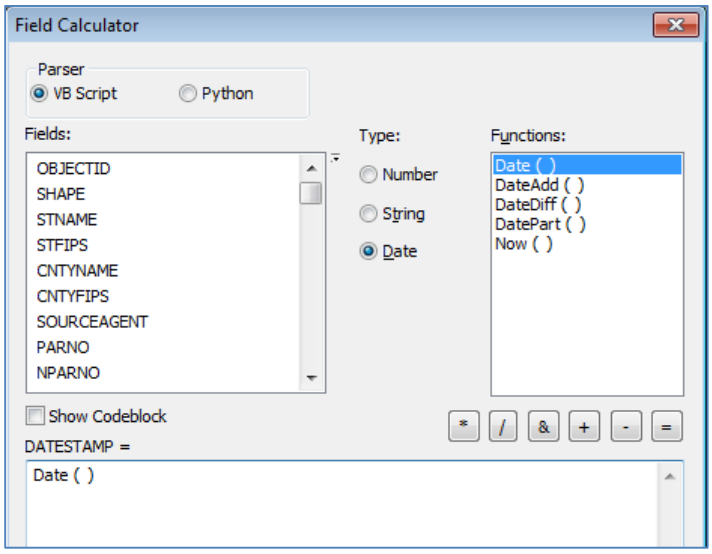
6. Spot check the horizontal alignment/accuracy of the parcel polygons for each county's feature class. It is recommended to zoom in closely (~1:1000 scale) to about 4 locations for each county to make sure parcel polygons align with features seen in the most recent aerial imagery available. Assuming all feature classes are in the correct coordinate system there shouldn't be any issues however, on rare occasions there could be an issue. The hyperlink field can also be used to bring up the Property Appraiser's webpage to verify the correct parcel geometry. If there are any issues with horizontal accuracy, describe them in the QC Comments document to be fixed by the vendor/contractor.

   In the past, two counties have had issues in this area:

   a. Pasco - due to an issue in which they seemed to have two separate sources for their parcel boundaries, one of which was going through an improvement process. Definitely check this one well since it does re- appear occasionally. Spot check by zooming into locations such as subdivisions.
   b. Pinellas - whose native coordinate system is "*NAD_1927_StatePlane_Florida_West_FIPS_0902*". This coordinate system must have two geographic transformations applied during the projection/reprojection to accurately convert it to the coordinate system that SWFWMD requires. It's good to check this one but has not happened recently.

7. Once the data for a county feature class is found to be acceptable, calculate the *DATESTAMP* field to the current date (for all records/features) and repeat the cycle (Steps 9-14) for the next county. Do not populate the *DATESTAMP* field if the vendor/contractor needs to fix any issues for a particular county.

   VB Script syntax: *DATESTAMP = Date ( )*
   Python syntax: *DATESTAMP = time.strftime('%m/%d/%Y')*



8. After completely reviewing all of the county feature classes (using the steps above) save the "QC Comments" Word document and then send the vendor an email informing them of the issues that need to be fixed, making sure to communicate which issues need to be fixed for the current deliverable and which issues to fix in future deliverables (i.e. those that were fixed by the QC person in the current deliverables). Send email with Word

document attached.

9. When the vendor sends revised deliverables for any issues found, repeat all the QC steps necessary to ensure the data is ready for loading into the SDE database.
10. Provide the geodatabase (with 16 feature classes) to the GIS Database Administrator for loading into SDE database.

References

Florida Division of Emergency Management (FDEM)
http://www.floridadisaster.org

Federal Geographic Data Committee – National Spatial Data Infrastructure (FGDC – NSDI)
http://www.fgdc.gov/nsdi/nsdi.html

FGDC-NSDI Cadastral Subcommittee
http://nationalcad.org

Florida Resources and Environmental Analysis Center (FREAC)
http://www.freac.fsu.edu

University of Florida's GeoPlan Center
http://www.geoplan.ufl.edu

Appendices

Appendix A: Complete list of fields in the standardized parcel data schema. This list can also be found in Excel format at:

..\..\..\Projects\FY_2016_Projects\P610_Parcel_Acquisition\Contracts and Agreements\Draft\WMD_parcel_coordination_info.xlsx

Note: The "***Populated***" column in the table below denotes fields which should be populated with data (***Yes***) and those fields that do not need to be populated with data (***No***).

Full list of fields needed for parcel attribution (see color key at right)					⟹	Color key
Field Name	**Type**	**Size/Length**	**Description**	**Alias**	**Populated**	NSDI Core fields
STNAME	String	2	The state name	State Name	Y	Additional fields needed by SFWMD
STFIPS	String	2	The state FIPS code	State FIPS Code	Y	Additional fields needed by SJRWMD
CNTYNAME	String	50	The county name	County Name	Y	Additional fields needed by SRWMD
CNTYFIPS	String	3	The county FIPS code 3 digit code	County FIPS Code	Y	Additional fields needed by SWFWMD
SOURCEAGENT	String	100	The agency that provided the data, the data steward	Data Source Agency	Y	
PARNO	String	100	The local parcel number for the parcel record	Local Parcel Number	Y	Fields added after the start of the 2011 project.
NPARNO	String	100	The local parcel number with the state and county fips added to the beginning of the number	National Parcel Number	Y	
STRUCT	String	1	Is there a structure or improvement on the parcel (Yes or No)	Structure Indicator	Y	
IMPROVVAL	Long integer	4	The value of the improvements on the parcels	Improved Value	If available.	
LANDVAL	Long integer	4	The value of the land on the parcel	Land Value	Y	
PARVAL	Long integer	4	The total value of the parcel	Total Parcel Value	Y	
PARVALTYPE	String	50	The type of value reported in the parcel value fields	Type of Value Reported	Y	
PARUSECODE	String	50	The local assessment parcel use code	Tax Parcel Use Code	Y	
PARUSEDESC	String	100	The local assessment parcel use description	Tax Parcel Use Code Description	Y	
OWNTYPE	String	50	The owner type based on the types listed in the LU_OWNTYPE table	Owner Classification or Type	Y	
AREATXT	String	20	The area of the parcel in acres as a text	Area of Parcel as Text	Y	
AREANO	Single	4	The area of the parcel in acres as a number	Area of Parcel as Number	Y	
OWNNAME	String	200	The primary surface owner name, the full name may be populated or the components of the name (first and last)	Full Owner Name	Y	
MAILADD	String	200	The full mailing address as a single field, the mailing address may also be broken into its component parts	Full Mailing Address	Y	
MCITY	String	100	The mailing city name	Mailing Address City	Y	
MSTATE	String	2	The mailing state name, two letter abbreviation	Mailing Address State	Y	
MZIP	String	15	The mailing ZIP code	Mailing Address ZIP	Y	
SITEADD	String	200	The full site address as a single field, the site address may also be broken into its component parts	Full Site Address	Y	
SCITY	String	100	The site address city name	Site Address City	Y	
LEGDECFULL	String	255	The full tax legal description - this is generally needed when the parcel data does not include a map of the parcel	Full Legal Description	Y	
SOURCEDATE	Date	8	The date of the source document that was used to generate the parcel information	Source Document Date	Y	
SOURCEREF	String	50	The reference to the source document could be a reference to a map or plat or a deed	Source Document Link or Reference	If available.	
REVISEDDATE	Date	8	The date of the last revision of the parcel record, this may be the initial create date if that is the last revision	Last Revised Date	If available.	
ACRES	Double	8	Acres from Deed	Acres from Deed	If available.	
ALTKEY	String	20	Altkey	Alternate Key	Y	
ASSD_BLD	Long integer	4	Assessed Building Value	Assessed Building Value	Y	
ASSD_LND	Long integer	4	Assessed Land Value	Assessed Land Value	Y	
ASSD_TOT	Long integer	4	Market Total Value	Market Total Value	Y	
LEGAL2	String	255	Legal Description 2nd	Second Legal Description	If available.	
MRKT_AG	Long integer	4	Market Agricultural Value	Market Agricultural Value	Y	
MRKT_BLD	Long integer	4	Market Building Value	Market Building Value	Y	
MRKT_IMPR	Long integer	4	Market Misc Improved Value	Market Misc Improved Value	Y	
S_RANGE	String	10	Range	Range	Y	
S_SECTION	Long integer	4	Section	Section	Y	
S_TOWNSHIP	String	10	Township	Township	Y	
SZIP	String	10	Site Address ZIP code	Site Address ZIP Code	Y	
SALE1_AMT	Long integer	4	Most Recent Sale Amount	Most Recent Sale Amount	Y	
SALE1_BK	String	10	Most Recent Sale Book	Most Recent Sale Book	Y	
SALE1_DATE	String	10	Most Recent Sale Date (mm/dd/yyyy)	Most Recent Sale Date	Y	
SALE1_PG	String	10	Most Recent Sale Page	Most Recent Sale Page	Y	
SALE1_YEAR	Short	2	Most Recent Sale Year	Most Recent Sale Year	Y	
SUBDIV_NM	String	70	Subdivision Name	Subdivision Name	If available.	
SUBDIV_ID	String	10	Subdivision from Subdivision/Block/Lot where available.	Subdivision ID	Y	
BLOCK	String	10	Block from Subdivision/Block/Lot where available.	Block	Y	
LOT	String	10	Lot from Subdivision/Block/Lot where available.	Lot	Y	
PIN	String	50	Parcel number with special characters removed.	District Parcel Number	Y	
YRBLT_ACT	Short/small integer	2	Year Built Actual	Year Built Actual	Y	
YRBLT_EFF	Short/small integer	2	Year Built Effective	Year Built Effective	Y	
ZONING	String	50	Zoning	Zoning	If available.	
TOT_LVG_AREA	Long integer	4	Total living or usable area	Total Living or Usable Area	Y	
NO_BULDNG	Long integer	4	Number of buildings	Number of Buildings	Y	
NO_RES_UNITS	Long integer	4	Number of residential units	Number of Residential Units	Y	
PAR_SPLT	Short/small integer	2	A code to denote a parcel that was split or combined ("1" or "2") with one or more parcels since the previous assessment	Parcel Split/Combine Code	Y	
PUBLIC_LND	String	1	A code indicating the type of public land (if applicable). The field is left blank if not applicable. Acceptable values: F, S, C,	Public Land Code	Y	
PARCELID	String	50	Parcel ID number.	Parcel ID Number	Y	
PARCELAUTO	String	50	Field for additional/alternate parcel ID number for some counties.	Altkey or Alternate Parcel ID	Y	
PAWEBPAGE	String	100	Link to the home page of the Property Appraiser's office.	Property Appraiser Homepage	Y	
PALINK	String	255	Direct web link to the parcel record on the Property Appraiser's website.	Parcel Record URL	Y	
COUNTYFIPS	Double	8	FIPS code (values from 001 to 133, odd numbers only) assigned to counties in alphabetical order (Alachua to Washington)	County FIPS Code	Y	
COUNTYDOR	Double	8	County number given by DOR.	DOR County Number	Y	
DORUSECODE	Double	8	Property code defined by DOR.	DOR Use Code	Y	
CTYUSECODE	Double	8	Property code defined by county.	County Use Code	Y	
ACQDATEMO	Double	8	The month the data was acquired by the contractor.	Data Acquisition Month	Y	
ACQDATEDAY	Double	8	The day the data was acquired by the contractor.	Data Acquisition Day	Y	
ACQDATEYR	Double	8	The year the data was acquired by the contractor.	Data Acquisition Year	Y	
SITUSADD1	String	150	Physical address of the property.	Site Address 1	Y	
SITUSADD2	String	150	Additional field for property address.	Site Address 2	Y	
SITUSADD3	String	150	Additional field for property address.	Site Address 3	Y	
SECTIONNUM	String	3	Section number in which property is located.	PLSS Section	Y	
TOWNSHIP	String	3	Township in which property is located.	PLSS Township	Y	
RANGE	String	3	Range in which property is located.	PLSS Range	Y	
OWNERNAME	String	80	Property owner's name.	Owner Name	Y	
OWNERADD1	String	130	Owner's address.	Owner Address 1	Y	
OWNERADD2	String	130	Additional field for owner address.	Owner Address 2	Y	
OWNERADD3	String	130	Additional field for owner address.	Owner Address 3	Y	
OWNERCITY	String	30	City of owner's address.	Owner City	Y	
OWNERSTATE	String	25	State of owner's address.	Owner State	Y	
OWNERZIP	String	10	ZIP code of owner's address.	Owner ZIP Code	Y	
DOR4CODE	String	4	4-digit DOR code (combined DOR and County Use code field).	Four-digit Use Code	Y	
FOLIONUM	String	30	An internal Hillsborough County identification.	Folio Number	Y	
PARNO_LABEL	String	100	The local parcel number as it is displayed on the Property Appraiser's webpage.	Parcel Number Label	Y	Requested by SWFWMD in 2012 specs; will be re
TAX_AUTH_CD	String	130	A code identifying the taxing authorities that levy property tax on the parcel.	Taxing Authority Code	Y	Requested by GeoPlan (2012-01-12).
WPARNO	String	100	The local parcel number as it is displayed on the Property Appraiser's webpage.	Web Format Parcel Number	Y	This field will replace the PARNO_LABEL field and
JV_HMSTD	Long integer	4	Just Value Portion of parcel subject to SOH cap.	Just Value Homestead	Y	
BAS_STRT	Long integer	4	The basic stratum number assigned follows the statutory classification of property established by section 195.096(3)(a), F	Basic Stratum	Y	Requested by NWFWMD in 2015 specs.

Creator: C. Glenn
Date 9/4/2014
Revision # V1
Date of last review 6/8/2016

Peace Creek Project Procedure

Purpose

The purpose of this document is to provide a procedure to maintain the Peace Creek project. This project has three major tasks; maintenance of the Peace Creek map book, updating the easement feature class, and tracking ownership changes of the parcels along the creek.

Scope

The project main folder contains four folders that is meant to segment the project by its tasks and keep intermediate data separate from the final output.

1. Data – This folder contains the Parcels database and the quarterly work databases. The Parcels database is used by the scripts to create the map book, and the quarterly databases contain the databases in which the comparisons are done.
2. Output – This folder contains the PDF files for the map book. The main purpose of this map book is to confirm property ownership and check to see if it has an active easement or license agreement. The field staff need this information when they try to gain access to the creek to perform weed control.
3. Scripts – This folder contains the Python scripts and ArcToolbox tool used in the project.
4. SourceData - A folder containing raw copies of any data received for the project. It usually contains the quarterly parcel data, easement shape files, and master mailing list versions.

Procedures

Project Initiation Steps for Quarterly Comparison

1. Create a new folder under: "D:\ACTIVE_PROJECTS\PEACE_CREEK\Data" and name it "PC_MONTHYEAR."
2. Create a file geodatabase within new folder named 'PC_MONTHYEAR.' Leave it empty for now.
   Copy new parcel info from Steve Clardy into D:\ACTIVE_PROJECTS\PEACE_CREEK\SourceData. Data is received semi-annually, but exact time frame can differ due to coordination among other Districts. The new parcel data files are located at: P:\SpecialProjects\ParcelData. Change name to show the date of the data (example: Polk_Parcels_Sept2013.). There may be other counties in original database, but only Polk County is needed. An alternative method is to retrieve the data directly from the Polk County Property Appraiser's site. One download needs to be done for the geographic data and another for the attribute data. The "parcel.zip" file is located at: ftp://ftp.polkpa.org/GISData. The "ftp_owner.zip" file is located at: ftp://ftp.polkpa.org/AppraisalData/. If using this method, the two will need to be parsed together.
3. Copy the master mail list into the "SourceData" folder. End the name with "monthyear." It is located in the OPS Bureau folder (bkvshare\bkvops) at: N:\Field Operations\Projects\Peace Basin\Peace Creek\Peace Creek APM License Agreements\Letters and Spreadsheets\Peace_Creek_2015 Master List.xlsx

Spreadsheet Prep Work

Background: Field OPS use the spreadsheet to track who has licenses along Peace Creek and when they expire. GIS uses the spreadsheet to enter tabular data onto the Peace Creek Maps distributed to field staff. Both Field OPS and GIS maintain their part of the spreadsheet.

Not every record in the spreadsheet is required by GIS. The field "GIS_USE" is used to indicate when GIS will need the record. When this field is marked as "no," an explanation in the "Comments" field will be provided.

1. GIS uses the following columns in the Master mail list spreadsheet:
   a. PropertyOwner – appears on the map
   b. ParcelID – used for tracking
   c. ExecutionDate – used as reference only
   d. ExpirationDate - appears on the map
   e. Notice – appears on the map
   f. Active – used to create color scheme on map
   g. Comments – used for tracking
   h. GIS_ID – used on map
   i. GIS_USE – used for tracking
   j. GIS_MAP – Map page number parcel is located on
2. Make the following changes to the GIS copy of the master mail list
   a. Delete all rows that have "GIS_USE" = "NO."
   b. Remove all tabs except "Master Mailing List."
   c. Delete the color-coded legend that appears at the end of the owner list.
3. Compare spreadsheet to previous version to see if there are parcel IDs that are not on both lists. This will determine if changes have been made to the Operations spreadsheet that GIS has not received. If a parcel ID appears on the new master list, then operations has added it themselves, and does not need to be notified of the change when it appears during the GIS process. If a parcel ID has been removed from the new spreadsheet, then Operations has removed the parcel from the list. After verification, GIS can remove it from their list. To perform this evaluation, follow these steps:
   a. Make a new spreadsheet.
   b. Copy ParcelID columns from the new and old spreadsheets into the new spreadsheet, each with its own column. Name the column with the month/year.
   c. Select all values in both rows. Go to: Home Tab > Conditional Formatting > Highlight Cells Rules > Duplicate Values. Every value that is duplicated is highlighted. (Note: you can do the same function to find unique values.
   d. Write down the Parcel ID of the solo record and indicate what the status is.
      i. Missing from prior list = Operations has added the parcel to the project.
      ii. Missing from current list = Operations has taken parcel off project,
   e. Do not save the new spreadsheet.
   f. Close the prior quarter's spreadsheet.

   (Note: An alternative would be to use the Exact function (=EXACT(A200,B200), other options include the match and lookup functions)

4. Import master mail list into the current PC<monthyear> geodatabase using ArcCatalog. Name it "MasterMailList_MONTHYEAR." Make sure the GIS_ID is brought in as a text field because the script requires it.

Pull GIS Parcels in Peace Creek Project Area from New Parcel Feature Class

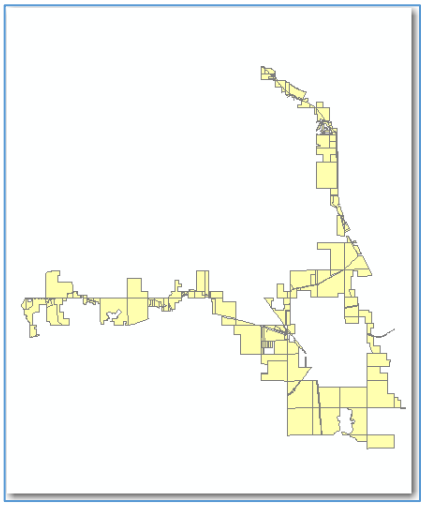
1. Open the PeaceCreekReview.mxd file.
2. Remove the oldest version of the parcels feature class and master mail list from the mxd and replace them with new versions listed below:
   a. The new Polk County parcel feature class copied to "SourceData" folder.
   b. The MasterMailList_Monthyear table that was just imported into the PC_MonthYear Database.
3. Run the model named "SelectNewParcels" that is within the Peace_Creek_Compare Toolbox. The tool will select all parcels within the new Polk Parcels feature class and export them to a new feature class.
   1. There are 4 parameters to enter
      i. NewPolkParcels – This will be the feature class just received from Steve Clardy.
      ii. Previous PC_Parcels_Date – This will be the previous quarter Peace Creek Parcels that is contained in the prior month's geodatabase.
      iii. Output Geodatabase – The name of the geodatabase where the new feature class will be stored in. It will be the PC_MonthYear database just created.
      iv. Name of Output Feature class. Name it "PC_parcels_MONTHYEAR."
   2. Add the new feature class to the ArcMap project if not automatically added by the model.

Check PC Parcel Layer for Completeness

The goal of this phase is to make sure that the new Peace Creek (PC) parcel feature class is complete and accurate and that any new parcels falling within the project area are removed into a temporary feature class until the evaluation is complete (after which it will be placed back in).

Background: The select by location method (used in the SelectNewParcels model in the previous step) is the most accurate found to select parcels that were located along the creek. However, there are a few parcels that need to be adjusted manually. Due to the odd shape of the project area no method has been discovered that will bring back a complete and accurate selection.

Project Area of Peace Creek



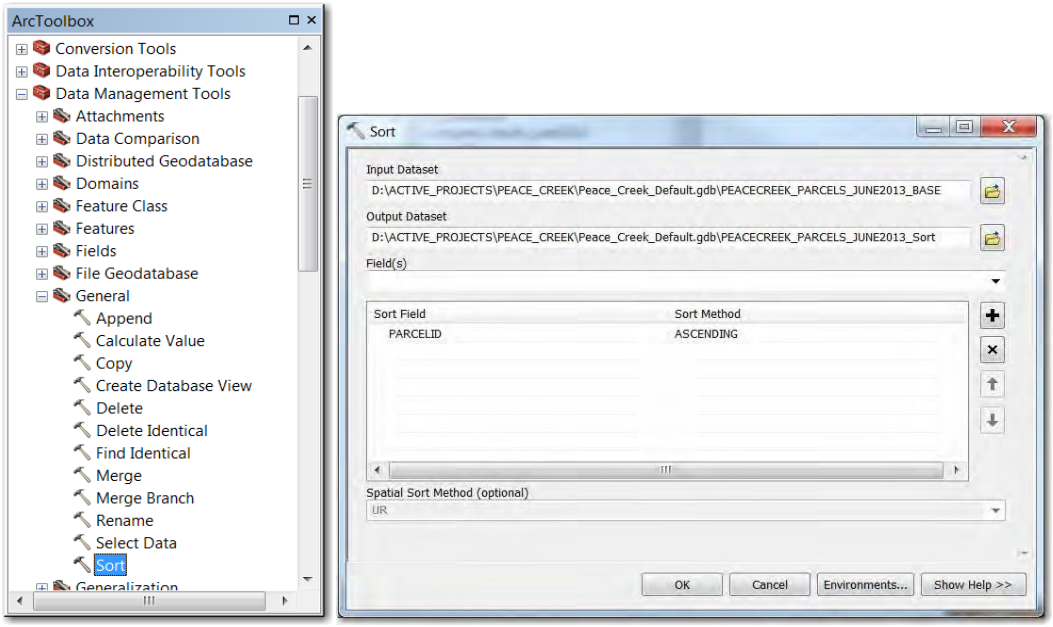
The following steps will make sure every parcel needed has been included and no extras are present. (Note: It is not enough to make sure there are the same number of records because not all parcels will be brought forth from the select process, and in other cases some parcels that are NOT needed are brought in. The first relate will select all that is missing so they can be added, and the second will find all parcels that do not belong so they can be removed.)

1. Set up a relationship between the new PC Parcels feature class and the one from the previous quarter using the ParcelID field. This relate will be used to compare the two feature classes to make sure nothing got missed and to remove new parcels.
2. Compare the two feature classes from "new" to "old" in order to find any parcels that were missed in the selection process and add them back.
    a. Select all parcels in the new Parcel feature class, and bring up the related feature class (one from previous quarter).
    b. Do a "switch selection" to select the parcels that did not match anything in the new Parcels feature class. These are the records that need to be added into the new PC parcels feature class.
    c. Open an edit session on the new Parcel feature class and use the Polk Parcels layer that is in the "SourceData" folder to add any parcels that are missing (do not use previous data as the contact info may be different). This ensures the information regarding the parcel is copied from the most current data set.
3. Compare the two feature classes from "old" to "new" in order to remove any unnecessary parcels from the new dataset.
    a. Select all parcels in the previous quarter PC Parcels, and bring up the related feature class (which will be the new pc parcels)
    b. Do a switch selection to pull up the records in the new pc parcels that are not in the previous quarter.
    c. Delete these parcels if they fall outside of the existing boundaries. If they are new parcels within the active area, continue to step 3.
4. Any new parcel that falls within the existing PC_Parcels feature class needs to be removed from the new set and placed in a feature class of its own, named "NEW_PARCELS_MONTHYEAR." This will usually happen when a parcel is split and sold. There are two reasons to do this; Operations needs to be notified of any new owners in the area and new parcels cannot remain in "POLK_PARCELS_MONTHYEAR" (current feature class) when the compare process is performed.
    a. Select all new parcels in the new feature class, and export and name them "NEW_PARCELS_MONTHYEAR."
    b. Delete the record from the current PC_PARCELS feature class.
    c. If the owner name or address is missing, go to property appraiser's link to find it, and make the corrections to the feature class.
    d. If the parcel ID is missing, wait until the next round to process. This is probably in transition in Polk County Property Appraiser's database.
5. Final feature class for the new quarter should be complete now. Each feature class should have the same number of parcels and each should have the entire set selected when the Relate is performed back and forth. It is ready for the compare section of the review.

PREPARE FOR AND PERFORM ATHE ACUTAL COMPARISON

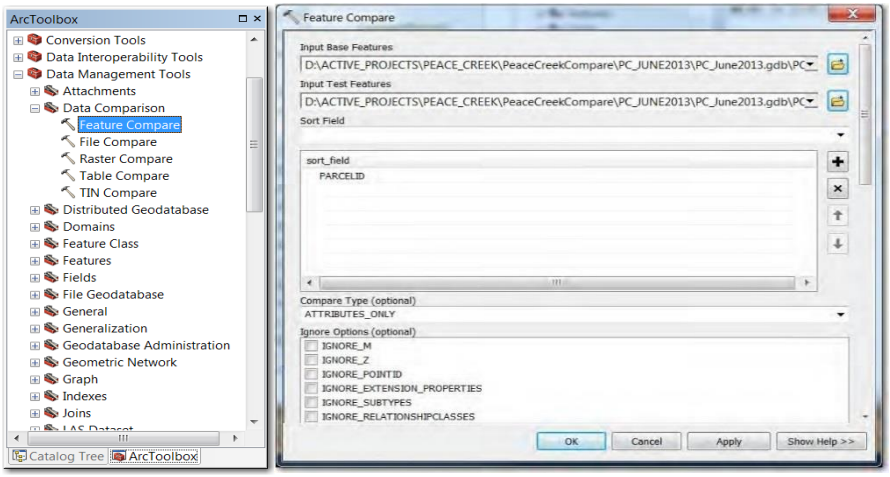
1. Sort both files (previous quarter and current quarter) by using the "sort" geoprocessing

tool found under data management tools/general. Use the parcel ID number to sort by. This step is needed because the compare tool uses the object ids in the comparison, and they need to match in the same order as the Parcel IDs. Save them in the working directory for that month, such as PC_OCT2013.gdb. Name the files "PEACECREEK_PARCELS_MONTHYEART_SORTED"



2. Run the "Feature Compare" geoprocessing tool found under "Data Management Tools > Data Comparison" to compare the two feature classes that are the output of the sort.

   There is a model named "CompareParcels" with the data prefilled that is located at: "D:\ACTIVE_PROJECTS\PEACE_CREEK\PeaceCreekCompare\Peace_Creek_Compare.tbx." If this tool is used, only the input and output features need to be completed, and the output file name and location. An explanation of the tool parameters is explained below (not all are shown on example).



Explanation of Tool Parameters

Input Base feature = This layer has been declared correct, and should be the prior version of PC_MONTHYEAR_SORTED)

Input Test Features = NOTE: This layer is being checked to see what differences are in it compared to the Input Base feature class. It should be the new version of PC_MONTHYEAR_SORTED)

Sort field = parcelid
(NOTE: This is the unique identifier. In order for the search to be done properly, both files need to have the same sequence. This is why parcel ID has to be unique and represent the same record in both files. The field needs to have the same name in both feature classes as well.

Compare type (optional) – Attributes Only
(NOTE: This does not have to include geometry search because any new parcels are already gone through the new parcel ID search

Omit fields = select all and then unselect parcel ID and OWNERNAME

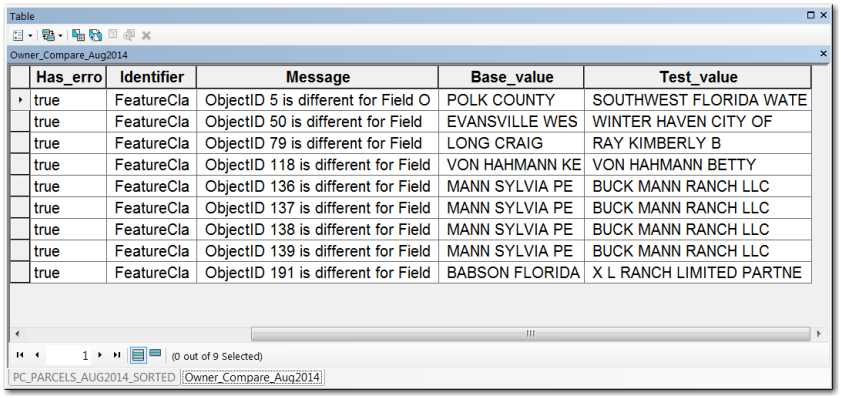
(NOTE: Only these two fields are needed to find differences between the new and the old feature classes)

Click on "Continue Comparison"
(NOTE: The comparison will stop after the first mismatch if not checked.)

Name output compare file = "owner_comparison_may_2010.TXT"
Save the output as a text file in the Peace_Creek/Data/PC_monthyear folder

(NOTE: This will be a text file that will be used to select out the changed fields. No need to save in geodatabase, but can be by following number 3 below)

3. Export the text file to the "PC_MONTHYEAR", if desired, into the geodatabase. If no results were found, not really necessary.
   a. Select all features except for the one with the Identifier listed as "Table."
   b. Compare the Base_value to Test_Value on the owner names. Sometimes there will be a slight variation to the name, and these do not need to be addressed. They can be taken off the list, so unselect any that are similar.
   c. Export to file Geodatabase and name it Owner_Compare_MonthYear.



Table

Owner_Compare_Aug2014

Has_erro	Identifier	Message	Base_value	Test_value
true	FeatureCla	ObjectID 5 is different for Field O	POLK COUNTY	SOUTHWEST FLORIDA WATE
true	FeatureCla	ObjectID 50 is different for Field	EVANSVILLE WES	WINTER HAVEN CITY OF
true	FeatureCla	ObjectID 79 is different for Field	LONG CRAIG	RAY KIMBERLY B
true	FeatureCla	ObjectID 118 is different for Field	VON HAHMANN KE	VON HAHMANN BETTY
true	FeatureCla	ObjectID 136 is different for Field	MANN SYLVIA PE	BUCK MANN RANCH LLC
true	FeatureCla	ObjectID 137 is different for Field	MANN SYLVIA PE	BUCK MANN RANCH LLC
true	FeatureCla	ObjectID 138 is different for Field	MANN SYLVIA PE	BUCK MANN RANCH LLC
true	FeatureCla	ObjectID 139 is different for Field	MANN SYLVIA PE	BUCK MANN RANCH LLC
true	FeatureCla	ObjectID 191 is different for Field	BABSON FLORIDA	X L RANCH LIMITED PARTNE

1 (0 out of 9 Selected)

PC_PARCELS_AUG2014_SORTED Owner_Compare_Aug2014

UPDATE MASTER MAIL LIST AND NOTIFY OPS OF CHANGES

The MASTER_MAIL_LIST table needs to be updated to indicate whether any parcels have changed and to add any new parcels. It is located on Operations shared folder. If necessary, a drive can be mapped to "bkvshare\bkvops." The spreadsheet is located at: \\bkvshare\bkvOPS\Field Operations\Projects\Peace Basin\Peace Creek\Peace Creek APM License Agreements\Letters and Spreadsheets\Peace_Creek_2015 Master List.xlsx.

The only issue with this process is that the Compare Analysis done previously lists the results by OBJECTID, and the spreadsheet lists the parcels by the Parcel ID number. So, instead of jumping directly from the Compare Analysis results to the Master Mail List, you need to go to the "PC_Parcels_MONTHYEAR_Sort" table to obtain the Parcel ID that is related to the OBJECTID.

Master Mail List Spreadsheet

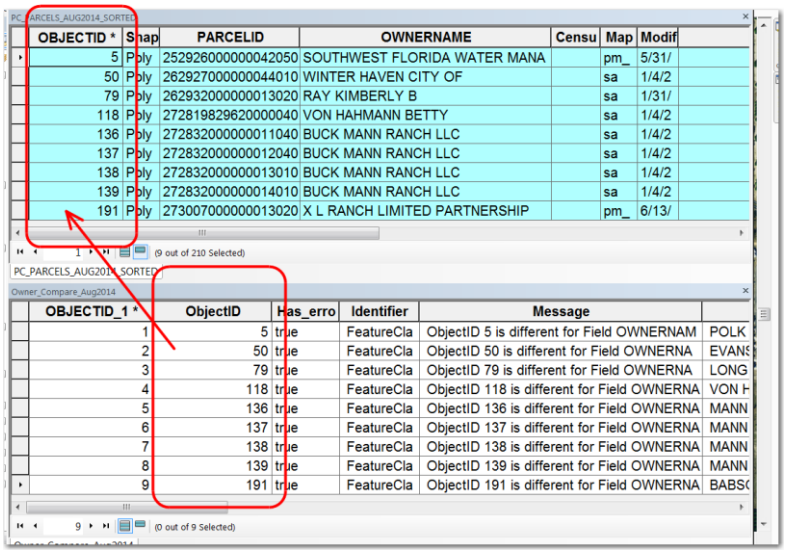
map#	Property Owner	Parcel ID	Execution Date	Expiration Date	Notice	Advanced Notice	Address1	Address2	Active	Comments	GIS_ID	GIS_USE	GIS_MAP
6	Babson Florida Limited Partnership	273007000000013020	10/18/2010	10/15	Frank Sikes 863-676-2297		PO Box 596	Morris, IL 60450	Y		6	YES	MAP 5, MAP 6
27	Craig Long	262932000000013020	7/28/2011	7/1/2015	Does Not Request		11030 Blue Jay Lane	Boynton Beach, FL 33472	Y		27	YES	MAP 3

Fields (ones in red are those that GIS updates)

Map# - This is a map identification number that ops used – not active any longer
Property Owner – The owner of the parcel
Parcel ID – The parcel number
Execution Date – Date the license agreement was executed
Expiration Date – Date the license agreement expires
Notice – The person and phone of the person to be notified of a site visit by the District
Advanced Notice – Indicates if the person needs to be notified in advance of a site visit.
Address1 – Street of the property owner
Address2 – City, State, and zip of the property owner
Active – Indicates status of license. Could be expired (E), active (Y), or no license (N).
Comments – Any notes of interest.
GIS_ID – The identification number used in the GIS process
GIS_USE – Yes or no indication of whether parcel is included in the GIS part of the project
GIS_MAP – Indicates the page number the parcel appears on the data-driven GIS mxd.

Step 1: Discover the parcels that need to be updated in the Master list. If this is not evident, the method described below can be used to find them.

1. Select the parcel records in the PC_PARCELS_MONTHYEAR_SORTED feature class in GIS that appear on the Owner_Compare_MonthYear table. The two will need to be related using the OBJECTID number because this is the link the compare tool uses. The PARCELID number is then used to link the PC_PARCELS_MONTHYEAR_SORTED feature class to the MasterMailList table.
   a. Open the tables for:
      i. PC_PARCELS_MONTHYEAR_SORTED
      ii. Owner_Compare_MonthYear
   b. Create a relate based on the ObjectID field.



OBJECTID *	Shap	PARCELID	OWNERNAME	Censu	Map	Modif
5	Poly	252926000000042050	SOUTHWEST FLORIDA WATER MANA		pm_	5/31/
50	Poly	262927000000044010	WINTER HAVEN CITY OF		sa	1/4/2
79	Poly	262932000000013020	RAY KIMBERLY B		sa	1/31/
118	Poly	272819829620000040	VON HAHMANN BETTY		sa	1/4/2
136	Poly	272832000000011040	BUCK MANN RANCH LLC		sa	1/4/2
137	Poly	272832000000012040	BUCK MANN RANCH LLC		sa	1/4/2
138	Poly	272832000000013010	BUCK MANN RANCH LLC		sa	1/4/2
139	Poly	272832000000014010	BUCK MANN RANCH LLC		sa	1/4/2
191	Poly	273007000000013020	X L RANCH LIMITED PARTNERSHIP		pm_	6/13/

(9 out of 210 Selected)

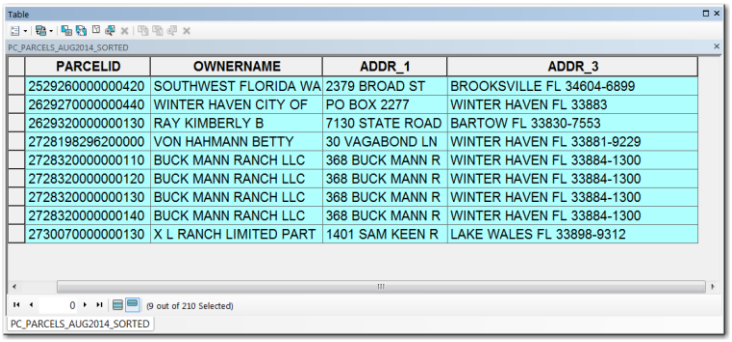
PC_PARCELS_AUG2014_SORTED

Owner_Compare_Aug2014

OBJECTID_1 *	ObjectID	Has_erro	Identifier	Message	
1	5	true	FeatureCla	ObjectID 5 is different for Field OWNERNAM	POLK
2	50	true	FeatureCla	ObjectID 50 is different for Field OWNERNA	EVANS
3	79	true	FeatureCla	ObjectID 79 is different for Field OWNERNA	LONG
4	118	true	FeatureCla	ObjectID 118 is different for Field OWNERNA	VON H
5	136	true	FeatureCla	ObjectID 136 is different for Field OWNERNA	MANN
6	137	true	FeatureCla	ObjectID 137 is different for Field OWNERNA	MANN
7	138	true	FeatureCla	ObjectID 138 is different for Field OWNERNA	MANN
8	139	true	FeatureCla	ObjectID 139 is different for Field OWNERNA	MANN
9	191	true	FeatureCla	ObjectID 191 is different for Field OWNERNA	BABS

(0 out of 9 Selected)

c. Select records in the “Owner_Compare_MonthYear” table that show different owners (note: do not need records that indicate row or column differences). Open the related table (PC_PARCELS_MONTHYEAR_SORTED). This is the table that shows the changes that need to be sent to operations and changed on the spreadsheet.



Table

PC_PARCELS_AUG2014_SORTED

PARCELID	OWNERNAME	ADDR_1	ADDR_3
2529260000000420	SOUTHWEST FLORIDA WA	2379 BROAD ST	BROOKSVILLE FL 34604-6899
2629270000000440	WINTER HAVEN CITY OF	PO BOX 2277	WINTER HAVEN FL 33883
2629320000000130	RAY KIMBERLY B	7130 STATE ROAD	BARTOW FL 33830-7553
2728198296200000	VON HAHMANN BETTY	30 VAGABOND LN	WINTER HAVEN FL 33881-9229
2728320000000110	BUCK MANN RANCH LLC	368 BUCK MANN R	WINTER HAVEN FL 33884-1300
2728320000000120	BUCK MANN RANCH LLC	368 BUCK MANN R	WINTER HAVEN FL 33884-1300
2728320000000130	BUCK MANN RANCH LLC	368 BUCK MANN R	WINTER HAVEN FL 33884-1300
2728320000000140	BUCK MANN RANCH LLC	368 BUCK MANN R	WINTER HAVEN FL 33884-1300
2730070000000130	X L RANCH LIMITED PART	1401 SAM KEEN R	LAKE WALES FL 33898-9312

(9 out of 210 Selected)

PC_PARCELS_AUG2014_SORTED

d. Open the master mail list spreadsheet and select the parcels that are selected on the PC_PARCELS_MONTHYEAR using the PARCELID field info. The filtering function of Excel works well for this step. Continue to step 2.

Step 2: Update the Master Mail List

1. Make updates to Master Mail List spreadsheet starting with the “Active” field and continuing to “Comments,”, “GIS_ID,” “GIS_USE”, and “GIS_MAP” for those with changed ownerships.
   a. The active field: If the owner has changed, the existing license will no longer be in effect. Change the code to “N.” In addition, if any of the expiration dates have expired, those can also be marked as “N.”
   b. Comments – Write the new/changed owner information in this field. If the entire parcel is new, make a note of that as well. The Administrative Supervisor of the Operations and Land Management Bureau will change the dates in the spreadsheet as the letters are sent out and approved.

c. GIS_ID – the GIS_ID will remain the same unless the Polk County Appraiser's site has changed the parcel number. This would usually occur if the parcel was split, and would probably be on the "new parcel" list.
d. GIS_USE – Mark with a yes as long as the parcel is within the GIS project area. (i.e. the PC_PARCELS_MONTHYEAR_SORTED fature class.
e. GIS_MAP – Enter the page number(s) of the parcel, or type "No" if not on the map.

2. Add any new parcels to the spreadsheet. Operations will decide if it will be required for the project. If the boundaries do not fall along the creek in a way they would need to access it for entry to the creek, then a license may not be needed and the parcel dropped.
   a. Make sure the parcel ID is not already on the spreadsheet. Fill in any information that is available. Usually the owner name and address will be available.
   b. Leave "Execution date, expiration date, notice, and advancedNotice" fields empty. Operations will complete these.
   c. Enter "N" under active (applies only once license executed). However, if the new owner is a family member, leave it as "Y," especially if the address is the same.
   d. If the parcel does not have a GIS_ID, assign the next available one.
   e. In the Comments field, enter a note that this new owner now owns the parcel.
   f. Make a map of the area and send to Administrative Supervisor of the Operations and Land Management Bureau with notification of new ownership.
3. Notify the Operations and Land Management Bureau of any changes of ownership in the parcels. The Administrative Supervisor is notified of all changes, and the Vegetation Management Manager is notified if a determination needs to be made if a parcel needs a license.
   a. Create an e-mail, and place a copy of the table of select parcels from PC_PARCELS_MONTHYEAR_SORTED and any maps that may have been created.
   b. When there is a response needed from Operations, make a comment in the email, and request a response (i.e. if you need to know if a new parcel should have a license).

Step 3: Prepare the data for next quarter

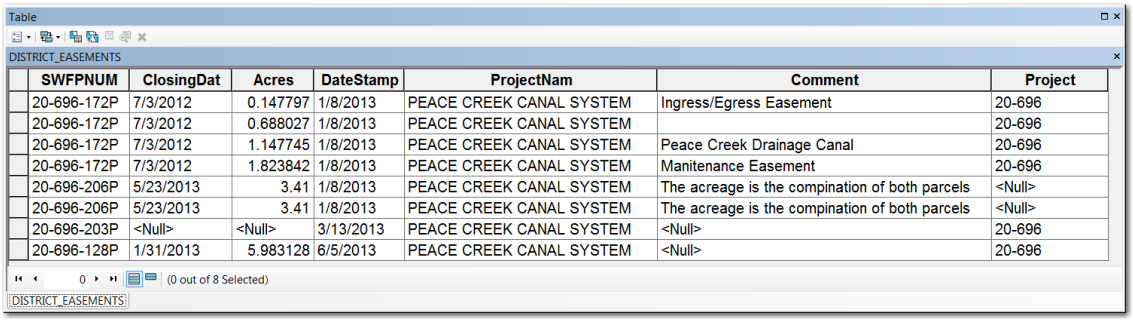
1. If the new parcels will remain within the study area, add them back to the parcel feature class (OPERATIONS NEEDS TO DETERMINE). If these parcels do not need to have licenses, remove the area from the parcel study area.
2. Remove the feature classes and tables that only apply to the previous quarter from the map.
3. Remove the source data from the map.
4. Save map document

UPDATE EASEMENTS

Background: When possible, the District obtains easements along Peace Creek to reduce the amount of licenses the must be maintained. When a new easement has been closed on, the easement is added to the District_Easements feature class, the parcel is removed from the Peace Creek Parcels feature class.

1. Mapping & GIS is notified by Real Estate Services (currently the Senior Real Estate Specialist) that an easement has had closing.
2. Obtain boundaries for the easement from GIS Analyst that handles Land Resources. Usually comes in the form of a shapefile. Place the shapefile in the "SourceData" folder.
3. Open the PeaceCreekReview map if not already open.
4. Add the new shape file to MXD.
5. Start edit session on District_Easements that is located in the Parcels geodatabase.

a. Add the easement boundaries to the DISTRICT_EASEMENTS feature class.
b. Update the table for DISTRICT_EASEMENTS feature class



Table

DISTRICT_EASEMENTS

SWFPNUM	ClosingDat	Acres	DateStamp	ProjectNam	Comment	Project
20-696-172P	7/3/2012	0.147797	1/8/2013	PEACE CREEK CANAL SYSTEM	Ingress/Egress Easement	20-696
20-696-172P	7/3/2012	0.688027	1/8/2013	PEACE CREEK CANAL SYSTEM		20-696
20-696-172P	7/3/2012	1.147745	1/8/2013	PEACE CREEK CANAL SYSTEM	Peace Creek Drainage Canal	20-696
20-696-172P	7/3/2012	1.823842	1/8/2013	PEACE CREEK CANAL SYSTEM	Manitenance Easement	20-696
20-696-206P	5/23/2013	3.41	1/8/2013	PEACE CREEK CANAL SYSTEM	The acreage is the compination of both parcels	<Null>
20-696-206P	5/23/2013	3.41	1/8/2013	PEACE CREEK CANAL SYSTEM	The acreage is the compination of both parcels	<Null>
20-696-203P	<Null>	<Null>	3/13/2013	PEACE CREEK CANAL SYSTEM	<Null>	20-696
20-696-128P	1/31/2013	5.983128	6/5/2013	PEACE CREEK CANAL SYSTEM	<Null>	20-696

0 (0 out of 8 Selected)

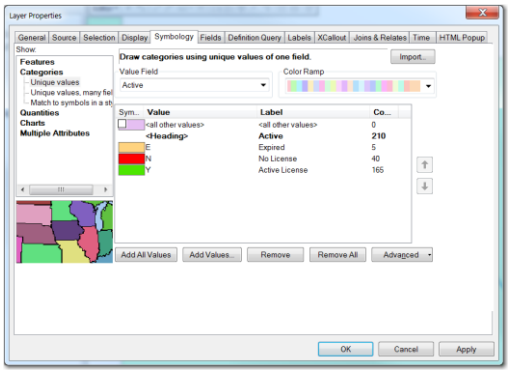
DISTRICT_EASEMENTS

c. Remove the parcel that the easement replaces from the PEACECREEK_PARCES_MONTHYEAR_BASE feature class (so the parcel will not be included during the next evaluation period).
d. Save edits and close edit session.

6. Go to the master mailist spreadsheet and mark parcel as not being used by GIS and put a note in the comments field that an easement has been obtained.

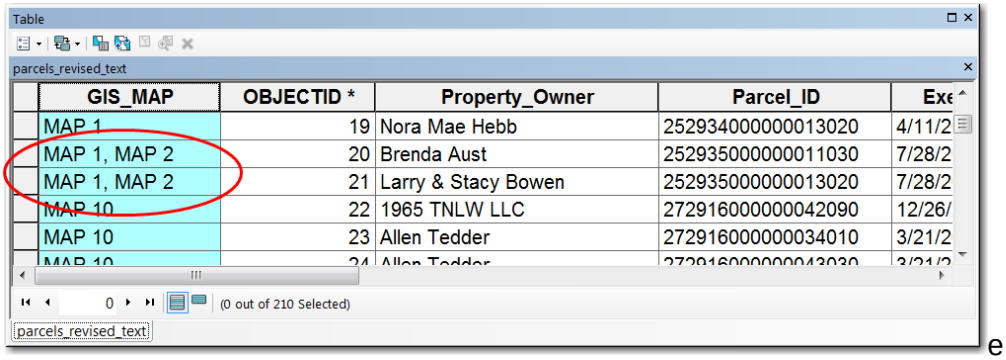
PREPARE PEACECREEKMAP.MXD FILE FOR PRINTING

1. Open the “PEACECREEKMAPS.MXD”
2. Remove the previous month’s parcel and master mail list files, and replace them with the current study month. Rename the parcels feature class to “PC”Parcels.” Join them together using the Parcel_ID field.
3. Set the symbology for PC_Parcels with the “Active” field. Name the labels “Active, Expired, and No license.” Set the colors to be orange, Red, and green. Set transparency to 60%.



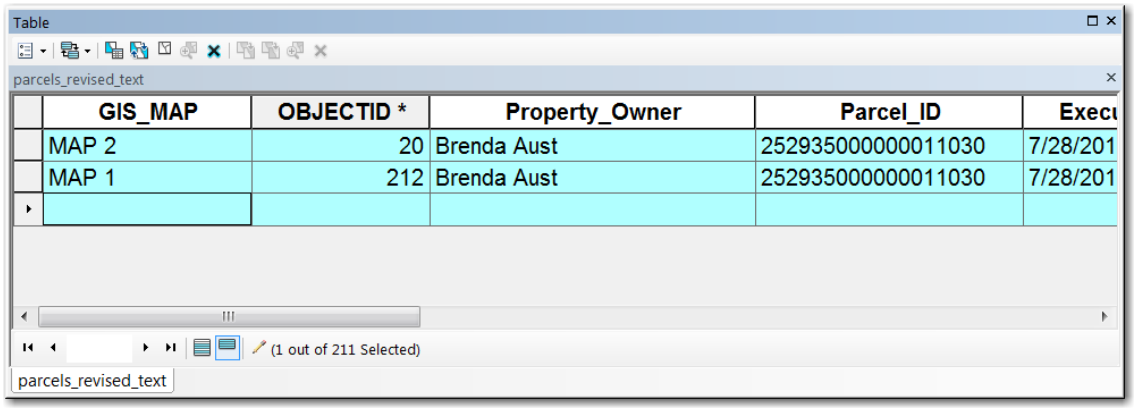
4. Export all rows from the master mail list into the Parcels database and name them “parcels_revised_text.” Ignore the message about the table existing already. Add it to the ArcMap project; this will be the file that provides ownership information on the map.
5. Edit the “parcels_revised_text” table to reflect one record for each parcel on each map page. If a parcel falls within two pages, that record will be repeated for each page. The edits need to be done in a separate ArcMap project because the scripts keeps you from “seeing” any data in the tables.

a. Go to “GIS_MAP” field. Those rows with two map pages will be copied so that there will be a separate record for each map. If there are multiple entries for the same owner, just leave enough entries to have one record for each page they appear on.



e

b. Copy and paste one of the field values into the bottom line, and a new record will be inserted into the table. Change the “GIS_MAP” field to reflect just one map page. Then the other fields can be copied down.



6. Delete extra rows for each owner on each page. For example, 5R Ranch will have one record for map 6, map 7 and map 8, as shown in the tables below. Each page needs its own record of the owner because the script grabs every record for each page when it is selected. However, if the license information for one of the parcels is different (i.e. different expiration date), then that record needs to be retained.

Table

parcels_revised_text

GIS_MAP	Parcel_ID	Property_Owner	OBJECTID *	Execution_Date	ExpirationDate	
MAP 6	273017000000012000	5R Ranch Limited Partnership	182	4/14/2011	4/1/2016	Robert Gukich 86
MAP 6	273020000000010000	5R Ranch Limited Partnership	183	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273014000000043020	5R Ranch Limited Partnership	184	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273015000000013000	5R Ranch Limited Partnership	185	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273016000000012000	5R Ranch Limited Partnership	186	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273021000000011000	5R Ranch Limited Partnership	187	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273023000000031030	5R Ranch Limited Partnership	188	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273027000000011000	5R Ranch Limited Partnership	189	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273028000000011000	5R Ranch Limited Partnership	190	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273010000000024010	5R Ranch Limited Partnership	191	4/14/2011	4/14/2016	Robert Gukich 86
MAP 7	273017000000012000	5R Ranch Limited Partnership	227	4/14/2011	4/1/2016	Robert Gukich 86
MAP 7	273020000000010000	5R Ranch Limited Partnership	233	4/14/2011	4/1/2016	Robert Gukich 86
MAP 8	273010000000024010	5R Ranch Limited Partnership	226	4/14/2011	4/14/2016	Robert Gukich 86

0 (13 out of 237 Selected)

parcels_revised_text

Table

parcels_revised_text

GIS_MAP	Parcel_ID	Property_Owner	OBJECTID *	Execution_Date	ExpirationDate	
MAP 6	273020000000010000	5R Ranch Limited Partnership	183	4/14/2011	4/1/2016	Robert Gukich
MAP 7	273010000000024010	5R Ranch Limited Partnership	191	4/14/2011	4/14/2016	Robert Gukich
MAP 8	273010000000024010	5R Ranch Limited Partnership	226	4/14/2011	4/14/2016	Robert Gukich

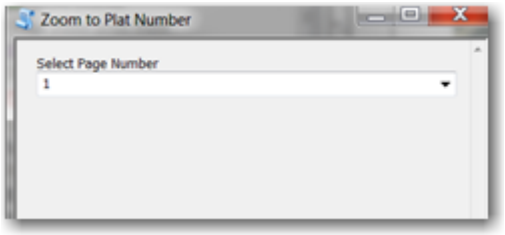
4 (10 out of 227 Selected)

parcels_revised_text

7. Add column with a “text” data type for expiration date. Copy the expiration dates into it, then for the records that are expired, enter “No license agreement.” For those that do not expire, type in “No expiration date.”

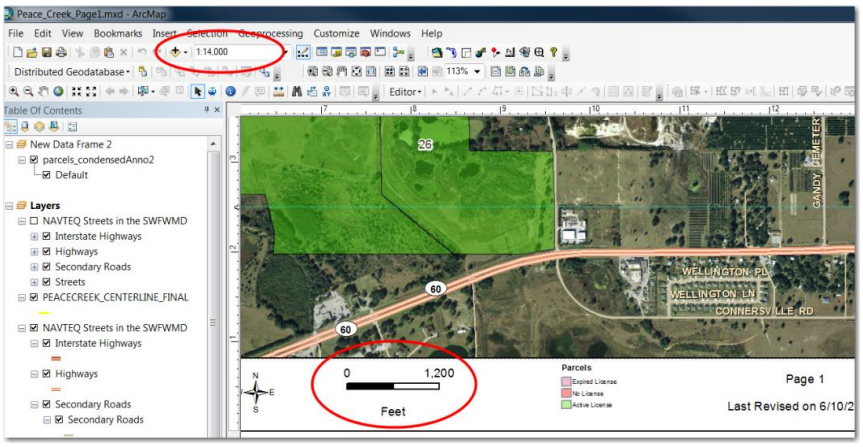
EXPORT AND PRINT MAP

1. Run the “Zoom to Plat Number” script to refresh each page
   Note: the “Export to PDF” and “Zoom to Plat Number” scripts do the same thing, except the “Export” script also exports the map as a PDF file. Either one can be used.
   a. Open ArcToolbox and expand the toolbox labeled “PeaceCreek.”
   b. Double click on “Zoom to Plat Number. A dialog box opens which asks for the page to produce. Select the page needed and click OK.



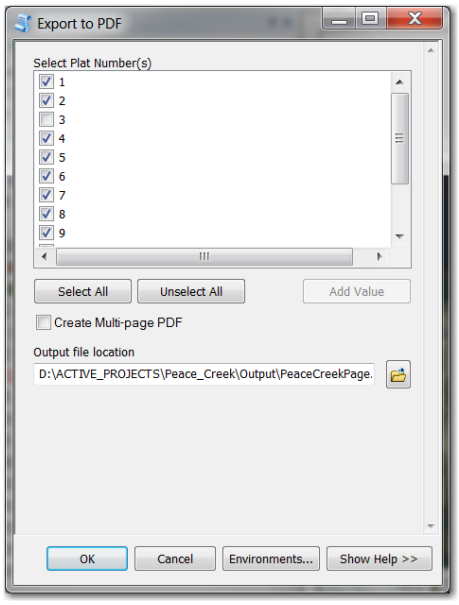
   c. The page will reset to be the page selected, the owner list will be for those owners on the current page, and the map page and date will all change automatically.
      i. Currently pages 3 & 13 have more people than will fit on one column. When they are chosen, a second row will appear.
      ii. Resize the two columns to fit in the allocated space.
   d. Make sure the scale bar is set to 1,200 feet and the scale is set to 1:14000 while in

layout view. These settings ensure that the map will print at 1" = 1,200 feet.



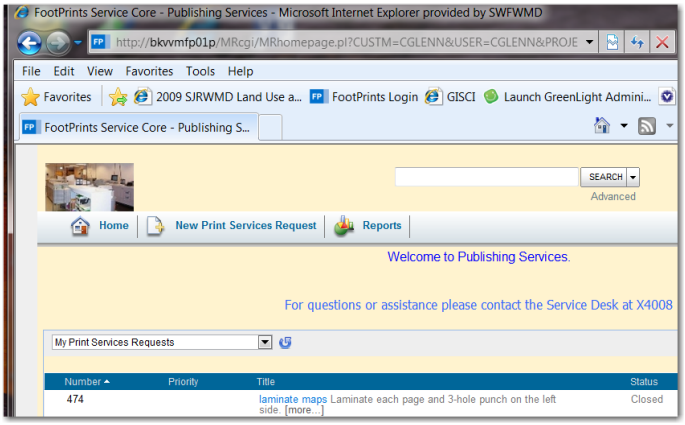
e. Save the map project.
f. Print a copy for GIS records.
   i. Page size 11X17
   ii. Orientation Landscape

2. Export the page as a PDF file." The "Export to PDF" script can be used for any of the pages except 3 and 13 (because the columns have to be reset).
   a. Double click on "Export to PDF" script that is in the PeaceCreek toolbox.
   b. Click on the checkbox by every page that needs to be exported
   c. Uncheck the "Create Multi-page PDF
   d. Can change the name of the file. When sending individual pages, the page number will be appended to the name.
   e. Click OK. Below is a copy of how the dialog box should appear.



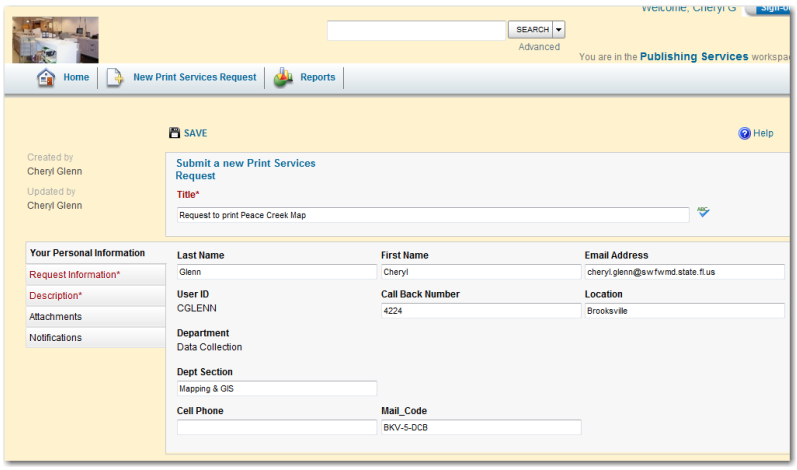
3. This file gets sent to the print shop to be printed and laminated.
   a. Open Internet Explorer > Applications > Work requests >Publishing services
   b. The login window will open for Footprints. Log in if necessary. Click on the link for

"New Print Services Request."



c. Fill in the information requested. The form is divided into five sections, which some areas expanding as information is completed. All required fields appear in red.

i. The tab for "Your Personal Information" is automatically populated except for the Title. Fill in the title.



ii. Click on the "Request Information" tab and fill in the data (some fields that pertain to the request are included below).
Service type = Printing Services
Subtype = documents
Sides = one sided
Quantity = 12
Original Type Code = digital
Finished size = 11 X 17
Finished size instructions: orientation is landscape
Drilling required: 3 holds on left side of page (landscape orientation)
Laminate required = yes
Laminate special instructions: "front and back"

iii. Click on the “Description” tab.
Description: “Need map page printed and laminated to be used in field”
iv. Click on “Attachments Tab” and attached each map page that needs to be sent to the print shop.
v. Click on the save button. The print request has been submitted.

Creator: C. Glenn
Date 09/04/14
Revision # V4
Date of last review: 5/12/2016

Project Information Management System (PIMS) Editorial Guidelines

Purpose
The purpose of this document is to: 1) establish standard verbiage and formatting for all Mapping and Geographic Information Systems (GIS) projects maintained in the Project Information Management System (PIMS); and 2) serve as a reference guide to assist Mapping and GIS project managers in the aforementioned task.

Background
Currently, Mapping and GIS project managers are required to provide project information such as the project name and description, cost and funding, and monthly status updates in PIMS on all active or ongoing projects. This information has been inconsistent and is not always easily understandable.

Scope
In an effort to establish uniformity and consistency between Mapping and GIS projects maintained and tracked in PIMS, the following guidelines have been applied. This document functions as a guide for standardizing entries and information entered in PIMS for active, ongoing, and/or proposed Mapping and GIS projects.

Procedures
As already required Mapping and GIS project managers must update the status information of assigned projects in PIMS at least once a month, and as necessary with relevant status and/or ancillary information. The following sections entail an overview of the common standards employed by the Mapping and GIS section for use in PIMS.

Project Naming Conventions

To ensure consistent naming conventions between projects the following guidelines must be followed.

Keyword for Project Type

A mapping and GIS project entered in PIMS that can be categorized into common activities shall have a common key name added to the project name. Examples are “data” or “mapping.”

e.g.: Mapping – Pasco – Digitizing of Drainage, Wetland & Conservation Easements Plats.

Geographic Reference

A Mapping and GIS project entered into PIMS that is specific to a County or Municipality must have the county or city name as the first two descriptive words in the project’s title.

The project naming convention is as follows:
County Name Project Description (OR) *City Name* Project Description

e.g.: Pasco County NAVD88 Control Densification (AND)
City of Tampa GIS Dataset Development

Project Description

A Mapping and GIS project that has similar purpose(s), scope of work, or task(s) with an existing proposed, ongoing, unfunded, or completed project already entered` into PIMS must have analogous descriptive words in the project’s name.

The project naming convention is as follows:
County Name *Project Description* (OR) City Name *Project Description*

e.g. City of Tampa GIS Dataset Development (AND)
Sarasota County GIS Dataset Development

Project Formatting Conventions

This section applies to information entered into PIMS pertaining to recommendations, descriptions, benefits, costs, additional information, and status updates. The formatting conventions listed herein are specific to the Mapping and GIS section.

Common Project Descriptions between Similar Projects

A Mapping and GIS project that has similar purpose(s), scopes of work, or task(s) with an existing proposed, ongoing, unfunded, or completed project already entered in PIMS must have corresponding project descriptions within the PIMS Description field.

For a project submitted under the District’s CFI Program, the project manager is required to edit the project description submitted by the Cooperator regardless of project status (e.g. proposed or ongoing) to align with projects already entered in PIMS.

Status Update

Status updates for the project will be accounted sequentially with the oldest fiscal year reported on first. Each relevant task or work order will be reported by consecutive order. To the greatest extent possible, updates made to the project status field must have a bolded header followed by a colon. Sample formatting options are as follows:

Status Date:

Where: MM/DD/YYYY is the format used for the date, which is generated in format by the date function tool.

Status Comment Text

e.g.: 10/13/2012
Final deliverables for this project are currently undergoing final review by the County, and will be provided to the District shortly.

(OR)

05/05/2009

FY2009 - Task 1: Kick off meeting has been completed.
FY2009 - Task 2: Data collection has begun.

(OR)

8/09/2010

FY2009 – Work Order 1: Final deliverables for this work order are currently undergoing final review by the County, and will be provided to the District shortly.

FY2009 – Work Order 2: The District and the County are in the process of developing an agreement. A revised Scope of Work and Agreement were sent to the County for review.

Cost Update
The most recent fiscal year is foremost in the cost description followed by any preceding funding. This ensures that historic cost information is maintained within the project. At a minimum, the statement of cost must include the fiscal year followed by the phrase "contractual services" and funding amount.

e.g.: Costs of the project through **FY2009** for contractual services is $200,000. The District is contributing 10 percent or $20,000. Costs of the project for **FY2008** were $100,000 where the District is contributing 50 percent.

NOTE: Reconcile the costs imported from District financial system(s) into PIMS with the actual costs of the project. Cost descriptions should reflect costs in the PIMS funding section.

Text Formatting Button
For all information entered in PIMS, the project manager must select the **CLEAN WORD FORMATTING Button** on the toolbar that located on all textual fields. This will ensure the text entered is formatted accordingly for the Basin notebook.

Abbreviations
Spell out abbreviated words the first time one is mentioned followed by the acronym in parenthesis. Subsequent use of these abbreviated words will be represented by the acronym without periods to separate the letters, and without parenthesis around the letters. Refer to "Appendix A: Common Acronyms" for a detailed list of abbreviations.

The acronym formatting convention is as follows:

e.g.: Southwest Florida Water Management District (SWFWMD)
(AND)
The SWFWMD approved this meeting.

EXCEPTION: Fiscal year does not need to be spelled out. It is understood to be represented by FY followed immediately by the four-digit numeral representing the funding year.
The fiscal year is always bolded when in the cost and status update fields to distinguish information pertinent to the referenced year or phase. The fiscal year is not bolded in other sections where it is an item on a list or does not serve to provide detailed information about that year.

The fiscal year formatting convention is as follows:
FY*yyyy*

Where: FY stands for Fiscal Year.
yyyy is the Year (four-digit numeral)

e.g.: Costs of the project through **FY2009** is $100,000. The District is contributing 50 percent or $50,000. Costs of the project for **FY2008** were $200,000 where the District contributed 50 percent.
(OR)
The project began in FY2005 and will be completed in FY2007.

Hyphen Usage
A compound adjective that contains an increment or measurement with units shall be separated by a hyphen.

e.g. 15-cm
six-inch imagery
one-foot orthophotography
25-feet

Do not use a hyphen when describing specific measurements.

e.g. Staff used five feet of rope.

The road is 12 meters from the levee.

Lists

Lists are denoted in the following format. Note the use of semicolons, numerals, and single spaces to separate ideas. The first letter of each item is always capitalized for complex lists.

e.g.: Benefits include: 1) Timely flight windows; 2) Increased ability to manage the project; and 3) Reductions in the duplication of mapping efforts.

Numbers

Fundamental rules for denoting numeric values, measurements or currency are listed below.

General Numeric Rules

Spell out numbers one through nine

e.g. one
six
nine

Use numerals to symbolize numbers ten or greater. Use commas to separate thousands.

e.g. 10
100
1,000

Currency

When denoting currency, use numerals to represent whole or rounded dollar amounts, placing a dollar symbol in front of the first numeral, and separate thousands with commas.

e.g.: $100,000

Avoid using decimal points after whole numbers when stating dollar amounts.

e.g.: $100,000.00

Range of Values

Use numerals for a range of values where any of the numbers are greater than nine. Use the word “to” in place of a hyphen.

e.g.: 5 to 10 years

Spell the number out for a range of numbers nine or less.

e.g.: four to five years

Percentage

Spell out the word percentage. Avoid representing percentages with the percent

(%) symbol.

e.g.: four percent
30 percent

Dates

Use the format MM/DD/YYYY when denoting a calendar date utilizing zero as a space holder.

Where: MM stands for the Month (two-digit numeral)
DD is the day (two-digit numeral)
YYYY is the Year (four-digit numeral)

e.g.: 04/01/2009, 12/31/2008

Capitalization and Spelling

The following are sample proper nouns and words with common capitalization errors, and words commonly misspelled.

Refer to "Appendix B: Common Accepted District Word Spellings" for a complete list.

Title Case

ArcINFO
ArcGIS
Basin
Board
County
District
Governing Board
Internet
Intranet
Land Use and Cover
Professional Surveyor and Mapper
Water Management District(s)

Lower Case

basin
conservation easements
county
land use and cover
watershed modeling activities
water use caution area

NOTE: Words such as Land Use and Cover, basin, and county are only capitalized when being referenced as a proper noun as in the title of project, name or a cooperator. All other times these words will be lower case.

The following is not capitalized unless referring to or identifying a specific STR:

e.g. Section 15 Township 25S Range 17E
section
township
range

Characters

Avoid the use of symbolic characters such as:

Slashes \ or /
(AND)
Ampersands &

Where these characters or others are used, spell out the conjunction or connecting word as: “and,” or “or.”

EXCEPTION: Dates are allowed to use slashes. Follow the format stated in the preceding subsection for “Numbers”.

Tense

The word “data” is plural and not singular. All references made to this word will reflect the plural tense.

Appendices

Appendix A: Common Acronyms

See the most current list of acronyms and word lists at the District's Admin page
http://currents.ad.swfwmd.net/cos/pab/district-administrative-standards

Color Infrared (CIR)

Environmental Resource Planning (ERP)

Environmental Systems Research Institute (Esri)

Federal Emergency Management Agency (FEMA)

Flood Insurance Rate Maps (FIRMs)

Florida Department of Environmental Protection (FDEP)

Florida Land Use and Cover Classification System (FLUCCS)

Geographic Information System (GIS)

Global Positioning System (GPS)

Land Boundary Information System (LABINS)

Light Detection and Ranging (LiDAR)

National Geodetic Survey (NGS)

National Hydrography Database (NHD)

Natural Color (NC)

North American Vertical Datum of 1988 (NAVD88)

National Geodetic Vertical Datum of 1929 (NGVD29)

Professional Surveyor and Mapper (PSM)

Public Land Survey System (PLSS)

Section Township and Range (STR)

Southern Water Use Caution Area (SWUCA)

Southwest Florida Water Management District (SWFWMD)

Surface Water and Management (SWIM)

United States Geological Survey (USGS)

Water Management Districts (WMD)

Water Management Information System (WMIS)

Water Use Caution Area (WUCA)

Water Use Permits (WUP)

Appendix B: Common Accepted District Word Spellings

See the most current list of acronyms and word lists at the District's Admin page http://currents.ad.swfwmd.net/cos/pab/district-administrative-standards

coastline

cost-effective

cost-efficient

Districtwide

ecosystem management

environmentally friendly

first-magnitude spring

flood control

floodplain

flood protection

fresh water (noun)

freshwater (adjective)

groundwater

homeowner

masspoints

ongoing

online

point-source

pollution

rainwater

real time (noun)

real-time (adjective)

runoff (noun)

saltwater

sinkhole

streamflow

stormwater (noun)

stormwater (adjective)

surface water

time frame

underground

wastewater

water body

watershed

water use

website

well field (noun)

wellfield (adjective)

Creator: A. Karlin
Date 5/22/2008
Revision # V2
Date last review: 8/31/2015

Quality Assurance/Quality Control Process for Digital Orthoimagery

Purpose

This SOP is for Mapping and GIS's Quality Control and inventory process for the one-foot digital orthoimagery acquired on an annual basis.

Scope

The QA/QC steps used for processing the 1-foot digital orthoimagery can be applied to the QA/QC for any of the digital orthorectified imagery (e.g. 1-meter pixel, 6" pixel, etc.).

Procedures

Receiving Digital Ortho Imagery deliverables on portable hard drives

1. The GIS Technician receives the hard drive for tracking purposes and inventory as it becomes District/MGIS property at the end of the project. The GIS Technician will forward the drive to the GIS Analyst responsible for the initial processing and loading of the imagery.
2. The GIS Analyst will copy the imagery files and associated files to the Map Cache Test server (bkvmc01t) used for staging the imagery for loading into the enterprise geodatabase.
3. The GIS Analyst will then create an unmanaged raster catalog on the server. Once the raster catalog is created, the QC staff begins the QA/QC process.
4. The GIS Technician will load the project imagery onto an external terabyte hard drive.
5. Loading of the imagery into SDE is coordinated process involving the GIS Analyst and the SDE System Administrators.

QA/QC Process

1. Using the GeoTIFF Header Utility, run a random sample of GeoTIFFs using the list function to check header information for correct spatial reference and corner coordinates.
2. Open ArcCatalog
3. Create a new point shapefile that includes the following fields:
   a. Problem description
   b. Date
   c. Initials of QC Person
   d. LIDAR project grid number
4. Open Arcmap
5. Load the raster catalog from Map Cache Server and the Photo ID Checkpoints Feature Class
6. Zoom in to a scale of 1:6,000
7. Use the scroll bar tool to navigate across, up and down the cells (tiles) of the mosaic. Once staff comes across a photo id checkpoint, zoom tight into the area to measure horizontal offset.
8. Staff should look for:
   a. Overall consistency in color between cells
   b. Any data gaps or No Data Cells (black) between cells. Random checks of grid lines (vertical and horizontal) – zoom into pixel level with the 5000- foot grid to observe if there are any data gaps.
   c. Any positional offsets between cells, e.g. roads, buildings, etc. Check distances if the offset appears to be outside of the limits for horizontal accuracy - *7.67 feet* - for 1-foot pixels.

d. Imagery from adjacent projects will be loaded and compared to the imagery at a scale of 1:1,200 for any offsets indicating a potential “Bust” in the DEM.

9. If there are any of the above problems, edit the point shapefile to create a point in the area and update attributes to reflect the inconsistencies.
10. Draw the entire block (county/project area) and create a bitmap to check for consistency of color balance within the project area. This is a critical step for overall consistency of imagery within the project area and for the entire District.
11. Check metadata files for consistency, flight acquisition date, projection information, etc.

REG GIS Custom Tools

Move to Audit Tool 

Purpose
The audit layer is a backup of the edit layers in GIS for the REG GIS spatial processes associated with WMIS. Not only does the Move to Audit Tool create a feature in the audit GIS layer it updates specific fields in the edit layers and also updates the county and section/township/range spatial information in the Oracle OLTP tables for certain permits.

Scope
This section will define the actions needed to properly use the Move To Audit Tool. This is an instructional document.

Procedures
1. Turn on the toolbar by choosing Customize□Toolbars□SWFWMD Move to Audit.
2. The toolbar searches for specific names within the map table of contents.

   The following feature classes can be used with this toolbar if the display name is exactly as it appears below:

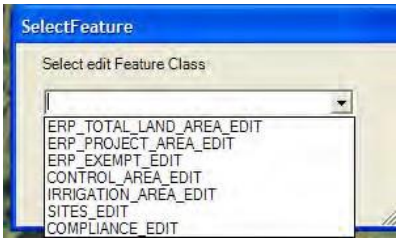
   a. SITES_EDIT
   b. SITES_AUDIT
   c. CONTROL_AREA_EDIT
   d. CONTROL_AREA_AUDIT
   e. IRRIGATION_AREA_EDIT
   f. IRRIGATION_AREA_AUDIT
   g. WUP_BOUNDARY_EDIT
   h. WUP_BOUNDARY_AUDIT
   i. ERP_TOTAL_LAND_AREA_EDIT
   j. ERP_TOTAL_LAND_AREA_AUDIT
   k. ERP_PROJECT_AREA_EDIT
   l. ERP_PROJECT_AREA_AUDIT
   m. ERP_EXEMPT_EDIT
   n. ERP_EXEMPT_AUDIT
   o. COMPLIANCE_EDIT
   p. COMPLIANCE_AUDIT

3. The unique identifier fields (listed below) and the SUBMIT_REC_COMMENT field need to be manually updated. The remaining fields will update when the toolbar is used:

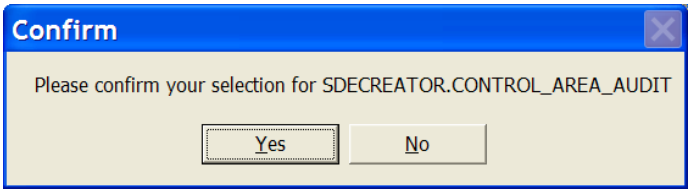
   a. SITES_EDIT: *SITE_ID*
   b. CONTROL_AREA_EDIT: *WUP_PERMIT_NBR* and *WUP_REVISION_NBR*
   c. IRRIGATION_AREA_EDIT: *WUP_PERMIT_NBR* and *WUP_REVISION_NBR*

d. WUP_BOUNDARY_EDIT: *WUP_PERMIT_NBR* and *WUP_REVISION_NBR*
e. ERP_TOTAL_LAND_AREA_EDIT: *ERP_APPLICATION_ID*
f. ERP_PROJECT_AREA_EDIT: *ERP_APPLICATION_ID*
g. ERP_EXEMPT_EDIT: *ERP_APPLICATION_ID*
h. COMPLIANCE_EDIT: *COMPLIANCE_NBR*
i. Once the edits have been completed in the edit environment, and the required fields updated, verify the feature is still selected in the EDIT environment, then select the Move To Audit Tool 

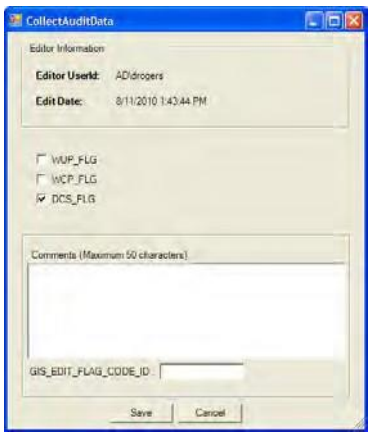
4. Select which feature class you are currently updating from the drop down.

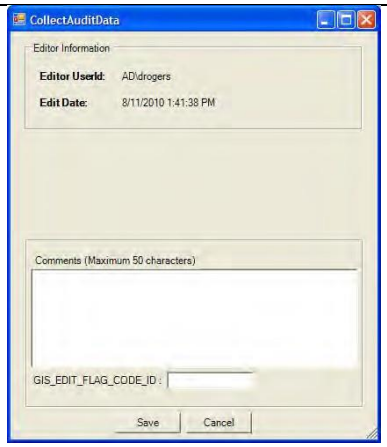


5. The tool will zoom you to the extent of the selected feature, and ask you to confirm your selection. If the correct feature is not selected, chose No, select the correct feature and start over at Step 4. Chose Yes if the correct feature is selected.



6. The Collect Audit Data box will display (it will look different depending on the feature class you have selected in Step 5):

Feature Classes	Screen Shot	Required Info
WUP_BOUNDARY_EDIT ERP_TOTAL_LAND_ AREA_EDIT ERP_EXEMPT_EDIT		• If the overlapping counties box has more than one county or the overlapping STRs box has more than one STR, verify that is accurate. • Enter comments that pertain to how the boundary was created. • Uncheck counties and STRs as appropriate. If the checkmarks are changed, the GIS_EDIT_FLAG_CODE_ID field is blocked from further entry and defaults to 9. • If nothing is changed in the Overlapping Counties box, enter GIS_EDIT_FLAG_CODE_ID, then click Save.
SITES_EDIT	. 	• The screen will default to the flags checked that are in SITES_EDIT for this SITE_ID. Adjust them as necessary. • Enter comments and the GIS_EDIT_FLAG_CODE_ID, then click Save. Save (See Appendix A for Numerical Codes).

CONTROL_AREA_EDIT IRRIGATION_AREA_ EDIT ERP_PROJECT_AREA_ EDIT COMPLIANCE_EDIT		• Enter comments and the GIS_EDIT_FLAG_CODE_ID, then click Save.

7. A message box will display indicating that the Audit environment has been updated.

8. The following is a detailed list of attribute updates and WMIS spatial updates performed with the Move to Audit Tool

Feature Class Selected	Feature Class Updated	Attributes Updated	WMIS Spatial Updates
SITES_EDIT	SITES EDIT	UTMN, UTME, SPFWN, SPFWE, WUP_FLG, DCP_FLG, DCS_FLG, EDITOR_NAME, GIS_UPDATE_DT, LONGITUDE_LATITUDE, BEST_GEO_FLG	NONE
	SITES_AUDIT	ALL ATTRIBUTES IN SITES_EDIT, EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID, BEST_GEO_FLG (for previous record)	
CONTROL_AREA_ EDIT	CONTROL_AREA_ EDIT	EDITOR_NAME, GIS_UPDATE_DT, BEST_GEO_FLG	NONE

	CONTROL_AREA_ AUDIT	ALL ATTRIBUTES in CONTROL_AREA_EDIT, EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID, BEST_GEO_FLG (for previous record)	
IRRIGATION_AREA _ EDIT	IRRIGATION_AREA _ EDIT	EDITOR_NAME, GIS_UPDATE_DT, BEST_GEO_FLG	NONE
	IRRIGATION_AREA AUDIT	GIS_EDIT_FLAG_CODE_ID, BEST_GEO_FLG (for previous record)	

Feature Class Selected	Feature Class Updated	Attributes Updated	WMIS Spatial Updates
WUP_BOUNDARY_ EDIT	WUP_BOUNDARY_EDIT	EDITOR_NAME, GIS_UPDATE_DT, BEST_GEO_FLG,	COUNTY, STR
	WUP_BOUNDARY_AUDIT	ALL ATTRIBUTES in WUP_BOUNDARY_EDIT, EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID, BEST_GEO_FLG (for previous record)	
ERP_TOTAL_LAND_ AREA_EDIT	ERP_TOTAL_LAND_AREA_EDIT	GIS_UPDATE_DT, EDITOR_NAME,	COUNTY, STR
	ERP_TOTAL_LAND_AREA_AUDIT	ALL ATTRIBUTES IN ERP_TOTAL_LAND_AREA_ EDIT, EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID	
ERP_PROJECT_ AREA_EDIT	ERP_PROJECT_ AREA_EDIT	GIS_UPDATE_DT, EDITOR_NAME	NONE
	ERP_PROJECT_ AREA_AUDIT	ALL ATTRIBUTES IN ERP_PROJECT_AREA_EDIT EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID	
ERP_EXEMPT_EDIT	ERP_EXEMPT_ EDIT	GIS_UPDATE_DT, EDITOR_NAME	COUNTY STR
	ERP_EXEMPT_ AUDIT	ALL ATTRIBUTES IN ERP_EXEMPT_EDIT, EDIT_COMMENT, GIS_EDIT_FLAG_CODE_ID	
COMPLIANCE_EDIT	COMPLIANCE_ EDIT	LATITUDE, LONGITUDE, UTMN, UTME, SPFWN, SPFWE, EDITOR_NAME, GIS_UPDATE_DT	NONE
	COMPLIANCE_ AUDIT	ALL ATTRIBUTES IN COMPLIANCE_EDIT, EDIT_COMMENT	

REG GIS Review Toolbar 

Purpose

This toolbar was designed to notify GIS when a boundary was received from District staff to correct an Environmental Resource Permit Project Activity Area or Exemption boundary, and update the appropriate GIS layers and WMIS queues once GIS has processed the boundary.

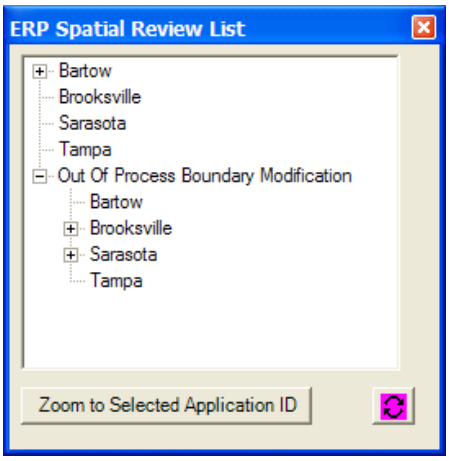
Scope

This tool is described in generic reference; specific practices should be discussed with the GIS Supervisor. This is an instructional document to utilize the tool, it is not intended to review the boundary correction process.

Procedures

An Editing Session must be started before the tool will function.

1. Turn on the toolbar by choosing Customize□Toolbars□SWFWMD REG GIS Toolbar.
   
2. Click the Tool and the Queue box will load.
3. Click the Queue Refresh Button. 
4. Queue List:
   a. The queue shows all “WMIS” applications that have a project activity area to be reviewed by GIS at the top of the list.
   b. The queue shows all other project activity areas to be reviewed by GIS at the bottom of the list, within the “Out of Process Boundary Modification” group.



5. Double click one of the records to zoom to the feature.
6. Update the EDIT and AUDIT layers as appropriate.
7. Right Click the record in the queue, and choose to Complete Task.
8. Choose to Accept or Reject the recommendation, and enter comments about the editing you performed (ie “Copied as-is” or “Cleaned edges to parcel”).

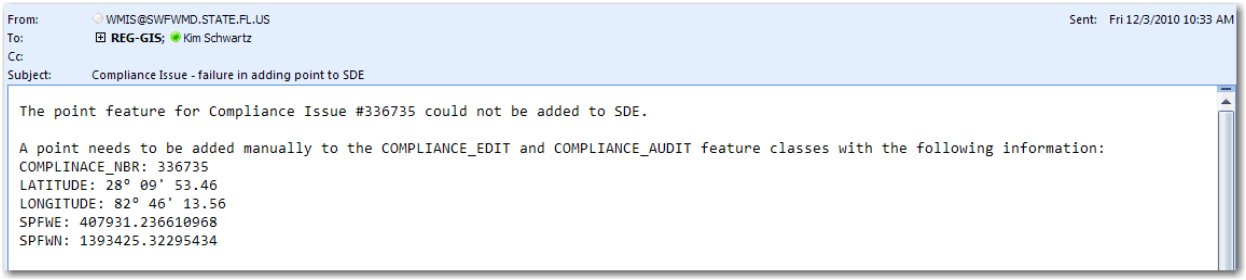
9. Choose Complete, then the REC feature will update.
10. Save Edits.
11. Click the Queue Refresh Button.

WMIS GIS Support Tool (Compliance)

Purpose
This tool was designed to allow a web interface to update the SDECREATOR.COMPLIANCE_EDIT and COMPLIANCE_AUDIT feature classes if there is a failure to write the features during the WMIS record creation.

Scope
This section will review how to utilize the tool within WMIS.

Procedure
1. If a user tries to create a CT point in WMIS, and the point fails to write to the COMPLIANCE_EDIT SDE feature class, an auto email notification will be sent to the REG-GIS email group and the user. (The GIS Analyst should open an ERP edit mxd to verify the point is not populated in COMPLIANCE_EDIT SDE feature class table before adding the point with this tool).



2. The designated GIS Analyst for the service office will need to launch WMIS, and navigate to MENU□MAPS□GIS Support Tool. The GIS Analyst must be a member of the AD\WMISGisAdministration group to access this tool.
3. The information from the email should be entered into the screen that loads. It should be copied and pasted. If WMIS states the point has not been created the info will need to be added manually. Be careful of typos, as there are no validations to verify the information you have submitted is correct.

4. Click “Create Point”. COMPLIANCE_EDIT and COMPLIANCE_AUDT will update with the information that was entered.

5. The GIS Analyst should forward the auto generated email to the user with the following statement.
   “The compliance point has been manually added to GIS. You will be able to see the changes in GIS tomorrow.”

APPENDIX A

Numerical Codes for GIS_EDIT_FLAG_CODE_ID:

0 = default (this will not be assigned - this value was used for all polygons that existed in the layer before the field was created)

1 = Permit Change (i.e., application was received)

2 = Change requested by evaluator

3 = Other Edits (normally cleanup)

4 = Withdrawn application

5 = WMIS pre revision

6 = Expired

7 = WMIS automated review

9 = WMIS update

Creator: L. Clark
Date 08/14/13
Revision # Original
Date of last review: 9/23/2015

REG GIS ERP Pre Application Boundary Location Processing

Purpose
District Regulation Engineering staff have regular meetings with the public to discuss potential projects being submitting to the District for review. These boundaries are mapped to assist with information about areas for projects that are still in a conceptual state (not to be confused with ERP Conceptual permits).

Scope
In an effort to ensure consistency, this section defines the actions needed to review and update the GIS Pre-Application Boundary layer.

Procedures
1. Regulation engineering staff E-mail REG-GIS staff a form that includes a boundary sketch of the potential ERP project area boundary, should an application be submitted.

Pre-App Plot Information

a.	Pre-App #	400409
b.	Name	Stoneville Court
c.	Eng	M Ritter
d.	Es	
e.	Attendee's name	Clay Black
f.	Related permit ERP or WUP	ERP
g.	Related ERP #	None
h.	Wetlands – Yes or No	No
i.	Comments –	Proposed ditch grading and driveway culverts
j.	County	Hernando
k.	S/T/R	20/23/18
l.	Meeting Date	8/8/2013

2. Add the PRE_APP_EDIT feature class from the REG_P ArcSDE instance.
3. Sketch the boundary to copy what the Regulation Engineer has identified as a conceptual boundary.
4. Fill in the attributes as applicable for the feature created.
5. Save Edits.

There is a nightly FME script ran to copy features from PRE_APP_EDIT on REG_P to the dissemination SDE instance (DW_P) PRE_APP_BOUNDARIES.

REG GIS ERP Processing

Initial Application Spatial Review-Total Land Area

Purpose
The initial application spatial review updates the ERP Total Land Area feature classes and sets the boundaries that will initiate certain spatial flags and create spatial data for the application. The ERP Total Land Area applies to Environmental Resource Permits only; it does not apply to exemptions. The ERP Total Land Area review should be completed within 0.5 business days of the application being uploaded into WMIS, no more than 10 calendar days from the District received date.

Scope
In an effort to ensure consistency, this section defines the actions needed to review and update the GIS layers associated with Environmental Resource Permit Total Land Areas.

Procedure

Access the application and Information
1. Open the WMIS application (internal) and navigate to the Spatial Analyst Queue.
   a. Menu□ERP□REVIEW
   b. Click the Drawer button to expand the list of queues.
   c. Left click the GIS Total Area Review Queue to expand it.
   d. Select the pertinent service office, and locate the permit. Left click the application.
2. Select the “Lock for Editing” button.
3. Review the application information:
   a. General Tab:
      i. Permittee and Other Permittee names
      ii. Permit Type
   b. History Tab:
      i. Pertinent comments from District staff
   c. Documents Tab:
      i. Application
      ii. Any other documentation submitted by the applicant
   d. Location Tab:
      i. County
      ii. Section/Township/Range
      iii. Acres Owned
      iv. Project Size
4. Open an edit session in ArcMap if one is not already open. The following feature classes will need to be selectable in the edit session (versioned from Default):
   a. ERP_TOTAL_LAND_AREA_REC
   b. ERP_TOTAL_LAND_AREA_EDIT
   c. ERP_TOTAL_LAND_AREA_AUDIT

5. Verify the following definition query has been applied to the GIS layer in the standard editing map. It removes reviewed recommendations and features that are not officially submitted.
   ERP_TOTAL_LAND_AREA_REC
   EDIT_REC_COMPLETE = 0 AND APPLICATION_STATUS = 'Submitted'

Review Process

1. Read the pertinent information in the WMIS application.
   a. Compare Permitee info and must match other documents
   b. Check for adjacent parcels to merge (any contiguous parcels with same owner must be merged together)
2. Review the location of the Total Land Area in ERP_TOTAL_LAND_AREA_REC. Determine if the location is correct.
3. Digitize the correct boundary (as determined by the analyst) in ERP_TOTAL_LAND_AREA_EDIT.
4. Fill in the attributes for ERP_APPLICATION_NO.
5. Close the WMIS Application. If you proceed to the next step without closing WMIS, you will receive an update error.
6. Copy the completed polygon from ERP_TOTAL_LAND_AREA_EDIT into ERP_TOTAL_LAND_AREA_AUDIT by using the Move to Audit Tool.
7. Open the polygon attributes in ERP_TOTAL_LAND_AREA_REC.
   a. Fill in the attributes for:
      i. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
      ii. REC_ACCEPTED: Indicates whether or not the analyst accepted the recommendation. A value of 0 indicates the recommendation was not accepted. A value of 1 indicates the recommendation was accepted.
      iii. EDIT_REC_COMMENT: This comment is required from the Analyst if the recommendation was not accepted. The comment should state why the recommendation was not accepted.
8. Save Edits
9. In WMIS, navigate back to subject application in the GIS Total Area Review Queue.
   a. Menu→ERP→REVIEW
   b. Click the Drawer Arrow button to expand the list of queues.
   c. Left click the GIS Total Area Review Queue to expand it.
   d. Select the pertinent service office, and locate the permit
   e. Left click the application.
10. Locate the package and add appropriate comments if necessary.
11. Route the application forward (if an error occurs during this process, repeat steps 8a – 8e.

Application Spatial Review-Project Area

Purpose

The GIS Project Area Review populates when an ERP Project Activity Area or an Exemption boundary is sent to GIS for processing for an application that is active in WMIS. This queue notifies GIS that a boundary has been received and needs to be reviewed. The GIS Permit Review tool works interactively with this queue, therefore eliminating the need for the Analyst to physically access the queue.

Project Activity Area and Exemption boundaries that have an active application in house should be reviewed within two business days of receipt.

Project Activity Area and Exemption boundaries that do not have an application in house should be reviewed within five business days of receipt.

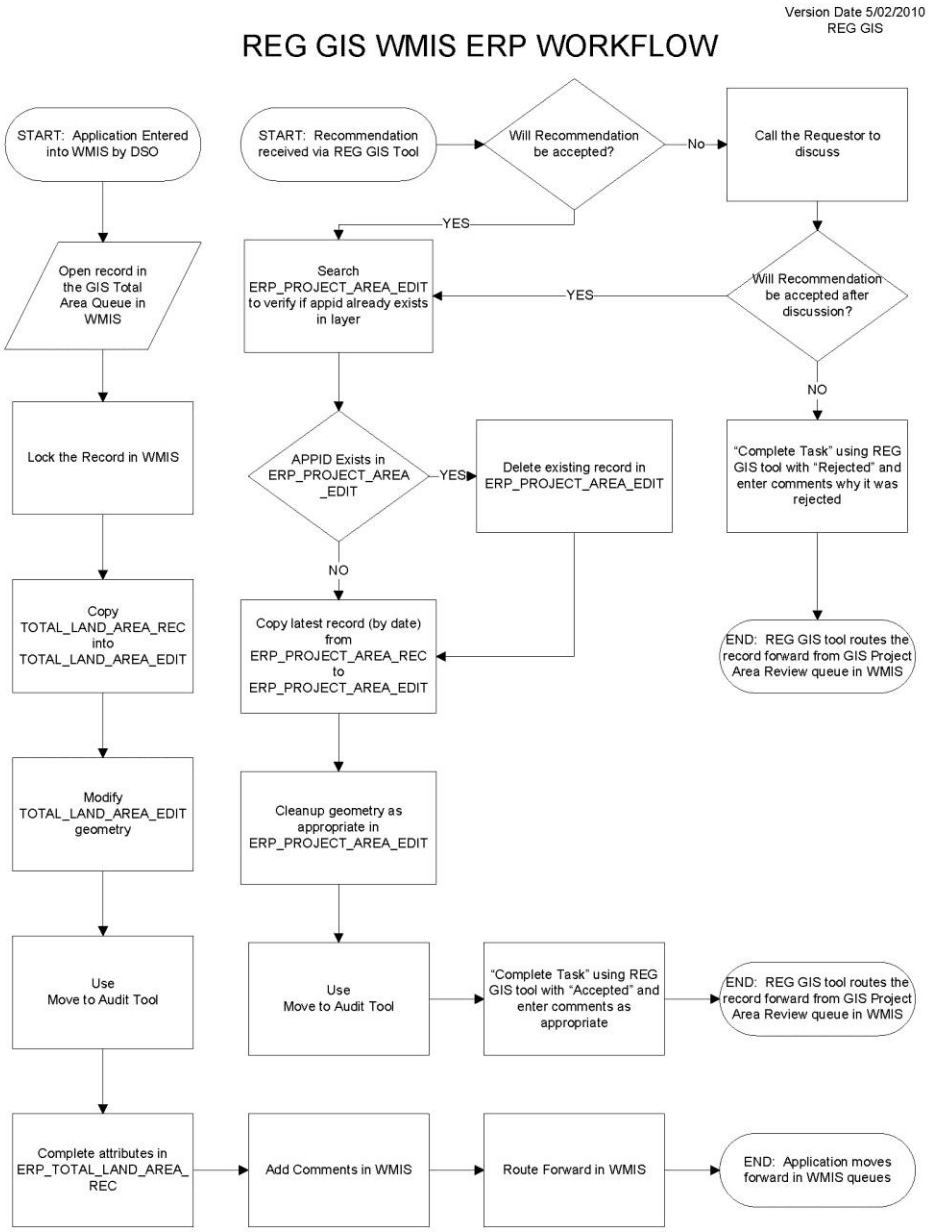
Scope

In an effort to ensure consistency, this section defines the steps required to process the ERP Project Activity Areas and Exemption boundaries submitted by the District Review staff. The District Reviewers must submit the boundary for the Project Activity Area or Exemptions using the ERP Editing Toolbar in ArcMap. Once the boundary is submitted by the District Reviewer, the polygon will be stored in the ERP_PROJECT_AREA_REC or the ERP_EXEMPTION_REC feature class and the package will route to the GIS Project Area Review Queue. The GIS Permit Review Tool was designed to work interactively with the feature class and the queue. Please refer to the Custom Tools for REG GIS for specific information regarding the tool. The ERP Editing Toolbar and the GIS Permit Review tool must be used when processing boundaries related to applications so the correct dates are populated within WMIS (please process oldest permit first if possible).

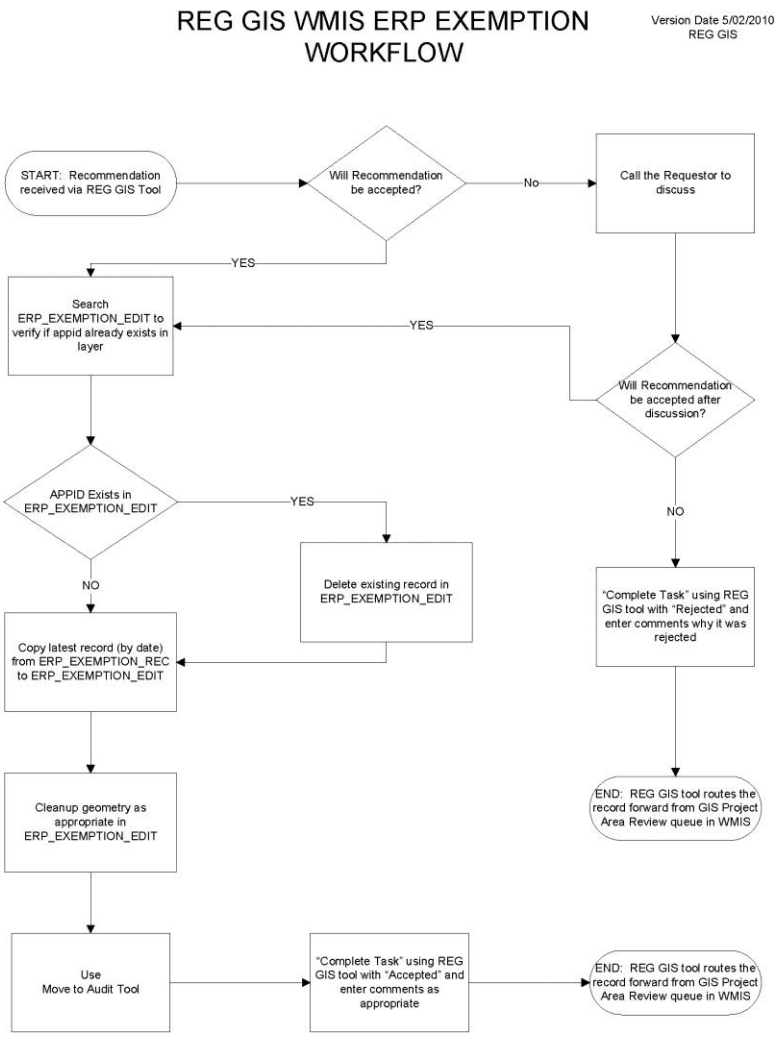
Procedure

1. Verify the following definition queries have been applied to the GIS layers in the standard editing map:
   a. ERP_PROJECT_AREA_REC:
      EDIT_REC_COMPLETE =0 AND APPLICATION_STATUS = 'Submitted' AND
      E_RECORD = 'NO'
      Removes reviewed recommendations, features that are not officially submitted, and the original e-record.
   b. ERP_EXEMPT_REC:
      EDIT_REC_COMPLETE = 0 AND APPLICATION_STATUS = 'Submitted'
2. Please follow the procedures outlined in the SOP for REG Custom Tools for REG GIS Review Toolbar for accepted boundaries.
3. If a boundary is rejected, the GIS Analyst must call the District Review staff to discuss why the boundary was rejected and follow up with an email summarizing why the boundary was rejected.

GIS ERP Workflow Chart



GIS Exemption Work Flow Chart



REG GIS Self Certification Location Processing

PURPOSE:
District Staff track FDEP generated Self Certification permits in GIS within the SWFWMD. This is to aid District Staff during permit review. SELF_CERT_REC_POLY is populated by FDEP.

SCOPE:
To ensure consistency, this section defines the actions needed to review and update the GIS Self Certification layer.

PROCEDURES:
1. Request ITB activate the "Regulator Support" E-mail inbox access in addition to the standard user's email inbox. E-mails will be sent from Florida Department of Environmental Protection with the following information indicating a new Self Certified permit:

Florida Department of Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Receipt for Submission

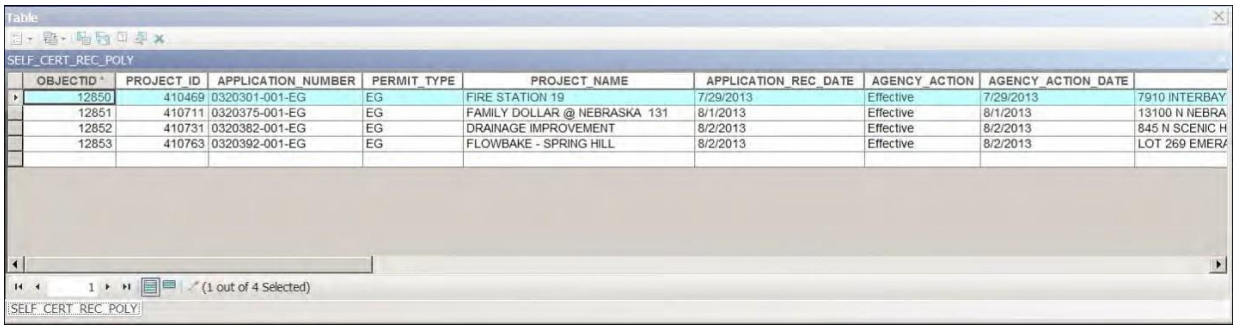
Date: July 29, 2013

Owner(s)/Permittee(s):	CITY OF TAMPA CONTRACT ADMIN.
File No.:	0320301001EG
File Name:	FIRE STATION 19
Site Address:	7910 Interbay Blvd Tampa FL - 33616
County:	Hillsborough
Registered Florida Professional:	Jesus Merly
License No.:	58113
Company:	5M Civil LLC

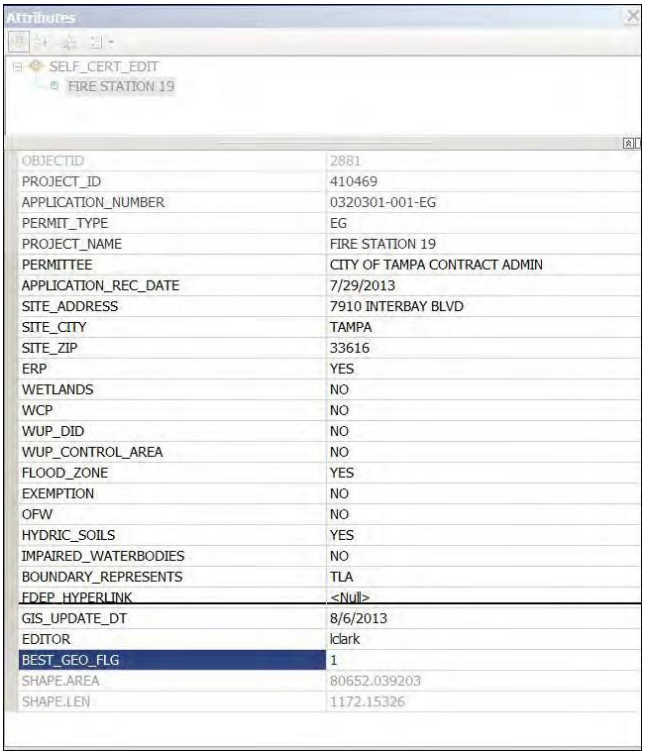
2. Open an edit session with the following feature classes found within the REG_P SDE instance in SDEREG ENTO database:
   a. SDEREG.SELF_CERT_REC_POLY
   b. SDEREG.SELF_CERT_EDIT
   c. SELF_CERT_AUDIT_NEW
   d. Stressed Lakes Group
   e. WUPs Currently Permitted-DIDs
   f. WUPs Currently Permitted-WUP Boundary
   g. Well Construction Permit Locations
   h. Self Cert Permits
   i. Environmental Resource Permits
   j. 2011 Landuse Landcover
   k. Wetlands
   l. Known Flooding Areas

m. SSURGO Soils from the NRCS - Hydrologic Group
n. Outstanding Florida Waters

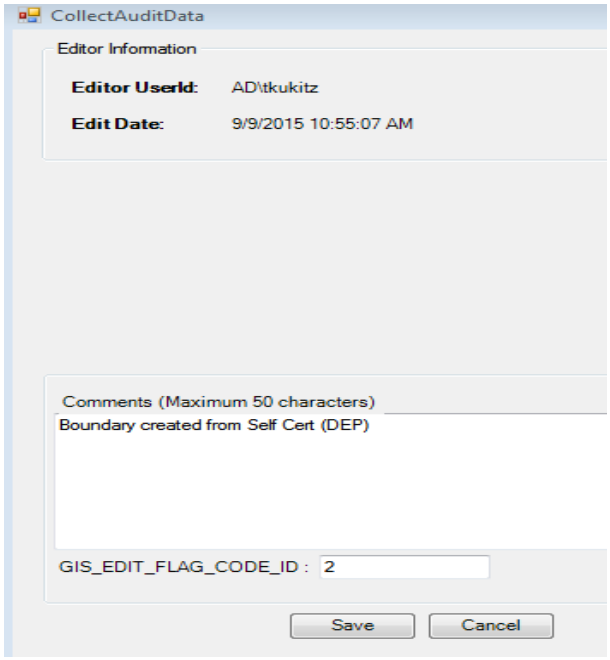
3. Open the SELF_CERT_REC_POLY attribute table:



4. Zoom to the Application Number from the feature in the file attribute table of the SELF_CERT_REC_POLY feature class as shown in the picture above. Find the respective email with the corresponding information that was sent from FDEP in the “Regulator Support” E-mail inbox.
5. Copy and paste the “REC” boundary into **SELF_CERT_EDIT** layer.
6. Fill in the NULL or missing values in the features using the information from the E-mail. Leave the FDEP Hyperlink field NULL.

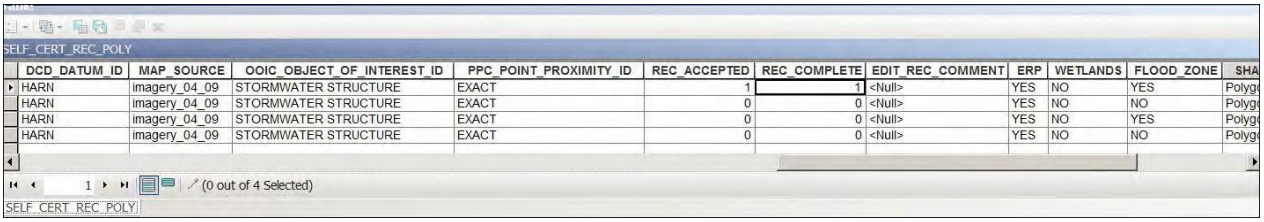


7. Copy the feature from the SELF_CERT_EDIT into the SELF_CERT_AUDIT_NEW layer with the Move To Audit tool (See “REG GIS Custom Tools” for details on using the tool) and fill the Comments and GIS_EDIT_FLAG_CODE_ID as follows:



8. Open SELF_CERT_REC_POLY attribute table, fill in the following:

   REC_ACCEPTED =1 and REC_COMPLETE = 1


SELF_CERT_REC_POLY

DCD_DATUM_ID	MAP_SOURCE	OOIC_OBJECT_OF_INTEREST_ID	PPC_POINT_PROXIMITY_ID	REC_ACCEPTED	REC_COMPLETE	EDIT_REC_COMMENT	ERP	WETLANDS	FLOOD_ZONE	SHA
HARN	imagery_04_09	STORMWATER STRUCTURE	EXACT	1	1	<Null>	YES	NO	YES	Polyg
HARN	imagery_04_09	STORMWATER STRUCTURE	EXACT	0	0	<Null>	YES	NO	NO	Polyg
HARN	imagery_04_09	STORMWATER STRUCTURE	EXACT	0	0	<Null>	YES	NO	YES	Polyg
HARN	imagery_04_09	STORMWATER STRUCTURE	EXACT	0	0	<Null>	YES	NO	NO	Polyg

1 (0 out of 4 Selected)
SELF_CERT_REC_POLY

9. Save the edits.

10. Forward the email from FDEP to Jaime Swindasz and CC Dave Kramer, stating that the boundary has been added to the Self Certification layer.

Message Insert Options Format Text Adobe PDF PKZIP

Send

From... Lela Clark;

To... Jaime A. Swindasz;

Cc... Dave Kramer;

Subject: FW: NGP 10-2 Submission Receipt

Attached: 7b913cc4b824b8921d69e27b2c2d1b.pdf (20 KB)

Boundary has been added to the Self_Cert layer
Thanks

From: no-reply@dep.state.fl.us [mailto:no-reply@dep.state.fl.us]
Sent: Monday, July 29, 2013 3:44 PM
To: jesus.merly@5mcivil.com
Cc: ERP.selfcerts@dep.state.fl.us; SW_ERP@dep.state.fl.us; RegulatorySupport; CabreraR@HillsboroughCounty.ORG
Subject: NGP 10-2 Submission Receipt

DEPARTMENT OF ENVIRONMENTAL PROTECTION FLORIDA

Florida Department of Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Herschel T. Vinyard Jr.
Secretary

Receipt for Submission

Date: July 29, 2013

11. Delete the applicable E-mail from Regulator Support inbox

Creator: T. Kukitz & J. Hendrix
Date: 6/1/2015
Revision # Original
Date of last review: 9/3/2015

REG-GIS WMIS SID Reassignment Tool

Purpose

The purpose of this document is to provide a SOP utilizing the WMIS SID Reassignment Tool.

Scope

To ensure consistency, this SOP defines the procedures involved for the review of proposed SID merges and how to complete the merge using the SID Reassignment tool. The SID layer is the top-level feature class for representing wells, no matter what permit that well may be involved in. The SID will follow the well no matter where it travels in District data.

Background

Data Collection Sites (DCS) are identified using the Site ID.

A Site Identifier (SID or Site ID) is a unique number that is assigned to a time bound series of data. In most cases, it can be described as “the hole in the ground”. Multiple permits can be associated with one SID. The SID is the key to relating the permits together.

Permit Types

Water Use Permits (WUP) contain District Identifiers (DIDs). A DID can be transferred across Water Use Permits (in which case it retains the same SID). A DID should not exist on the same Water Use Permit multiple times (one SID should only exist once on a particular Water Use Permit base number).

Well Construction Permits (WCP) contain well numbers. A Well Construction Permit may have multiple SIDs, however the well number associated with the Well Construction Permit should only appear once (with its own SID).

Data cleanup is a necessary requirement since currently one “hole in the ground” may be represented with multiple SIDs if the permit relationships were not properly identified in the past. This requires the multiple SIDs to be merged into one SID. There is a hierarchy to follow when identifying which SID should be retained.

DCS

WUP

WCP

Typically, if the SIDs to be merged involve a DCS, the DCS SID is retained. If no DCS is involved, the WUP SID is retained. If a WUP is also not involved, then the oldest of the WCP SIDs is retained.

Some WUP DIDs are part of the Automatic Meter Reporting (AMR) program. If a DID SID is an AMR and is proposed to be merged with a DCS, then additional coordination is required with the

Performance Management Office. Caution: If the AMR SID is changed and the consultant is not notified, the meter reporting will fail. They report based on the SID, therefore coordination is critical.

Procedures

1. A Merge SID form should be completed and submitted to the appropriate reviewers. Margit Crowell in Resource Projects reviews all Merge SID requests that involve DCS. REG-GIS reviews all Merge SID requests that involve WUP or WCP.
2. The form accuracy and validity is verified by the designated reviewers.
3. Reviewers then complete the merge by accessing the SID Reassignment Tool located in WMIS→Resource Data→Admin Tools.
4. The reviewer will enter the following information:
   a. The current SID (this is the one that will be deleted).
   b. The proposed SID (this is the one that will be retained).
   c. Short description of why the merge is needed.
5. Click Ok.
6. WMIS will load a screen that compares the information for the 2 SIDs and a graphic map displaying the location of the 2 SIDs. If one of the SIDs is AMR, a warning message will display (see special section titled “AMR Merges”).
7. The reviewer will analyze the data and make sure no merge rules are violated.
8. If the reviewer determines the merge can be completed, he/she should click the Merge button. A confirmation screen will appear stating the merge has been completed. The following actions took place once the merge was completed.
   a. The current SID was moved from SITES_EDIT to SITES_AUDIT:
      i. EDIT_FLAG_CODE_ID =7
      ii. EDIT_COMMENT = Reassigned SID to the proposed SID located in the change request.
      iii. EDITOR_NAME updated to reflect who completed the merge.
   b. The proposed SID had the following updates performed:
      i. SITES_EDIT
         (1) Flags updated to reflect the flags from the current SID also.
         (2) EDITOR_NAME updated to reflect who completed the merge.
         (3) GIS_UPDATE_DT updated to reflect the date of the merge.
      ii. SITES_AUDIT
         (1) Copy of updated SID in SITES_EDIT placed here.
         (2) EDIT_COMMENT updated to state “merged with SID (the current SID).
         (3) EDIT_FLG_CODE_ID is updated to 7.
   c. The PERMIT_NOOWM.COMBINED_SITE table is updated with information from the merge.
9. After completing the merge process in WMIS, update the requestor stating the changes have been made.

AMR Merges

If a proposed merge is identified as involving an AMR site, the following actions should take place:

1. Resource Data should determine if the DCS SID can be changed. If so, the merge should be completed using the AMR SID as the Proposed SID.

2. If Resource Data determines the DCS SID cannot be changed, a footprints ticket should be assigned to the WUP Support group with the Merge SID request attached. PMO will coordinate the completed merge between the District and the consultant.

References

Management of Site-Related Data in SWFWMD Information Systems.docx. Located at:

http://ecmvmprod01.ad.swfwmd.net/gm/document-1.9.1209621

Creator: Tom Kukitz

Date 10/31/2014
Revision #V4
Date last reviewed: 8/4/2014

REG GIS WUP Processing

Initial Application Spatial Review

Purpose

The initial application spatial review updates the appropriate GIS layers and sets the boundaries that will initiate certain spatial flags and create spatial data for the application. The WUP application review should be completed within 2 business days of the application being uploaded into WMIS, no more than 10 calendar days from the District received date.

Scope

In an effort to ensure consistency, this section defines the actions needed to review and update the GIS layers associated with Water User Permit Applications.

Procedures

Access the Application and information

1. Open the WMIS application (internal), and navigate to the Spatial Analyst Queue.
   a. Menu→WUP→REVIEW→WUPs
   b. Click the Drawer button to expand the list of queues.
   c. Left Click the WUP Application Received – Spatial Review queue to expand it. Select the pertinent service office, and locate the permit. The permits are listed in order of date received, the last one on the list being the most recent. Left click the permit.
2. Select the "Lock for Editing" button.
3. Review the application information:
   a. General Tab:
      i. Applicant Name
      ii. Type
      iii. Class
      iv. Application Received Date
      v. Review flags (specific changes in wmis which require edits in gis, i.e., changes to withdrawals, control area boundary, and service area boundary, etc.).
   b. Location Tab:
      i. County
      ii. STR
      iii. Control Acreage
   c. Withdrawals Tab:
      i. DID
      ii. Site ID
      iii. Type
      iv. Status
   d. Predominant Uses Tab
      i. Predominant Use for application
   e. Uses Tab (if Agriculture with crops)
      i. Specific use information and acreage

f. Documents Tab
    i. Application
    ii. Any other documentation submitted by the applicant.

4. Open an edit session in ArcMap if one is not already open. The following feature classes will need to be active in the edit session.
    a. SITES_**REC**
    b. SITES_**EDIT**
    c. SITES_**AUDIT**
    d. IRRIGATION_AREA_**REC**
    e. IRRIGATION_AREA_**EDIT**
    f. IRRIGATION_AREA_**AUDIT**
    g. CONTROL_AREA_**REC**
    h. CONTROL_AREA_**EDIT**
    i. CONTROL_AREA_**AUDIT**
    j. WUP_BOUNDARY_**REC**
    k. WUP_BOUNDARY_**EDIT**
    l. WUP_BOUNDARY_**AUDIT**
5. Verify the following definition queries have been applied to the GIS layers in the standard editing map.
    a. CONTROL_AREA_REC and IRRIGATED_AREA_REC:
        EDIT_REC_COMPLETE = 0
        Removes reviewed recommendations from view.
    b. SITES_REC:
        EDIT_REC_COMPLETE = 0
        Removes reviewed recommendations from view.

Control Area Process

1. Read the Review Flags in the WMIS application under the General Tab. This will display if changes were made to the control area.
2. Review the location of the control area in CONTROL_AREA_**REC**. Determine if the location is correct (verify property ownership, verify control acreage variance < 10%, verify if any adjacent wup's. Comments necessary in WMIS if any discrepancies exist).
3. If there is an existing polygon in CONTROL_AREA_**EDIT**, then delete the polygon from CONTROL_AREA_**EDIT**.
4. Digitize the correct boundary (as determined by the analyst) in CONTROL_AREA_**EDIT**.
5. Fill in the attributes for:
    a. WUP_PERMIT_NBR
    b. WUP_REV_NBR (current revision #)
6. Copy the completed polygon from CONTROL_AREA_**EDIT** into CONTROL_AREA_**AUDIT** by using the Move To Audit Tool.
7. Open the polygon attributes in CONTROL_AREA_**REC**
8. Fill in the attributes for:
    a. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
    b. EDIT_REC_ACCEPT: Indicates whether or not the analyst accepted the recommendation. A value of 0 indicates the recommendation was not accepted. A value of 1 indicates the recommendation was accepted.

c. EDIT_REC_COMMENT: This comment is required from the Analyst if the recommendation was not accepted. The comment should state why the recommendation was not accepted.

9. Save Edits.

Irrigated Area Process

Applies to **Agricultural** Permits with **CROPS** only (areas such as sod, pasture, landscape, and golf courses do not apply).

1. Read the Review Flags in the WMIS application under the General Tab. This will display if changes were made to irrigated area.
2. Review the location of the irrigated area in IRRIGATED_AREA_**REC**. Determine if the location is correct (verify acreage variance is < 20%, in not comment in WMIS).
3. If there is an existing polygon in IRRIGATED_AREA_**EDIT**, then delete the polygon from IRRIGATED_AREA_**EDIT**.
4. Digitize the correct boundary (as determined by the analyst or evaluator) in IRRIGATED_AREA_**EDIT**.
   a. Fill in the attributes for:
      i. WUP_PERMIT_NBR
      ii. WUP_REV_NBR (current revision #)
5. Copy the completed polygon from IRRIGATED_AREA_**EDIT** into IRRIGATED_AREA_**AUDIT** by using the Move To Audit Tool (comment = created from (year) imagery).
6. Open the polygon attributes in IRRIGATED_AREA_**REC**
   a. Fill in the attributes for:
      i. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
      ii. EDIT_REC_ACCEPT: Indicates whether or not the analyst accepted the recommendation. A value of 0 indicates the recommendation was not accepted. A value of 1 indicates the recommendation was accepted.
      iii. EDIT_REC_COMMENT: This comment is required from the Analyst if the recommendation was not accepted. The comment should state why the recommendation was not accepted.
7. Save Edits.

Sites Process

(This layer will only display sites that are being changed (i.e., additions/location changes, if no site changes were made by pass this process)

1. Read the Review Flags in the WMIS application under the General Tab. This will display if changes were made to the Sites.
2. Review the location of the withdrawals in SITES_**REC**. Determine if the location is correct (Comment in WMIS if all sites in Control Area on not present in WMIS Locations Tab along with SITE ID). NOTE: Monitor well can be outside Control Area.
3. Make the appropriate corrections in SITES_**EDIT**.
   a. Verify all existing sites are within the control area. If you need specific information for a withdrawal (i.e., to discover the type of withdrawal it is: groundwater, surface water, or monitor) refer back to the WMIS application and view the Withdrawals Tab.

b. If the site is in WMIS, in Sites_Rec and NOT in Sites_Edit, it needs to be copied from sites_rec to sites_edit (if a site exists in GIS which is not in WMIS, note it in WMIS comments).
c. Fill in the attributes for:
SITE_ID

4. Copy the modified sites from SITES **_EDIT** to SITES **_AUDIT** using the Move to Audit tool. Be sure the audit comment states the adjusted location (or new location) is via the WMIS Application submittal.
5. Open the file attribute table in SITES **_REC**
   a. Fill in the attributes for:
      i. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
      ii. EDIT_REC_ACCEPT: Indicates whether or not the analyst accepted the recommendation. A value of 0 indicates the recommendation was not accepted. A value of 1 indicates the recommendation was accepted.
      iii. EDIT_REC_COMMENT: This comment is required from the Analyst if the recommendation was not accepted. The comment should state why the recommendation was not accepted.
6. Save Edits.

WUP Boundary Process

1. If there is an existing polygon in WUP_BOUNDARY **_EDIT**, then delete the polygon from WUP_BOUNDARY **_EDIT**.
2. Copy CONTROL_AREA**_EDIT** and IRRIGATION_AREA**_EDIT** polygons into WUP_BOUNDARY**_EDIT** then Merge them for this permit (if no irrigation copy just control area).
   a. Fill in the attributes for:
      i. WUP_PERMIT_NBR
      ii. WUP_REV_NBR (current revision #)
3. Copy the completed polygon from WUP_BOUNDARY**_EDIT** into WUP_BOUNDARY **_AUDIT** by using the Move To Audit Tool (Comments: Union of Control Area and Irrigated Area).
4. Open the file attribute table WUP_BOUNDARY_REC:
   a. Fill in the attributes for:
      i. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
      ii. EDIT_REC_ACCEPT: Indicates whether or not the analyst accepted the recommendation. A value of 0 indicates the recommendation was not accepted. A value of 1 indicates the recommendation was accepted.
      iii. EDIT_REC_COMMENT: This comment should state “area of water use or union of Control_Area_Edit and Irrigation_Area_Edit.”
5. Once the Control Area, Irrigated Area (if applicable), Sites, and WUP Boundary have been reviewed and editing completed, complete the General Review.

General Review

1. Review the following and comment in WMIS on any discrepancies using the 'Add Comment' button:
   a. Application owned/controlled acres versus mapped control area acres
   b. Ownership name discrepancies
   c. Land use discrepancies
   d. Irrigated area acre discrepancies
   e. Irrigated area extending beyond control area without service agreement
   f. Production wells (excluding plugged/dismantled) outside of the control area
   g. DIDs are in reasonable locations
   h. Overlapping permits that appear to violate Regulation rules
   i. Adjacent permits issued to same applicant with same predominant use
   j. Anything else that does not make sense
2. Review the following but DO NOT comment on these in WMIS:
   a. All SIDs listed on the Withdrawals Tab exist in Sites_Edit
   b. Any sites that may be a candidate for merging should have the Request to Merge SID's form sent to the GIS Supervisor.
3. Select the "Add Comment" button to add a comment that the evaluators would need to know (ie DID x was moved 50ft west because the well house could be seen from the aerial, or insufficient information to plot control area).
4. Spell Check then select Add.
5. Select the "Route Forward" button in WMIS to push the application forward to the Waiting for Poly Update Queue and remove from the Application Received-Spatial Review queue.
6. The Waiting for Poly Update Queue in WMIS should be empty every morning. The GIS Analyst is responsible for monitoring this queue. If a WUP does not clear out of this queue after an overnight update, the GIS Analyst should review the GIS data for any issues and repair them.

Public Supply

Purpose

Applications and permits that have a predominant use of Public Supply involve additional GIS analysis and coordination with the Planning Department. The Planning Department relies heavily on the public supply GIS layers for population projection modeling, so it is important that these layers are accurate and error free.

Scope

This section is under construction. Currently the public supply boundary update process is being updated. Once the update and new feature classes are complete, this section will be finalized. In the interim, see the GIS Supervisor with questions.

Procedures

Under construction. NOTE: Tentatively slated for January 2015 for discussion and completion.

Changed Withdrawals Queue

Purpose

The Changed Withdrawals Queue populates when District Review Staff enter a new DID during the application review process or when the staff update the location of a DID on the application. REG GIS reviews the proposed changes, updates the appropriate GIS layers, and notifies the

reviewers of any potential issues. The changed withdrawal should be completed the same day as the change was proposed.

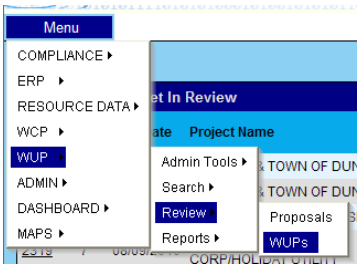
Scope

This section defines the actions needed to process the GIS data and complete the GIS analysis on changed withdrawals that come through the WMIS Changed Withdrawals Queue. All changed withdrawals that come through this queue are application related, and are expected to be completed the same day it is received in the queue.

Procedures

Access the Queue and Information

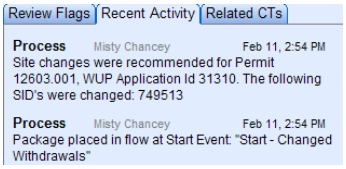
1. Open the WMIS application (internal), and navigate to the Spatial Analyst Queue.
   a. Menu→WUP→Review→WUPs



   b. Click the Drawer button to expand the list of queues.
   c. Left Click the Changed Withdrawals queue to expand it.
   d. Select the pertinent service office, and locate the permit. The permits are listed in order of date received, the last one on the list being the most recent. Left click the permit.
2. Select the "Lock for Editing" button.
3. Open an edit session in ArcMap if one is not already open. The following feature classes will need to be active in the edit session (versioned from Default):
   a. SITES_**REC**
   b. SITES_**EDIT**
   c. SITES_**AUDIT**

Sites Process:

1. Review the Recent Activity Tab within the General Info tab.
2. Look for the Site Changes Information. The SID's that were changed will be listed.



3. Review the location of the sites in SITES_**REC** (locate the changed DID's by using the SID number). Determine if the location is correct.
4. Make the appropriate corrections in SITES_**EDIT**.
5. Verify all existing groundwater or surface water withdrawals are within the control area. If you need specific information for a DID (i.e., to discover the type of withdrawal it is:

groundwater, surface water, or monitor) refer back to the WMIS application and view the Withdrawals Tab.

6. Fill in the attributes for (**should copy over):
   a. SITE_ID**
7. Move Feature to Audit using the “Move To Audit” Tool Verify the flags (WUP,WCP, DCS) are set properly (comment = location moved per reviewer).
8. Complete the attributes for the site in SITES_REC
   a. EDIT_REC_COMPLETE: Indicates whether or not this recommendation has been reviewed by the analyst. By default, the value will be 0. Change to 1 once the review is complete.
   b. EDIT_REC_COMMENT: Mandatory if Rejected, and optional if the recommendation was used, and if it wasn't, why it wasn't (comment = copied as is or if rejected state why).
   c. REC_ACCEPTED: Indicates whether or not the recommendation was accepted. A value of 0 indicates the recommendation was NOT accepted. A value of 1 indicates the recommendation WAS accepted.
9. Save Edits.
10. Once the Sites have been reviewed and editing completed, return to the WMIS queue.
11. Select the "Add Comment" button to add a comment that the evaluator's would need to know (i.e., the recommendation was not accepted because it places a groundwater withdrawal outside of the control area).
12. Spell Check then select Add.
13. Select the "Route Forward" button to push the change forward and remove from the Changed Withdrawal queue.
14. If you do not accept a changed withdrawal recommendation, you must first contact the person who initiated the request.

Permit Withdrawn/Denied Queue

Purpose

The Permit Withdrawn/Denied Queue notifies GIS that a WUP application has been withdrawn or denied so the appropriate GIS layers can be updated. The GIS Analyst should update the appropriate GIS layers and route the package forward from the queue. No comments from the GIS Analyst are required.

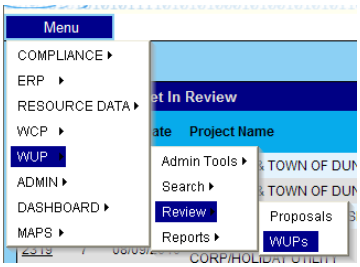
Scope

This section defines the actions needed to access the Permit Withdrawn/Denied Queue and the GIS data that needs to be adjusted.

Procedures

Access the Queue and Information

1. Open the WMIS application (internal), and navigate to the Spatial Analyst Queue.
   a. Menu→WUP→Review→WUPs



b. Click the Drawer button to expand the list of queues.
c. Left Click the Permit Withdrawn/Denied Queue to expand it.
d. Select the pertinent service office, and locate the permit. Left click the permit.

2. Select the "Lock for Editing" button.
3. Open an edit session in ArcMap if one is not already open. All WUP editing feature classes must be active for editing (versioned from Default)

Control Area Process

1. Select the feature in CONTROL_AREA_EDIT.
2. Select the Move to Audit Tool.
   a. Enter the comment “Application withdrawn”.
   b. Enter the EDIT_FLAG_CODE_ID as 4.
3. Delete the feature from CONTROL_AREA_EDIT.
4. If an active revision exists for the base number:
   a. Restore that boundary to CONTROL_AREA_EDIT.
   b. Select the move To Audit Tool.
      i. Enter the comment “Restoring Active Revision to Edit”
      ii. Enter the EDIT_FLAG_CODE_ID as 3.

c. Verify and correct any topology errors that are created.

Irrigated Area Process

If an irrigated area exists:

1. Select the feature in IRRIGATION_AREA_EDIT.
2. Select the Move to Audit Tool.
   a. Enter the comment “Application withdrawn”.
   b. Enter the EDIT_FLAG_CODE_ID as 4.
3. Delete the feature from IRRIGATION_AREA_EDIT.
4. If an active revision exists for the base number:
   a. Restore that boundary to IRRIGATION_AREA_EDIT.
   b. Select the Move To Audit Tool.
      i. Enter the comment “Restoring Active Revision to Edit”
      ii. Enter the EDIT_FLAG_CODE_ID as 3.
   c. Verify and correct any topology errors that are created.

WUP Boundary Process

1. Select the feature in WUP_BOUNDARY_EDIT.
2. Select the Move to Audit Tool.
   a. Enter the comment “Application withdrawn”.
   b. Enter the EDIT_FLAG_CODE_ID as 4.

3. Delete the feature from WUP_BOUNDARY_EDIT.

4. If an active revision exists for the base number:
    a. Restore that boundary to WUP_BOUNDARY_EDIT.
    b. Select the Move To Audit Tool.
        i. Enter the comment “Restoring Active Revision to Edit”
        ii. Enter the EDIT_FLAG_CODE_ID as 3.
    c. Verify and correct any topology errors that are created.

Boundary Corrections

Purpose
Water Use Permits do not have a GIS toolbar in production that allows District review staff to propose boundary changes to the WUP Boundary, Control Area, Irrigated Area, or Public Supply Service Area. These corrections must be coordinated manually between the GIS Analyst and the District Review staff. This procedure should be followed for application, permitted, and historical boundary corrections.
Boundary corrections should be completed within 2 business days of receiving if an application is in house. If an application is not in house, boundary corrections should be completed within 5 business days of receiving.

Scope
This section will review how to process all boundary corrections in the Water Use Permit layers.

Procedure

Control Area
1. The legal documents that prove control must be provided to the GIS Analyst. The GIS Analyst will map the legal description based on the control documents, not maps.
2. If there is an existing polygon in CONTROL_AREA_EDIT, then delete the polygon.
3. Map the new polygon using the legal documentation provided.
4. Copy the completed polygon from CONTROL_AREA_EDIT into CONTROL_AREA_AUDIT using the Move To Audit Tool.
    a. Include the district staff name or initials in the comment that requested the change and how the GIS Analyst mapped the boundary.
    b. Enter 2 as the EDIT_FLAG_CODE_ID.

Irrigated Area
1. The irrigated area may be mapped from any reliable data, including but not limited to imagery, map provided by the applicant, shapefile provided by the Hydrologist.
2. If there is an existing polygon in IRRIGATION_AREA_EDIT, then delete the polygon.
3. Map the new polygon using the data provided.
4. Copy the completed polygon from IRRIGATION_AREA_EDIT into IRRIGATION_AREA_AUDIT using the Move To Audit Tool.
    a. Include the district staff name or initials in the comment that requested the change and how the GIS Analyst mapped the boundary.
    b. Enter 2 as the EDIT_FLAG_CODE_ID.

WUP Boundary
1. The WU P Boundary may be mapped from any data provided by District staff, typically a map.

2. If there is an existing polygon in WUP_BOUNDARY_EDIT, then delete the polygon.
3. Map the new polygon using the data provided.
4. Copy the completed polygon from WUP_BOUNDARY_EDIT into WUP_BOUNDARY_AUDIT using the Move To Audit Tool.
   a. Include the district staff name or initials in the comment that requested the change and how the GIS Analyst mapped the boundary.
   b. Enter 2 as the EDIT_FLAG_CODE_ID.

Public supply
Under Construction. Make sure updates are closely coordinated with the Planning Department GIS Analyst.

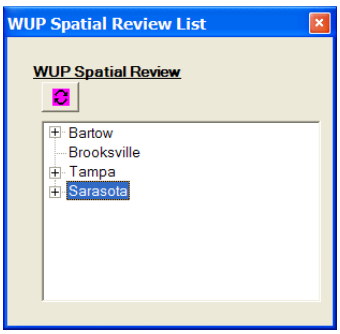
Proposal Spatial Review

Purpose
WUP Proposals are existing permits that are going to expire within the next year. The District sends renewal proposal packages to the permittee to streamline the renewal process for Small General Agricultural Water Use Permits that will not have any changes at renewal. Before the District sends the renewal package to the permittee, it is reviewed by District staff to verify it is a candidate for a proposal. REG GIS assists with the review to screen out permits that will not meet the proposal criteria.
Proposals should be reviewed by GIS nine months prior to the WUP expiration date. The GIS review should be completed by the last business day of the month.

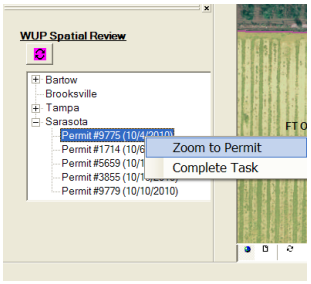
Scope
This section reviews how to use the WUP Spatial Review Tool and the review process that should be completed by the GIS Analyst.

Procedures

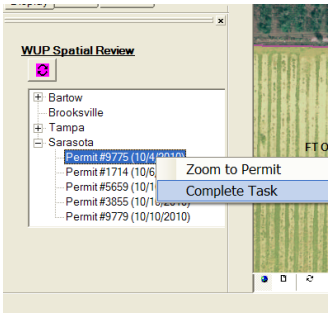
Access the Queue and Information
1. *Preparation:* To begin the process, your data should already be versioned in your standard editing document and an editing instance should be open on your version. The WUP Control Area layer must have a display name of CONTROL_AREA_EDIT in order for the tool to work properly.
2. Find Target Permit:
   a. Select the SWFWMD WUP Proposals Tool . The WUP Spatial Review List box opens.



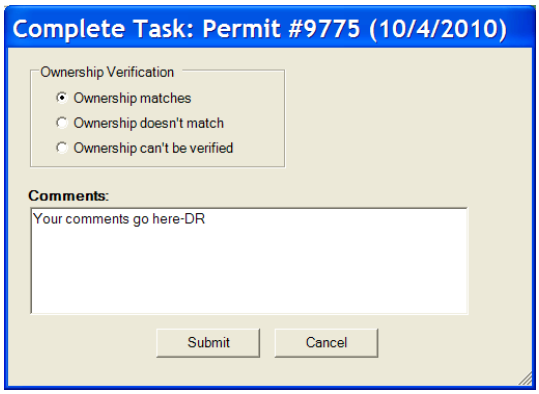
b. Expand the service office that you want to review. Each service office will have five permits listed initially.
c. Right click the permit in the WUP Spatial Review List that you would like to review. Select Zoom to Permit. The map should refresh with the target permit control area in the display screen.



3. Evaluate the WUP:
   a. Control Area.
      i. Compare ownership of parcels to the Owner for the permit. Make edits as necessary to correct boundaries. If WUP Owner does not match Parcel Data Owner, go to the respective property appraiser website to verify the most recent owner information for the parcel.
      ii. Acreage Verification: Verify the owned area listed in WMIS is the same as the mapped polygon.
      iii. Verify all non-delete status groundwater and surface water withdrawals are within the control area, and appear to be located in the correct area (i.e., not in a swimming pool).
      iv. Review the aerial to determine if there have been any significant land use changes (i.e., an Agricultural permit now appears to be a residential subdivision).
   b. Evaluate the Irrigated Area.
      a. Verify the irrigated area appears to match the aerial. If it is different, modify as necessary and update all appropriate layers.
4. Update Attributes as appropriate in the Edit layers.
5. AUDIT Update:
   a. The feature must be placed into audit with an EDIT_FLAG_CODE_ID = 5. This indicates the WUP has been reviewed for Proposals. Use the Move to Audit Tool (See Move Feature to Audit Tool SOP for detailed instructions) for the control area, irrigated area, WUP boundary, and any modified sites.
6. Complete Task:
   a. Right click the target permit number in the WUP Spatial Review List and select Complete Task.



b. Select the appropriate button for the Ownership verification. Add comments if needed (there is a 4,000 character limit). If you insert comments, be sure you include your initials at the end of the comment. Select Submit.



7. Refresh Queue: Once you have finished reviewing the permits listed within the queue, select the refresh button  to upload the next five permits into the queue.
8. *Wrap Up:* When editing is finished, save edits, reconcile and post to parent version.

Standard Verbiage for Comments:

1. Ownership does not match:
   a. The permittee is John Doe. The owner listed on the property appraiser website is Paul Smith.--DR
   b. The permittee is John Doe. There are multiple properties within the control area that are owned by various people, other than the permittee.--DR
2. Landuse has changed:
   a. This is an agriculture permit. The 2010 imagery indicates a residential use of the land.—DR
3. Acreage discrepancy:
   a. The permitted control acreage is 20 acres. The mapped control acreage is 40 acres.--DR
   b. The permitted citrus use acreage is 20 acres. GIS has identified 30 acres of citrus use on the 2010 imagery.—DR
4. Existing/proposed DIDs outside of the control area or other area of concern:
   a. DID 1 is an existing groundwater withdrawal that is located outside of the control area.
   b. DID 2 is an existing groundwater withdrawal located within a wetland.

Creator: Tom Kukitz
Date: 6/2/2015
Revision #: Original
Date of last review: 915/2015

REG GIS WUP-ERP Other Processes

Compliance Problems Related to Project Area Review Errors

Purpose

This process provides an easy method to plot a boundary into an ERP Project Area Review to resolve the Compliance Issue when a point is added in Compliance_Problems feature class. This occurs from historic permit data which is not in GIS, but in WMIS (as of this version, there is much historic data in WMIS, which is not in GIS). Hence the error message and the purpose for this manual process.

Scope

This section will define the actions needed to properly perform the process to resolve this issue. This is an instructional document.

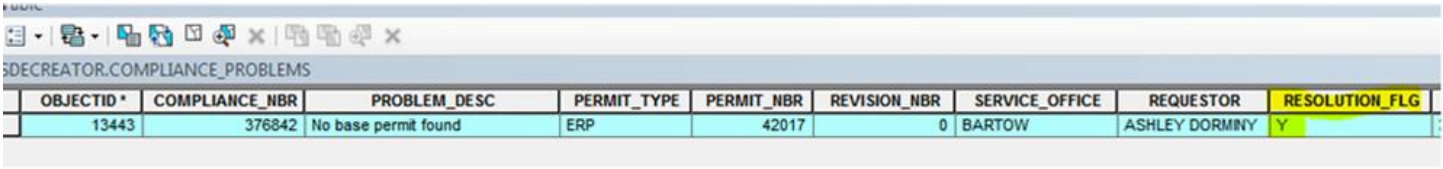
Procedures

If Reg_GIS mailbox receives an email error message such as the one below:
To: REG-GIS
Subject: Compliance Issue missing associated feature
The associated feature for Compliance Issue #377949 could not be found.

> A point was added to the COMPLIANCE_PROBLEMS feature class with the following information:
> PROBLEM_DESC: Missing specific revision
> PERMIT_TYPE: ERP
> PERMIT_NBR: 6628
> REVISION_NBR: 7
> SERVICE_OFFICE: BARTOW
> REQUESTOR: ASHLEY DORMINY
> REQUEST_DATE: 4/29/2015 9:35:05 AM

1. Check if there is a pending ERP boundary edit in Project Area Review related to the error. Do this by viewing the queue using the REG_ GIS Review Toolbar in your ERP editing mxd. If there is a related permit, process it according the SOP named “REG GIS ERP Processing” for Application Spatial Review-Project Area, then skip to step 4 below.
2. If not, check to see the status of the permit. Go to WMIS Review in IE, then Menu, then ERP, then Search, the ERPs. Put in the permit number (optional: Rev#), click Search, note if it is approved, then look under History tab for any additional info. If it is approved, but not in GIS (many old revisions are not in GIS and have to be plotted) it must be plotted in Project Area Review from the Documents tab in WMIS if there is any available (possibly a plans doc). If there is no documentation to support the permit in WMIS. You will need to use one of the older permit revision boundaries related to where the compliance problem point is located. You can check Project_Area_Audit to find a previous revision there to plot it. If no revision boundary is available, go to the vault and find the plans and sketch the boundary.

3. After following instructions in Step 2, process the permit by digitizing the area in ERP_PROJECT_AREA_EDIT and manually add the ERP Application ID from the ERP in WMIS. The number is located in parentheses next to the permit number in WMIS. Then follow the instructions to finish processing the boundary using the “Move to Audit” tool in the SOP “REG GIS Custom Tools” Populate GIS_EDIT_FLAG_CODE_ID with a 2. Save all edits.
4. After processing the boundary in GIS, open the Compliance_Problems feature class attribute table, then change the RESOLUTION_FLG to Y and save edits:


SDECREATOR.COMPLIANCE_PROBLEMS

OBJECTID *	COMPLIANCE_NBR	PROBLEM_DESC	PERMIT_TYPE	PERMIT_NBR	REVISION_NBR	SERVICE_OFFICE	REQUESTOR	RESOLUTION_FLG
13443	376842	No base permit found	ERP	42017	0	BARTOW	ASHLEY DORMINY	Y

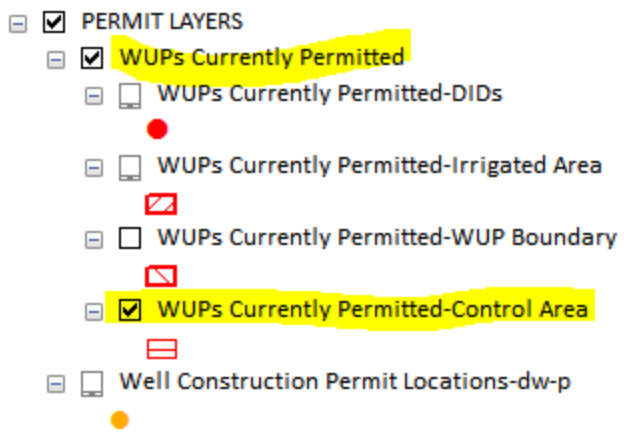
5. Turn off editing.

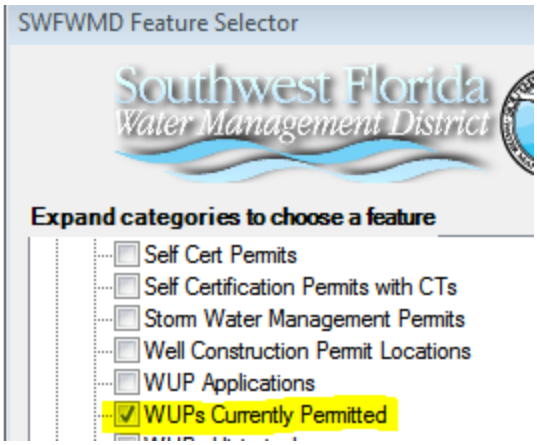
CFWI

Purpose
This process is an element of the Central Florida Water Initiative (CFWI) underway by the District, SFWMD and SJRWMD; each of the three Districts provide a monthly report of the water use permit applications received that are located within the CFWI area. For us this includes applications received within Polk and Lake Counties. A monthly list of the applications received is generated by Regulatory Support staff, which is then forwarded to GIS staff to obtain shapefiles showing the locations of these permit sites. Combined with an updated spreadsheet showing statistics for the applications that the WUP Bureau creates, the files are all uploaded by WUP Bureau staff onto SFWMD’s ftp site (lead agency on this matter) so that they may combine the three District’s information into one final report ultimately provided to FDEP, Tallahassee.

Scope
This process is described in generic reference; where some of the steps can be done using various methods which best suit the GIS Analyst. This is an instructional document to create a shapefile from the data supplied by a reviewer.

Procedures
1. First save the xls/xlsx in the email. This file contains the permit info needed to pull data from WUP Applications Control Area feature class to make the shapefile.
2. Open the xls and parse the PERMIT_NUMBER into two columns to separate the permit number and revision number (method choice is yours).
3. Then add the header name PERMIT_REVISION_NBR to the new column, save as a new file to preserve the original.
4. Then open an .mxd and load the WUP Applications layer from the SWFWMD toolbar: Permits/WUP Applications, then click OK, then Cancel to close the window.





5. Load the parsed xls/xlsx into the .mxd.
   a. Do a join with the xls to the WUP Application Control Area (only matching permits) (you can also do a pull by def querying Lake and Polk counties and then search for all the permits in the WUP Applications Control Area layer: the previous finds better results)
   b. Export this to a shapefile,
   c. Then see if the count of the join matches the xls, if not you will need to pull the rest from WUP's Currently Permitted-Control Area
   d. Now join the new shapefile to the xls and find the missing permits,
   e. Then query them in WUP's Currently Permitted-Control Area and copy and paste them into the new shapefile manually.
   f. Then type in the permit number and revision number, then join it to the WUP's Currently Permitted-Control Area layer and field calculate the rest of the data into the shapefile,
   g. Check to make sure counts in xls match shapefile again,
   h. Zip up the shapefile and send it to Mario Cabana.

Mitigation Investigation Area Boundaries

Purpose

Allows a GIS Analyst to make adjustments to spatial boundaries according to instructions from a reviewer with respect to The Water Use Permit Applicant's Handbook, Part B defines mitigation as *measures and actions provided to offset, lessen, rectify or prevent adverse impacts to the environment, water resources, existing land use, or legal users of the water resources*.

When drawdown(s) may interfere with existing legal users (like the example below), WUP reviewers may include a special condition on the permit to have the permittee mitigate any dry wells complaints caused by a reduction in water levels, within a certain distance from the WUP Boundary.

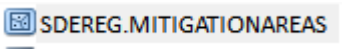
Scope

This process is described in generic reference; where some of the steps can be done using various methods which best suit the GIS Analyst. This is an instructional document to create a shapefile from the data supplied by a reviewer.

Procedure
You will get an email from a WUP reviewer as in the example below: Example email will state something similar to this: Attached is an aerial jpg indicating the mitigation boundary for WUP 20012523.001. The boundary is 1,000 feet out from the WUP boundary. Please reflect this in GIS. NOTE: Some will send a shapefile of the area needing to be plotted.

The email should include this (if it does not email the table to them as an example and request they fill in the data:

WUP	20012523001
WUP Permit Number	12523
WUP Permit Revision	001
Permittee Name	University of Florida Board of Trustees, Attn: Kevin Heinicka
Permittee Address	14909 County Road 672
Permittee City	Wimauma
Permittee State	FL
Permittee Zip Code	33598
Permittee Phone Number	352-392-6488
Crop Protection	6516400
Existing Use Date	3/3/2004
Comments	1,000 feet from Water Use Permit boundary

Open ArcMap and load 

from sdeview_entop_sdereg.sde into a mxd.

Export the entire thing to a file geodatabase (new or scratch you may already have made). Create the boundary in the file geodatabase you made from either georeferencing the pdf (convert to jpg) or the shapefile, fill in the fields with the data from the table above, then save.

Put a copy of your entire geodatabase in current database admin's folder on the P:\Workdisk folder and notify them about updating the layer in sde with the new boundary feature.

Creator: T. Mulroney
Date 06/06/13
Revision # V3
Date of last review: 4/19/2016

SDE Physical Object Naming Guideline

Purpose

The purpose of this document is to provide guidelines for naming spatial database objects created and managed using Esri's Spatial Data Engine (SDE).

Scope

The standards proposed in this document apply to all production SDE instances. Whenever possible, the standards proposed in ITB's Guideline 3400 – "Data Management Practices" and its subsections will apply to database objects created and managed by SDE. Database objects existing prior to the publication of this set of standards are exempt. Efforts will be made to bring prior existing database objects into compliance with the current standards.

Guidelines

Feature Datasets

Feature datasets names can be mixed case. Underscores can be used for word separation for readability.

Example: PERMITS_WEBMERCATOR

Feature Classes

Feature class names must be upper case with minimal use of underscores (_). Underscores should be used for word separation for readability. Refer to ITB's Guideline 3404 – "Physical Object Naming Guideline". Data element (attribute field or column) names should follow the standards defined in ITB's

Guideline 3401 – "Physical Data Element Naming Guideline".

Relationship Classes

Relationship class names should follow Esri's standard of using "Has" or "Have" to join the two table names participating in the relationship. Plural table names indicate a "many" relationship rather than "one".

Examples:	CountyHasCode	(one to one)
	StreetHasAddressRanges	(one to many)
	AddressesHaveNames	(many to many relationship)

Domains
Domain names may be prefixed with a lower case “d” with the rest of the name being uppercase. The uppercase name should describe the domain.

Examples: dCOUNTYCODE

dDEPCODE

Indexes
Refer to ITB’s Guideline 3404 – “Physical Data Element Naming Guideline” for index naming conventions.

Versions
Versions should be named using the version creator’s Oracle user name whenever possible. If a user creates multiple versions, they will need an additional identifier which could be a sequential number, quadrangle name or number, county name, permit number, etc.

Object Classes
Object class (non-spatial table in SDE) names should follow ITB’s Guideline 3404 – “Physical Object Naming Guideline”. Data element (field or column) names should follow the standards defined in ITB’s Guideline 3401 – “Physical Data Element Naming Guideline”.

Raster Datasets
Besides the historical DRG’s, only DEMs are loaded into SDE as Raster Datasets. Most raster dataset names will have a project name or area of coverage (county name, etc.) as part of the name. If the name does not contain information about the extent of the coverage, it is assumed that the raster covers at least the District, if not a larger area. Raster dataset names will contain two or more of the following:

Source Name	e.g. DOQ, FGS
Year	Year of acquisition- 2005 or period for acquisition – 1970s Type
	SURFACE or THICKNESS
Scale	Used with DRGs: 024K, 100K, 250K
Deliverable Name	OCALA, PEACE_RIVER

Raster datasets should use one of the following conventions depending on the source of and/or type of imagery:

IMAGERY TYPE	NAMING CONVENTION	EXAMPLES
USGS Digital raster graphics	*SourceScale*	DRG100K
Florida Geological Survey DEMs	*Source_Area_Type*	FGS_NOCATEE_THICKNESS

References

"Designing Geodatabases: Case Studies in GIS Data Modeling", David Arctur and Michael Zeiler, Esri 2004

SWFWMD IRD Guidelines:

Guideline 3400 – "Data Management Practices"

Guideline 3401 – "Physical Data Element Naming Guideline"

Guideline 3402 – "Class Word List Guideline"

Guideline 3403 – "Data Element Standardization Lifecycle Guideline"

Guideline 3404 – "Physical Object Naming Guideline"

Guideline 3405 – "Data Integration Governance Guideline"

SDE Spatial Reference

Purpose
This document defines the Southwest Florida Water Management District's (District) SDE spatial reference that is associated with its enterprise geographic information system (GIS) data. These standards are to be followed when creating new or managing existing data layers. Spatial reference includes projection, datum, MinX and MinY, precision, and z-values.

Scope
The standards proposed in this document apply to all production SDE instances. Whenever possible, the standards proposed will apply to database objects created and managed by SDE. Database objects existing prior to the publication of this set of standards are exempt. Efforts will be made to bring prior existing database objects into compliance with the current standards. Spatial data specifically used in ArcGIS Online for Organizations applications use a different projection from ArcMap.

Standards

Historic Vector Data
Name: NAD_1983_HARN_UTM_Zone_17N

Alias:
Abbreviation:
Remarks:
Projection: Transverse_Mercator
Parameters:
  False_Easting: 500000.000000
  False_Northing: 0.000000
  Central_Meridian: -81.000000
  Scale_Factor: 0.999600
  Latitude_Of_Origin: 0.000000
Linear Unit: Meter (1.000000)
Geographic Coordinate System:
Name: GCS_North_American_1983_HARN
Alias:
Abbreviation:
Remarks:
Angular Unit: Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983_HARN
  Spheroid: GRS_1980
    Semimajor Axis: 6378137.000000000000000000
    Semiminor Axis: 6356752.314140356100000000
    Inverse Flattening: 298.257222101000020000

The X/Y domain and precision values should be: MinX: -700,000; MinY: 2,000,000; Precision: 1,000. All layers should carry z-values. The minimum z-value should be –20. The precision should be 1,000.

Current Vector Data for ArcMap
Name: NAD_1983_HARN_StatePlane_Florida_West_FIPS_0902_feet
WKID: 2882 Authority: EPSG

Alias:
Abbreviation:
Remarks:
Projection: Transverse_Mercator
Parameters:
  False_Easting: 656166.666667
  False_Northing: 0.000000
  Central_Meridian: -82.000000
  Scale_Factor: 0.999941
  Latitude_Of_Origin: 24.333333
Linear Unit: Foot_US (0.304801)
Geographic Coordinate System:
Name: GCS_North_American_1983_HARN
Alias:
Abbreviation:
Remarks:
Angular Unit: Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983_HARN
Spheroid: GRS_1980
  Semimajor Axis: 6378137.000000000000000000
  Semiminor Axis: 6356752.314140356100000000
  Inverse Flattening: 298.257222101000020000

The XY Tolerance and XY Resolution is 0.003280833.

Current Projection for ArcGIS Online for Organization Vector Dataset
Name: WGS_1984_Web_Mercator_Auxiliary_Sphere

Projection: Mercator_Auxiliary_Sphere False_Easting:
0.000000
False_Northing: 0.000000
Central_Meridian: 0.000000
Standard_Parallel_1: 0.000000
Auxiliary_Sphere_Type: 0.000000 Linear
Unit: Meter (1.000000)
Geographic Coordinate System: GCS_WGS_1984 Angular Unit:
Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000) Datum:
D_WGS_1984
    Spheroid: WGS_1984

Semimajor Axis: 6378137.000000000000000000
Semiminor Axis: 6356752.314245179300000000
Inverse Flattening: 298.257223563000030000

Historic Raster Dataset
The historic raster data is any raster that was received by the District before 2005, such as DOQ2004NC1M and TM2004NC_STATEWIDE.

Name: NAD_1983_UTM_Zone_17N

Alias:
Abbreviation: Remarks:
Projection: Transverse_Mercator
Parameters:
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -81.000000
Scale_Factor: 0.999600
Latitude_Of_Origin: 0.000000 Linear
Unit: Meter (1.000000) Geographic
Coordinate System:
Name: GCS_North_American_1983_HARN Alias:
Abbreviation: Remarks:
Angular Unit: Degree (0.017453292519943299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983
Spheroid: GRS_1980
Semimajor Axis: 6378137.000000000000000000
Semiminor Axis: 6356752.314140356100000000
Inverse Flattening: 298.257222101000020000

The X/Y domain and precision values were not defined for historical raster data sets.

Current Raster Dataset
The current raster data is any raster that was received by the District after 2005, such as OP2005NC1FT_CHARLOTTE and EDSARASOTA2004NC1FT.

Name: NAD_1983_StatePlane_Florida_West_FIPS_0902

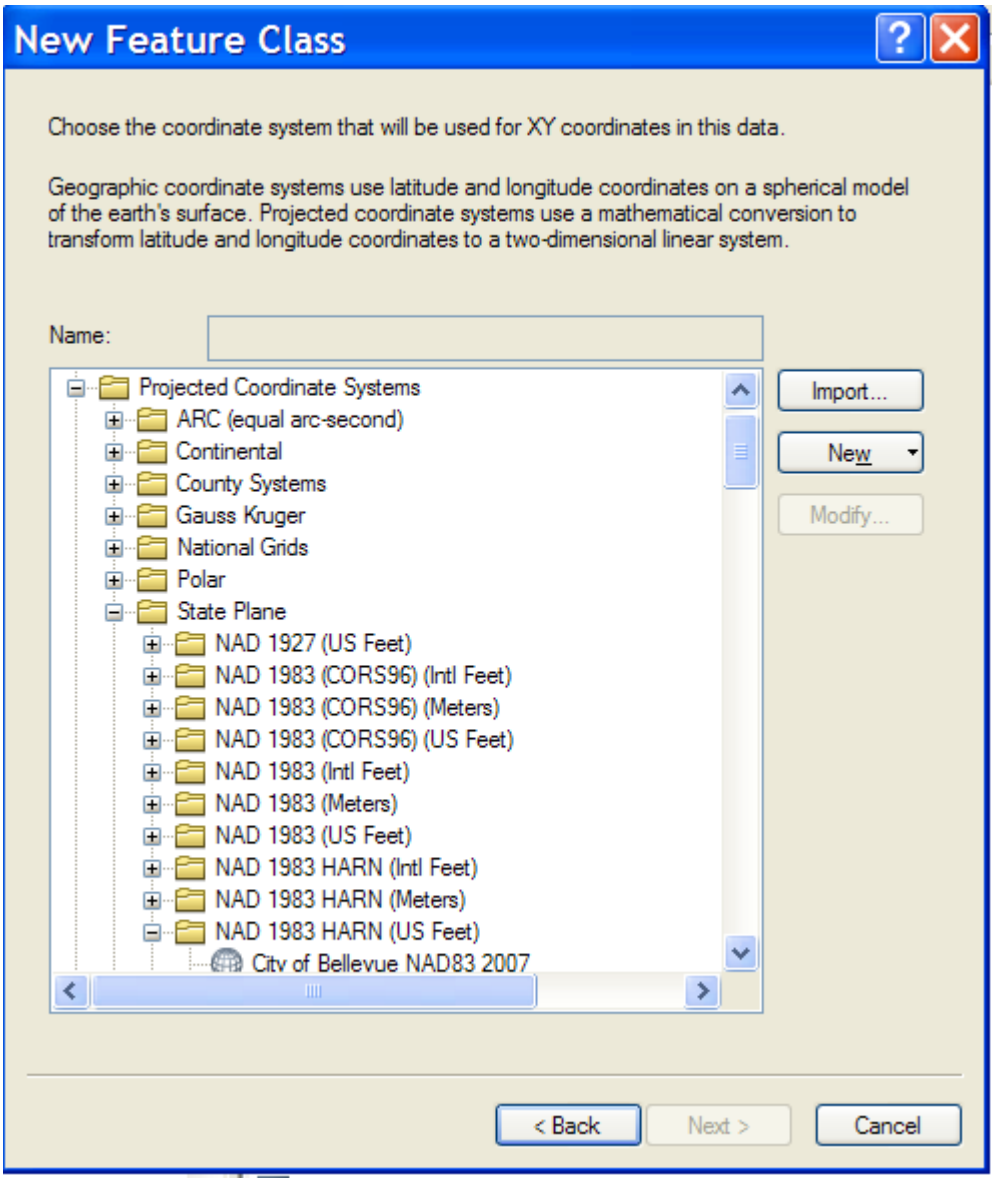
Alias:
Abbreviation: Remarks:
Projection: Transverse_Mercator
Parameters:
False_Easting: 656166.666667
False_Northing: 0.000000
Central_Meridian: -82.000000
Scale_Factor: 0.999941
Latitude_Of_Origin: 24.333333 Linear
Unit: Foot_US (0.304801) Geographic

Coordinate System: Name:
GCS_North_American_1983 Alias:
Abbreviation: Remarks:
Angular Unit: Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000) Datum:
D_North_American_1983
  Spheroid: GRS_1980
    Semimajor Axis: 6378137.000000000000000000
    Semiminor Axis: 6356752.314140356100000000
    Inverse Flattening: 298.257222101000020000

The X/Y domain and precision values are not defined for current raster data sets.

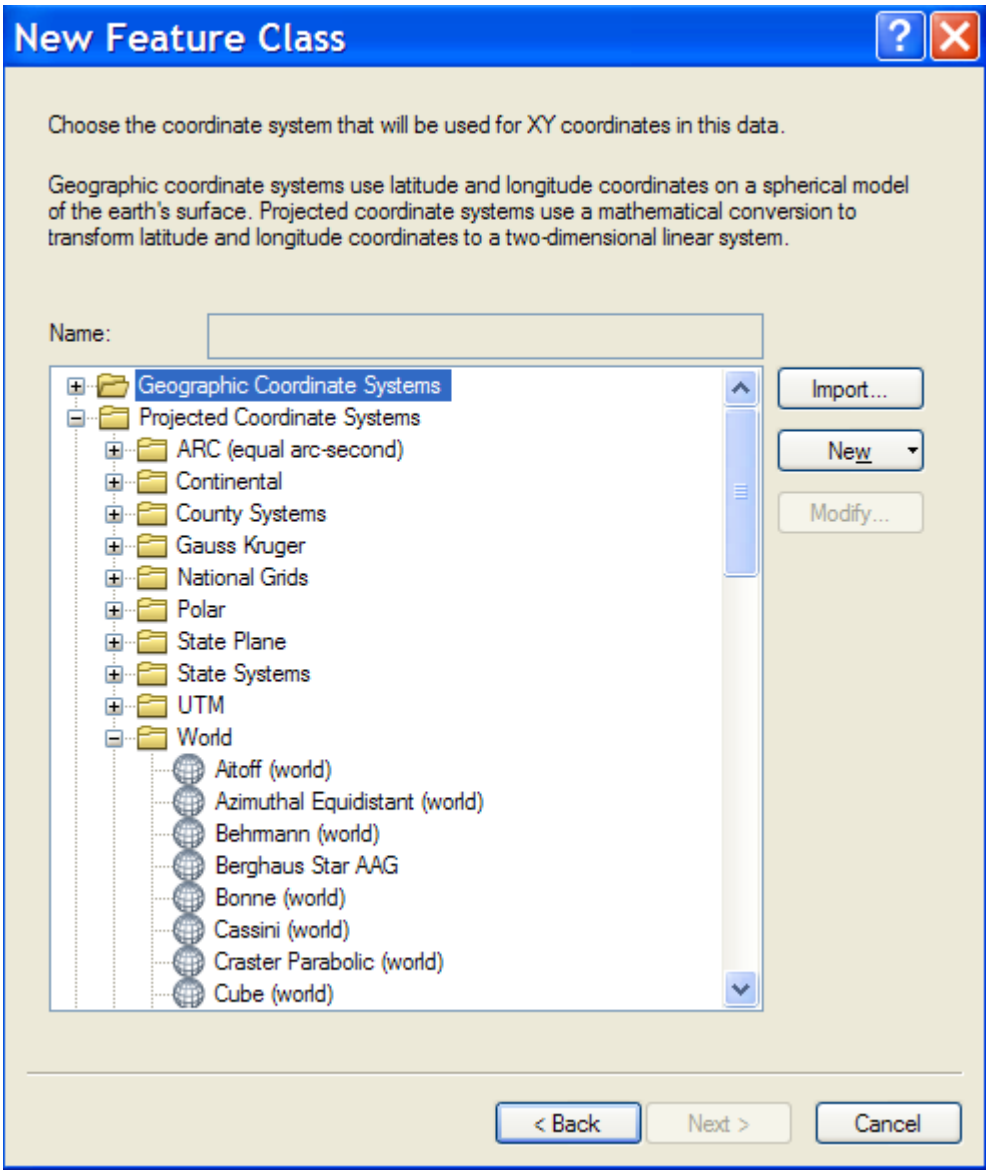
Procedures

Vector Data
During creation in ArcCatalog, at the second screen navigate to the NAD 1983 HARN StatePlane Florida West FIPS 0902 for feature classes that will be used in ArcMap.



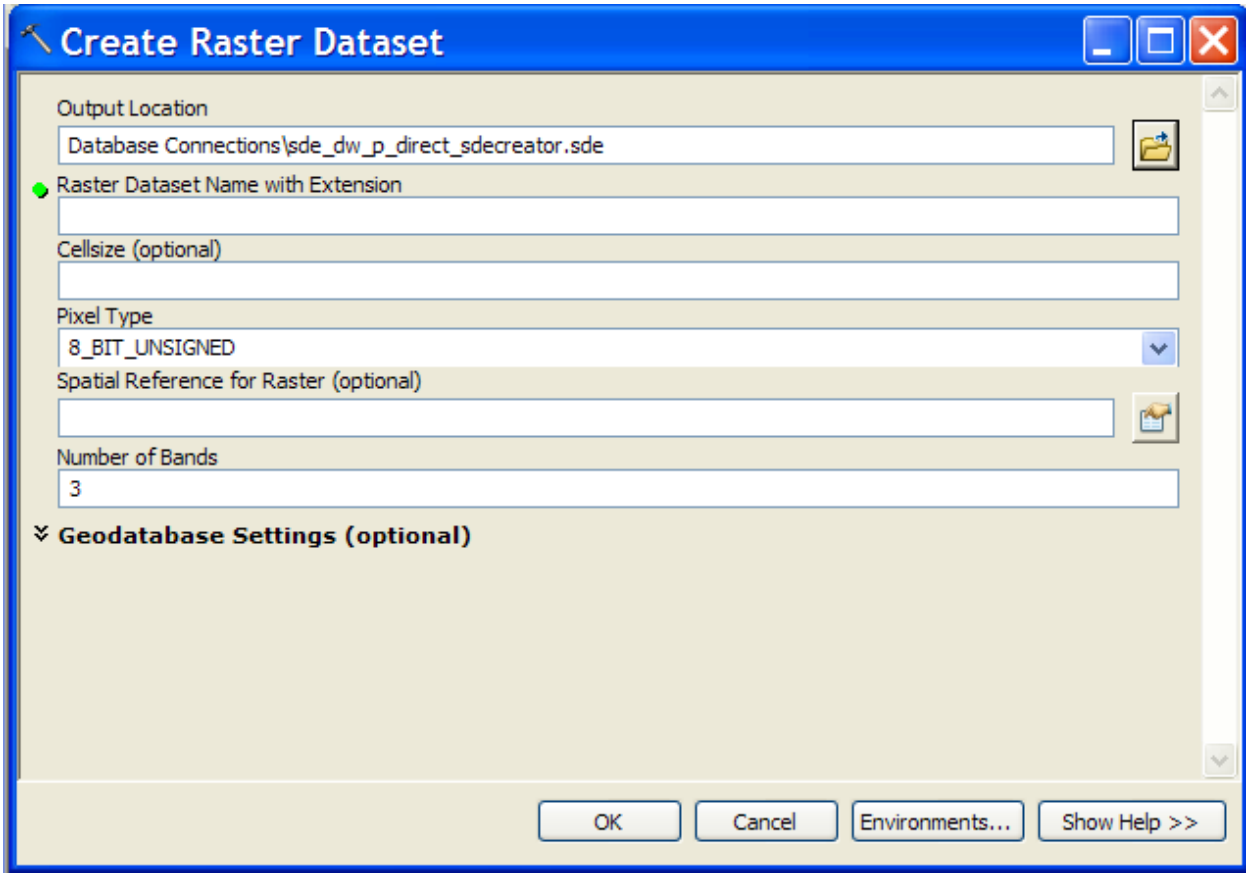
The 'Import' button can also be used. Navigate to an existing feature class with the same projection and choose it.

For feature classes that will be used in ArcGIS Online for Organizations applications, navigate to WGS 1984 Web Mercator (Auxiliary Sphere).


New Feature Class
Choose the coordinate system that will be used for XY coordinates in this data.
Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.
Name:
Geographic Coordinate Systems
Projected Coordinate Systems
ARC (equal arc-second)
Continental
County Systems
Gauss Kruger
National Grids
Polar
State Plane
State Systems
UTM
World
Aitoff (world)
Azimuthal Equidistant (world)
Behrmann (world)
Berghaus Star AAG
Bonne (world)
Cassini (world)
Craster Parabolic (world)
Cube (world)
Import...
New
Modify...
< Back
Next >
Cancel

Raster Dataset

In the Create Raster Dataset window, click on the icon  next the Coordinate system for the raster window.



Then click on Import. Navigate to an existing data layer in the same SDE instance that has the same extent or to the TIFF file that will be imported. Then click Add and then OK.

Creator: J. Hendrix

Date 08/06/13
Revision # V1
Date of last review: 9/4/2015

Security Hard Drive Storage Records Procedure

Subject
Protective and accessible storage of security copy Mapping and GIS hard drives and electronic media.

Purpose
Securely receive, transfer, track and protect GIS Mapping external hard drives and other electronic media by placing the security copy of these media in Records Management Vital Records Vault # 2.

Overview:
1. Mapping and GIS vendors deliver electronic data on external hard drives/CD/DVD* - no changes or alterations are made to these data. Note: under special circumstances data are resubmitted by the Vendor to Mapping and GIS for post project acceptance. The redelivered data are replaced on the applicable external hard drive.
2. Data from these original drives are verified for accuracy and downloaded to a second external hard drive/CD/DVD** - no alterations or changes are made to the second external hard drive data but the directory format and filenames may be reorganized – second external hard drive is held off line
3. Data from the original drive are downloaded to three locations -
   a. ArcSDE Server*** – This server stores a compressed version of the imagery that is accessed by District staff.
   b. Distribution drive – Mapping and GIS staff draw from these data for distribution
   c. Security drive – An archive external hard drive where data can be reorganized but the data content does not change

   *The vendor external hard drive is sent to off-site storage as the Record/Master copy of the data after downloads have been completed. It is tracked on the Mapping and GIS retention schedule because it is the originating department. Each drive is entered into Fixed Records Management individually. Special care is taken at every step to ensure and safe guard the drives. Records Retention coordinates the transfer and CRM makes a special run to pick up the drives from the District. The drives are vault protected.

   **The second external hard drive is sent to the District's Vital Records vault # 2 and serves as the security back up to the data. Each drive is entered into Fixed Records Management individually. It is tracked on the Mapping and GIS retention schedule as the security copy and the actual location is vault # 2.

   ***Server based data are maintained in ITB and are considered to be the informational copy and therefore are not tracked on any retention schedules. Data are compressed when loaded onto the servers to save space.

Procedure:

1. Hard drives containing mapping data are delivered from vendors to MGIS staff.
2. MGIS staff verifies the data for completeness of deliverables, and compliance with mapping specifications.
3. Unaltered data are downloaded to a second off-line external hard drive for security purposes by MGIS staff.
4. For tracking purposes, this second external hard drive is entered into Fixed Records Management as a folder with pertinent identification including: section (e.g. MGIS Section) and location in MGIS.

   Example of entry from GIS

   Mapping and GIS Section

   B089 WO1 – North District Orthophoto

   PO #06PCSOW0471

   2006 North District Natural Color

5. After the external hard drive is entered into Fixed Records Management, MGIS records the following into the MGIS Driver Manager located on P:\SpecialProjects\MGIS Driver Manager
   a. Records Box Number
   b. Size of drive, space used, space free, and serial number
   c. Description of data on drive (ex: see Example of entry from GIS above)
6. The external hard drive is stored in the MGIS vault.

Creator: P. Jackson
Date 9/21/2015
Revision # V5
Date of last review: 9/18/2015

Submitting Published Maps on the GIS Web Page

Purpose
The purpose of this document is to provide guidelines for publishing maps on the District's GIS web page.

Scope
The MGIS section has a web page that allows District employees the opportunity to view and print maps created by District employees. This document was written to provide guidelines and standards for creating maps placed on this web page.

Procedures
A map approved for publishing must meet minimum standards and guidelines approved by the MGIS section. The map must be submitted to the MGIS section for approval, via email or in person. There are two categories that most maps fall into; reference and thematic. Reference maps show locations of features, either natural or man-made, or a combination or both. Thematic maps may also include natural and/or man-made features, but emphasize one or more topics such as rainfall data or landcover/landuse. The final map should be submitted to the GIS Administrator to be placed on the Intranet.

Standards
Maps submitted for publishing on the MGIS web page must include a title, author (creator), date, and brief description of the map. Source material should also be referenced when cited. The format should be .PDF, to allow users to view the published maps using Adobe Acrobat. The resolution should be fine enough to allow potential viewers the ability to clearly view all text and features on the map.

1. Naming Conventions
    a. Published Map must have a descriptive title with the date the map was produced.
        i. Good example: District_owned_lands_12_12_2005.pdf.
            (1) The underscores and date format make it easy to read.
        ii. Bad example: 1234LC3#7X4.pdf
            (1) File uses arbitrary letters and numbers that appear random to the common user and do not describe the map or give a date.
    b. The date should be easy to read.
    c. The file name should identify the map, not the author.
2. Cartographic Features
    a. Title – Too much information is better than too little.
        i. Good example: "1999 Agricultural Land Use Land Cover in the SWUCA." Identifies the data and area being mapped.
        ii. Bad example: "Land Use" What data was used? What year? How much land use can you show of the entire state? What area are you mapping?
    a. Date – the date the map was created
    c. North arrow
    d. Legend – Your audience must be able to discern features. If you only have one feature or data set (included in the title) you should identify what the feature represents. For

example, you may not need a legend in a map titled "Counties in the SWFWMD" if you label each county.

e. Source – Always a good idea to let your audience know where you got your information. Rivers, roads, and other physical features should appear in the legend, but do not necessarily need a source. Census data should appear with the date the census was taken. In general, all outside data sources should at least be referenced in or near the legend, or the title.

3. Additional descriptive information
   Prior to submitting the map, populate the properties:
   a. Right-click on the file name.
   b. Click on the Summary tab.
   c. Fill in the fields for Title, subject, and author (creator).
   d. Fill in the fields for category, keywords, and comments.
4. The MAPS folder is located at
   L:\Mapping-GIS\Map

Creator: D. Gillett
Date 3/24/2014
Revision # Original
Last review date: 5/21/2015

Survey Benchmarks Update Procedure

Purpose

The purpose of this document is to outline the procedure for updating the SURVEY_BENCHMARKS point feature class and its attachments.

Scope

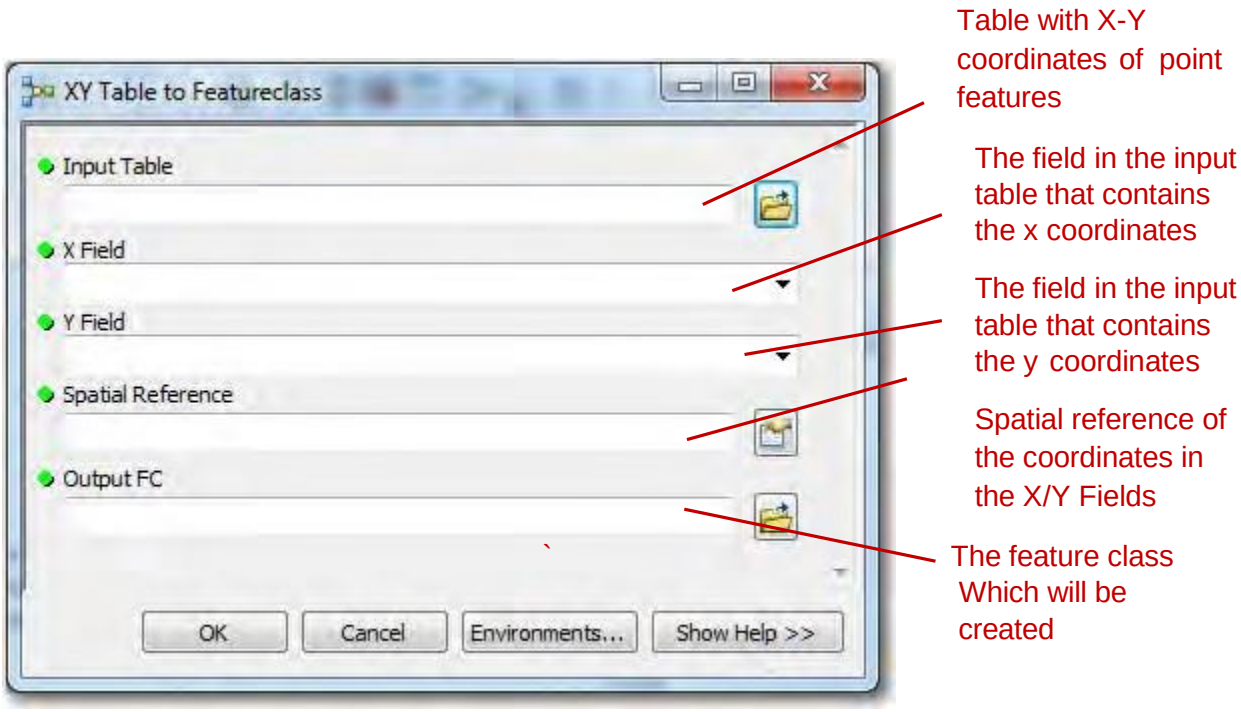
The SURVEY_BENCHMARKS feature class is currently located in SDE_REG. This feature class is updated within an edit session within ArcMap.

Procedures

1. An Excel spreadsheet of the benchmark data is created by a geomatics technician from the Survey section. This spreadsheet contains the information for creating and attributing the updates.
2. The location of the benchmark pdf files that are to be attached to the points is provided by a geomatics technician from the Survey section.
3. Request editing privileges from the SDE administrator to SDE_REG
4. Create a geodatabase for the feature class that will be created from the spreadsheet.
5. Some of the column headings in the spreadsheet need to be revised to match the field names in SURVEY_BENCHMARKS. The column headings that need to be revised are listed in this table. Save your changes as a new spreadsheet.

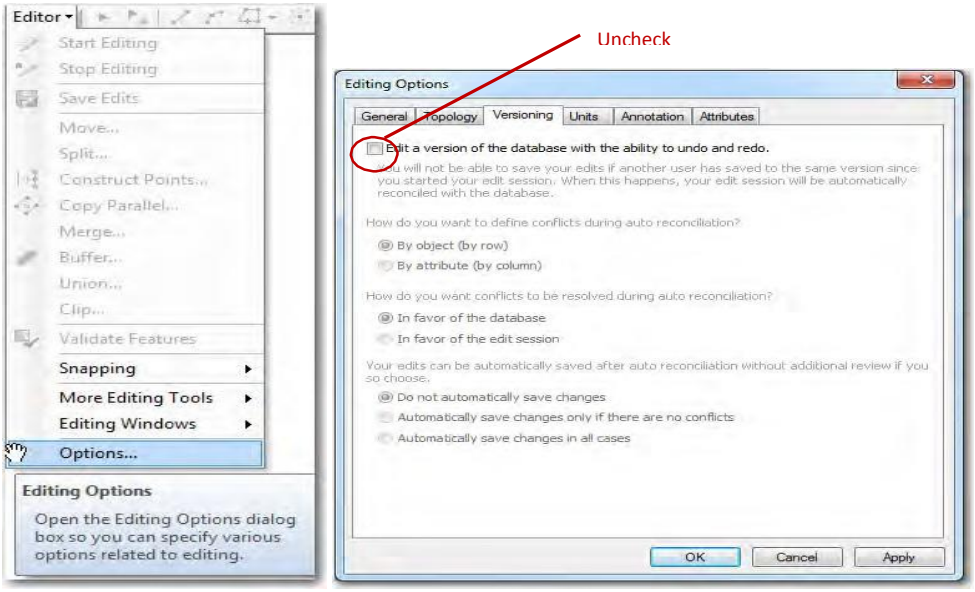
FROM	TO
NAME	BENCHMARK_NAME
DATE	LASTVERIFIED_DT
OUTSIDE_AGENCY_CODE_ID	BM_ OUTSIDE_AGENCY_CODE_ID
BENCHMARK_QUALITY_CODE_ID	BM_VERT_QUALITY_CODE_ID
NAVD88_ELEVATION	ELEVATION_NAVD88
WO_Num	WORKORDER

6. Add SURVEY_BENCHMARKS from SDE_REG to an ArcMap project.
7. Run the XY File to Feature Class model (BKVFS07\LndRes\Mapping\Reference\My Tools.tbx)

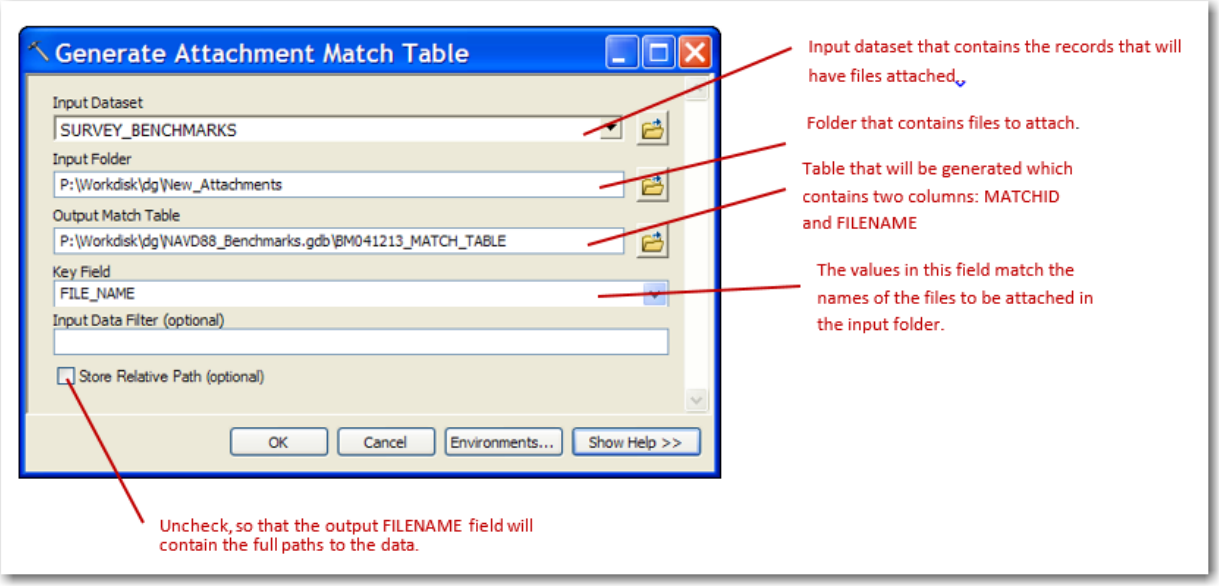


Note: The spatial reference will be the output feature class spatial reference

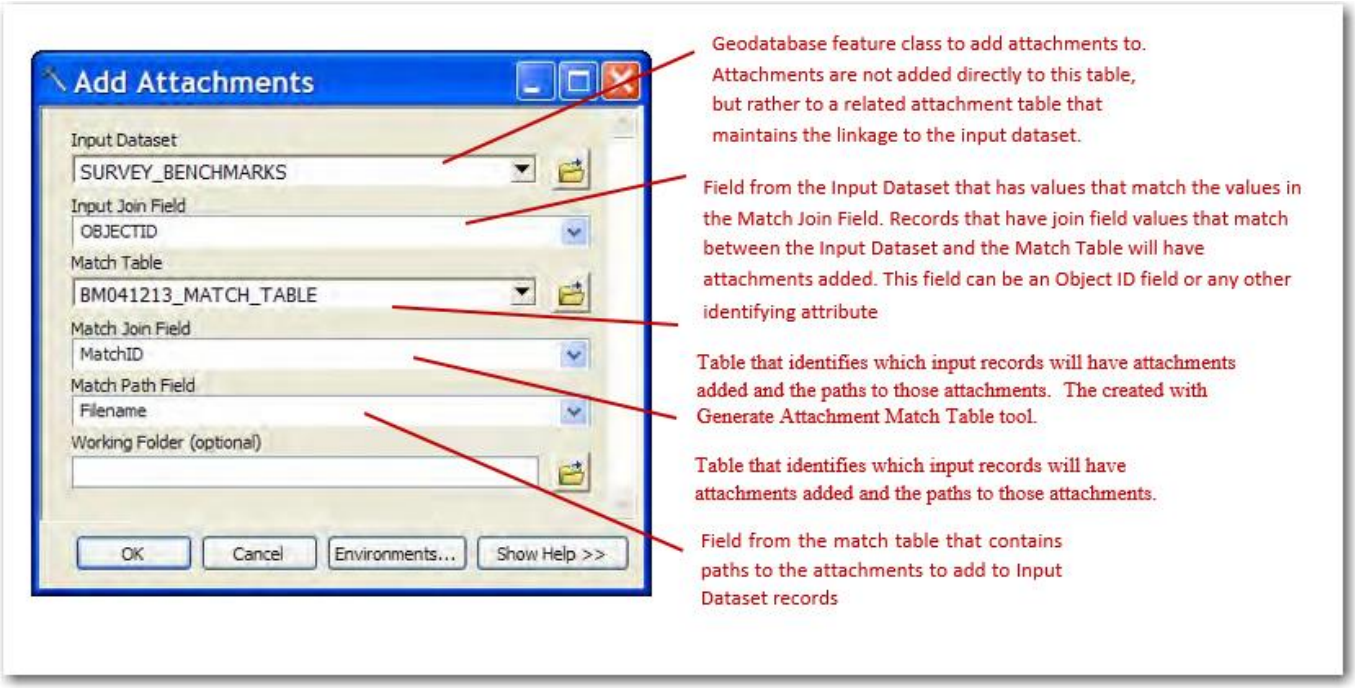
8. Add the new feature class created from the XY File to Feature Class model to the Arcmap project.
9. Before starting an edit session uncheck the “edit a version of the database with the ability to undo and redo” box from the versioning tab in editing options.



10. Start an edit session for the SURVEY_BENCHMARKS feature class
11. Select all features from the feature class that was created with XY File to Feature Class model
12. Copy, then paste into existing SURVEY_BENCHMARKS
13. Update GIS_UPDATE_DT to current date.
14. Save and stop editing.
15. Make sure that the new features are selected in SURVEY_BENCHMARKS.
16. Create an attachment match table using the Generate Attachment Match Table from the Data Management Tools Attachments toolbox.



17. Verify the number of records in the match table are equal to the number of selected features in the SURVEY_BENCHMARKS.
18. Add attachments for the new features in SURVEY_BENCHMARKS feature class using the Add Attachments tool in the Data Management Tools Attachments toolbox


Add Attachments
Input Dataset
SURVEY_BENCHMARKS
Input Join Field
OBJECTID
Match Table
BM041213_MATCH_TABLE
Match Join Field
MatchID
Match Path Field
Filename
Working Folder (optional)
OK
Cancel
Environments...
Show Help >>
Geodatabase feature class to add attachments to. Attachments are not added directly to this table, but rather to a related attachment table that maintains the linkage to the input dataset.
Field from the Input Dataset that has values that match the values in the Match Join Field. Records that have join field values that match between the Input Dataset and the Match Table will have attachments added. This field can be an Object ID field or any other identifying attribute
Table that identifies which input records will have attachments added and the paths to those attachments. The created with Generate Attachment Match Table tool.
Table that identifies which input records will have attachments added and the paths to those attachments.
Field from the match table that contains paths to the attachments to add to Input Dataset records

Creator: P. Jackson
Date 9/17/2015
Revision # V2
Date of last review: 9/21/2015

Updating and Maintaining the SWFWMD Named Hydrographic Features

Purpose

To document the procedures used to capture and maintain data used in the Named SWFWMD Hydrographic Features data set. There are two audiences for this data set.
Originally, it was conceived to provide WMIS with a list of features as Identified by the National Hydrography Data (NHD) Division of the United States Geological Survey (USGS). This feature class was also added to the SDE library for all District Staff to use for quick and easy mapping of major hydrographic features. Over the years, this dataset has been expanded to include secondary flow lines (rivers and streams) for mapping purposes with a very high level of detail. Beginning in January 2015, this dataset was compared to and modified to NHD's own dataset. The SWFWMD_NAMED_HYDROGRAPHIC_FEATURES dataset is basically a simplified version of the NHD 1:24,000 data set designed for cartographic purposes, yet digitized with a high level of precision.

Scope

The MGIS section of the Data Collection Bureau (DCB) is responsible for updating, on an as-needed basis, changes, corrections, or additions to the Named SWFWMD Hydrographic Features data set. Once completed by MGIS, the updated file geodatabase is provided to the SDE Administrator to upload to the data set for District-Wide use (SDE). If an edit to the Named SWFWMD Hydrographic Features layer occurs, then the following procedures should be performed.

Procedures

Changes are made ad-hoc as requested by District Staff.

A new Map Request is either started or updated to track the changes. All features in the Named SWFWMD Hydrographic Features data set should have at least a local name (SWF_NAME). Ideally, they should have a name in the national database. (GNIS_NAME) and a number (GNIS).

1. Research the new feature(s) you would like to add using the following sources. Check the NHD website for the GNIS_ID number and official name from USGS using the following link: https://geonames.usgs.gov
   a. Click on: Search Domestic Names
   b. Enter feature name such as "Lake Bell"
   c. On the advanced search, click the dropdown arrow for state and select "Florida"
   d. A list of lakes will populate the Feature Name field
   e. Look in the County field and click on the Feature Name
   f. A new window will open with more information
   g. On the right side of the window there should be a box labeled "Mapping Services"
   h. Click on the first choice - GNIS in Esri Map – this will open up a new window with a map that will verify the location of the feature you are searching for
   i. If it is not the right feature, go back to the list from the previous page and select another one.

j. If you still can't locate the feature, you need to find another source, such as city or state government.
k. If you still can't locate the feature, try the Engineering Dept. at the District.

2. Open the most recent Hydro_Update.MXD with the following format: P:\SpecialProjects\Hydro_Update\Hydro_Update_dd_mm_year.mxd.
3. The .MXD will contain the existing DETAILED_HYDRO_LINE and the DETAILED_HYDRO_POLY layers. Delete these two feature classes
4. Add the existing DETAILED_HYDRO_LINE and DETAILED_HYDRO_POLY feature classes from SDE to insure you have the latest version of the feature classes.
5. Ancillary sources such as aerial imagery, especially Color Infrared imagery are very useful. On smaller rivers/streams, there might not be a clearly visible stream channel on the imagery. In this case, the District's County-Wide DEMs will be best available source, especially in wetland areas that are flood-prone. County and city governments may also have more detailed information, and may have a local name for the river/stream or water body, especially small lakes and short, narrow streams.
6. Starting in 2015, secondary and tertiary flow lines were added to the DETAILED_HYDRO_LINE feature class. Most of these rivers/Streams are not named.
7. Also, starting in 2015, a new attribute called FLOW_DESCRIPTION helps to define the branch of the stream. This designation is assigned by SWFWMD GIS staff and was added to help staff with drawing the layer by stream hierarchy. For example, Hillsborough River is considered a Major River, as are the Alafia, Withlacoochee, Peace, Anclote, and Pithlchasscotee, Manatee, and Little Manatee, all of which drain directly into the Gulf of Mexico. Coastal Streams also drain directly into the gulf, but are much shorter, and have few if any tributaries. Major Canals are usually named, and are also included as Primary Canals, since they often contribute to Major Rivers, or drain directly into the gulf. Smaller canals and drainage ditches are only included if they contribute to larger, named features. The goal is to provide a quick way to draw hydro features by level of importance with the major basins.
8. Begin editing the newly copied feature classes using the edit tool in ArcMap. DETAILED_HYDRO_POLY features are derived from the District's NHD_Waterbodies _with_GNIS_Names using the existing polygons if they exist. This is done more for compatibility to capture polygons used by USGS, not necessarily the most recent delineation. If the new feature is not found in an existing District feature class such as one of the NHD_Waterbodies feature classes, then it must be digitized in manually using the most recent aerial imagery. Highlight the features needed (Ctrl + a) and copy (right-click 'Copy Selected') all from the feature class attribute table and paste (Ctrl + v) into the DETAILED_HYDRO_LINE feature class.
9. Update the metadata for date and add a process step to briefly describe what was edited. For example, "Added line feature Hidden River feature to DETAILED_HYDRO_LINE feature class using GNIS website as a name source, and used 2011 CIR imagery for digitizing the line feature."
10. If the added features are to be sent to NHD, they need to be approved by a District Engineer for approval. For example, if the District has field-collected GPS data, this data should be reviewed by GIS Staff and Engineering staff prior to submittal to NHD.
11. Copy the new feature classes into a new file geodatabase and place on:

    P:\SpecialProjects\Hydro_Update

12. Send email to GIS System Admin and ask them to load the updated feature classes into SDE. If only feature class was updated, just provide the updated feature class.

Creator: T. Mulroney
Date 06/06/13
Revision # 2
Date last reviews: 4/19/2016

Updating Existing Vector Spatial Data in SDE

Purpose
This document defines the Southwest Florida Water Management District's (District) vector spatial data loading procedures that are associated with its enterprise geographic information system (GIS). These standards and procedures are to be followed when updating existing data layers stored in Oracle using Esri's Spatial Data Engine (SDE).

Scope
The GIS Database & Server Administrators are responsible for the loading, maintenance, and updating of over 200 vector data layers into the SDE instances. These loading standards and procedures have been developed to allow for a consistent and efficient process. Deviation from these procedures may only occur with permission from the GIS Database & Server Administrators.

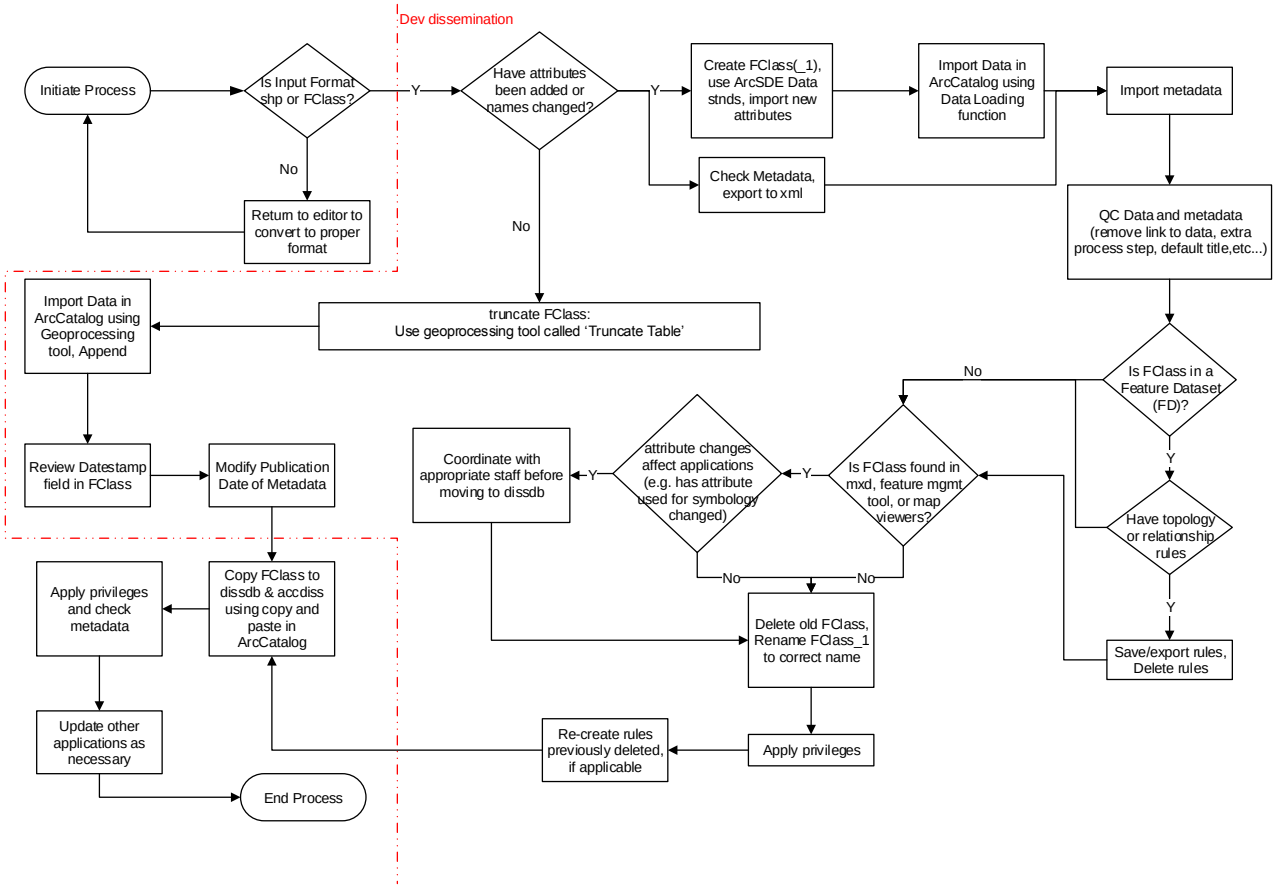
Standards
A personal Geodatabase (pGDB), file Geodatabase (fGDB), or shapefile are acceptable data types for importing into SDE. Please refer to SDE Physical Object Naming Guideline.docx for data layer naming, attribute column naming, and other data naming conventions. Please refer to SDE Spatial Reference.docx for the spatial reference standards for the data.

Every data layer is required to have complete metadata. Please refer to GIS Data Metadata .docx for metadata standards.

The feature classes are stored with High Precision using ST_Geometry spatial type (SRID2882).

Procedures
Refer to the following diagram for the procedure to updating existing data into SDE.

Updating an Existing Feature Class to SDE



Prior to loading new data into SDE, review the GIS Applications Affected by Feature Classes.docx to determine if GIS applications should be updated. After updating data into SDE, create stats on the feature class or table. This is done using ArcCatalog and NOT TOAD. In ArcCatalog, with the feature class name highlighted, right click and select 'Analyze'. Also preview the feature class in the Preview tab. This will make sure that the spatial indexes are created.

References

SWFWMD Guidelines:

SDE Physical Object Naming Guideline.docx
GIS Data Metadata.docx
SDE Spatial Reference.docx
GIS Applications Affected by Feature Classes.doc

Creator: C. Denninger
Date 07/30/13
Revision # Original
Date Last Review: 6/9/2016

Updating Public Supply Service Area Population Spreadsheet

Purpose
To document the procedures used to calculate and disseminate an updated spreadsheet of population projections of the Public Supply Service Area (PSSA) layer.

Scope
The MGIS section of the Data Collection Bureau (DCB) is responsible for updating, on an as-needed basis, the District-derived PSSA population projections Excel spreadsheet. Once completed by MGIS, the spreadsheet is provided to a District Economist who analyzes the population projection totals and performs numerical adjustments, if necessary, based on each utility's approved Public Supply Annual Report (PSAR) projection figures. After the file is returned from the Economist, the GIS Analyst uploads the revised file. If an edit to the PSSA layer modifies the boundary of a utility, then the following procedures should be performed. Currently, this process is recommended for the entire PSSA layer; not only the revised boundary.

Note: Ad hoc, single utility service area population projections can be performed using a variation of this procedure; however, that is not the focus of this document. In that case, the GIS analyst would fill-in the correct UTILITYNAME and/or SERVICEAREANAME in the GIS model dialog for 'Select Service Area to Calculate Population (optional)' (e.g. UTILITYNAME = 'CITY OF NEW PORT RICHEY'). See Figure 3.

Guidelines
Scenarios that Trigger Performing this Procedure

1. Significant update to any PSSA boundary
   a. Significant is defined here as any boundary that either adds or deletes parcels
   b. Not Significant is defined as minor topological edits that do not increase/decrease the number of parcels from the service area boundary
2. Modifying a boundary's attribute for AREAFLAG (from 'N' to 'Y' or from 'Y' to 'N')
3. Modifying the attributes for UTILITYNAME and/or SERVICEAREANAME fields

For more on how to apply edits to the PSSA layer, see SOP section titled '*Maintaining Public Supply Service Area Layer*'.

Procedures

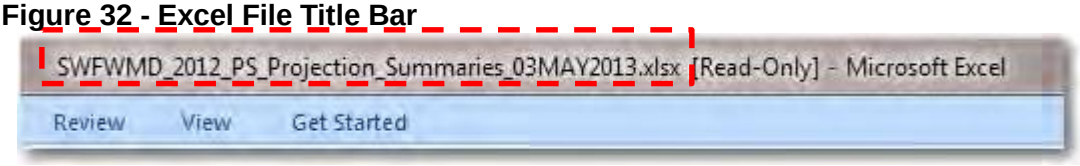
Generalized Workflow

Changes have been applied to the PSSA layer that triggers the necessitation of this procedure.

1. Open ArcMap project (.mxd) titled: PSSA_Pop_Projections.mxd
2. Open, populate dialog appropriately, and run the PSSA Population model (already included in the mxd's toolbox). See Figure 2 for completed form details.
   a. Toolbox Location: L:\Mapping-GIS\PLN\GIS\Toolboxes\
   b. Toolbox Name: PSSA Population Projections.tbx
   c. Model name: PSSA Population Projections w/ TOTFUNC
3. After the model completes, open the output feature class attribute table in ArcMap.
4. Open macro-based Excel spreadsheet (PSSA_POP_PROJ_Template.xlsm).
5. Highlight all records (Ctrl + a) and copy (right-click 'Copy Selected') all from the feature class attribute table and paste (Ctrl + v) into the Excel Spreadsheet ('Sheet1', cell A1).
6. Run Macro (in Excel: View □Macros □View Macros □select macro 'Paste_POP_PROJ' □Run).
7. Save as an '.xlsx' spreadsheet to the L:\ drive . Click 'Yes' to save as a Macro-free workbook
8. Provide to District Economist; who will return the updated spreadsheet.
9. GIS Analyst uploads the updated spreadsheet to District external internet Demographics website for public consumption. To upload new Excel file, go to website: http://webstaging/staff
10. Log-in using: email address and password. Access must have been previously granted by the District's Webmaster (D. Weaver).
11. Select the Demographics webpage under 'Editable Pages' section.
    12)Select 'Edit'.
12. Select 'Edit' under Excel File icon.
13. Select 'Browse' to navigate and locate new Excel file; double-click on file to add.
    15)Update 'Title:' and 'Caption:' with new dates and file names (if necessary).
14. 16)Select 'Update'.
    17)Select 'Save'.
15. 18)Return to original tab containing account information and select 'Logout'. 19)Close internet browser, and re-open internet (see 'Note' below).
16. Navigate to Excel file on the District's external internet site: http://www.swfwmd.state.fl.us/data/demographics/utility-parcel-layer.php#c.1
17. Select Excel file under Section C-1, open, and verify information has been updated and is the correct file.

*Note: There have been occasions when the file has been uploaded successfully, yet the title bar (see Figure 1) on top of the Excel file still has the same old file name; even though the data has been revised successfully. If this occurs, return to step 13, remove the file completely, save, and return to (step 13) upload the new file. In this scenario, you must copy the 'Title' & 'Caption' to a text file, and then paste in the new file's dialog box.

Figure 32 - Excel File Title Bar



References

Excel macro-based spreadsheet template:
\\bkvshare\bkvDCB\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\Macros\PSSA_POP_PROJ_Template.xlsm

Location to save Excel (.xlsx) file:
\\bkvshare\bkvDCB\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\Excel_Tables

Final PSSA Population Projection spreadsheet (District internet site):
http://www.swfwmd.state.fl.us/data/demographics/utility-parcel-layer.php#c.1

Geodatabase (GDB):
\\bkvfs03\DCB\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\PSSA_POP_PROJECTIONS.gdb

MXD:
\\bkvfs03\DCB\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\PSSA_Pop_Projections.mxd

Toolbox Name:
PSSA Population Projections.tbx

Toolbox Location:
L:\Mapping-GIS\PLN\GIS\Toolboxes\

Model Name:

PSSA Population Projections w/ TOTFUNC

Custom Python Script Tool (located within the 'PSSA Population Projection.tbx' toolbox):

Total Functional Pop Tool (Model)

Script Location:

\\bkvshare\bkvDCB\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\Excel_Tables \Mapping-GIS\PLN\GIS\Scripts\TOTFUNC_Calc.py

PSARs:

http://www.swfwmd.state.fl.us/data/demographics/public-supply-reports.php

Required GIS layers

SDECREATOR.PS_SERVICEAREAS SDECREATOR.POPPROJECTION_POINTS

Appendices

Figure 33 – Toolbox (return)

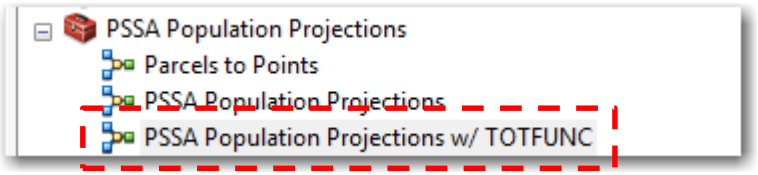


Figure 34 - Model Dialog (GUI) (return)

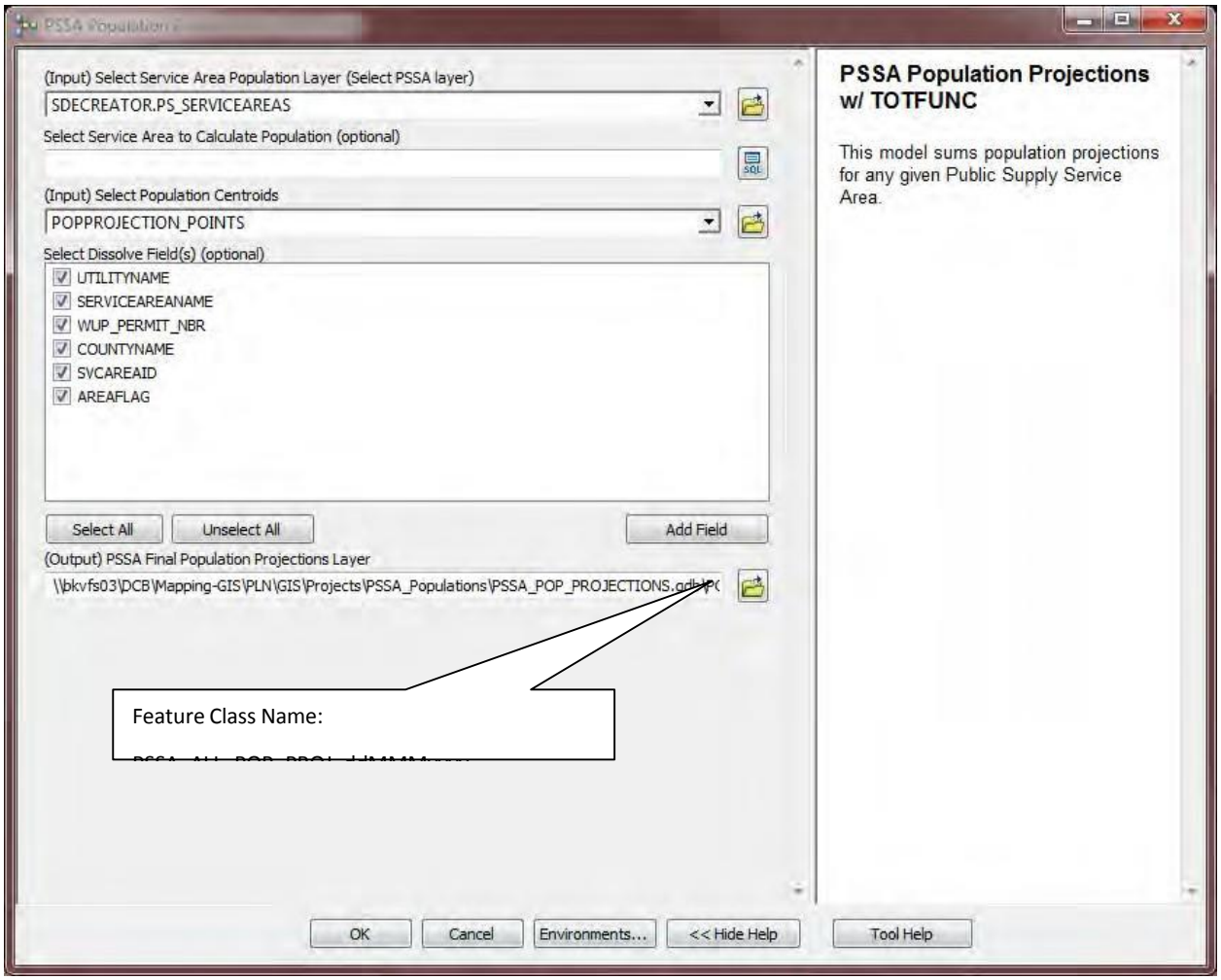


Figure 35 - Total Functionalized Script Tool

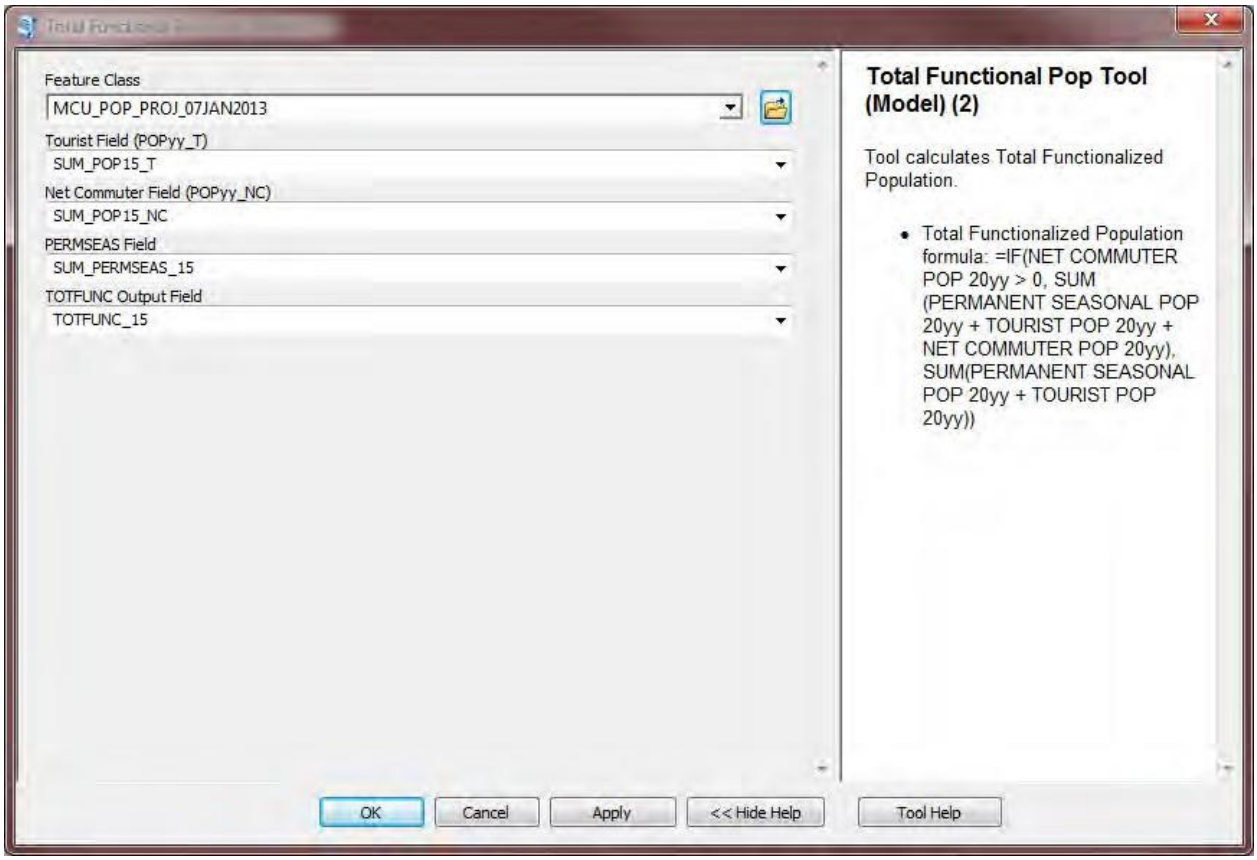


Figure 36 - PSSA Population Projection Model

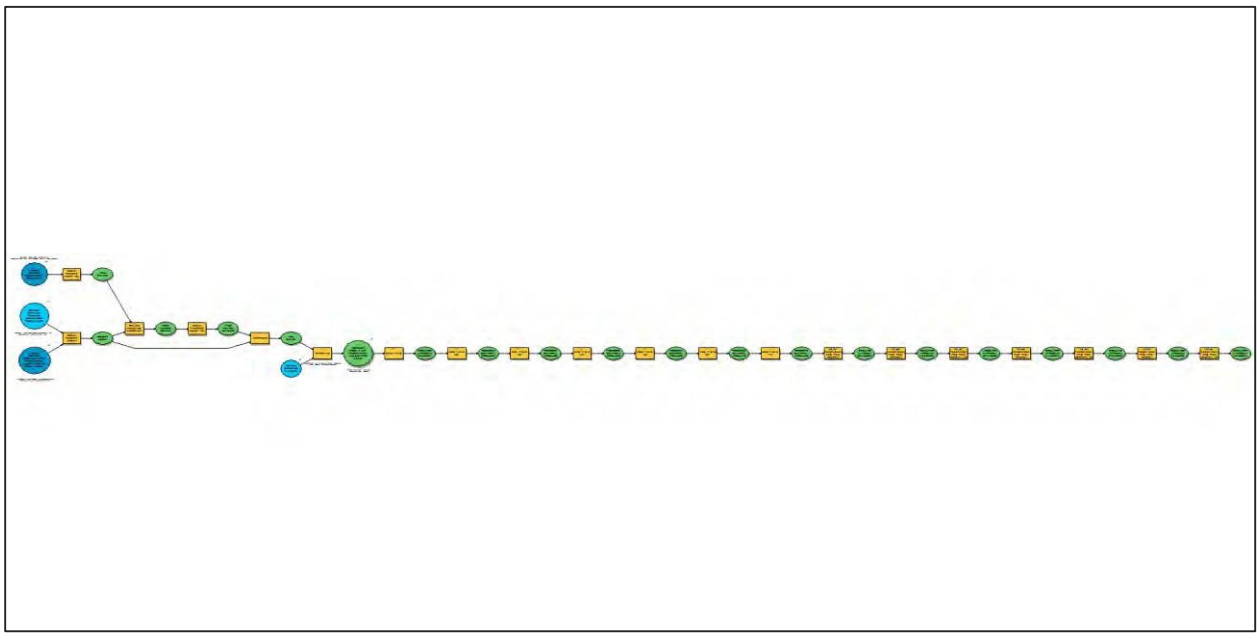


Figure 37 - Editable Pages link (return)

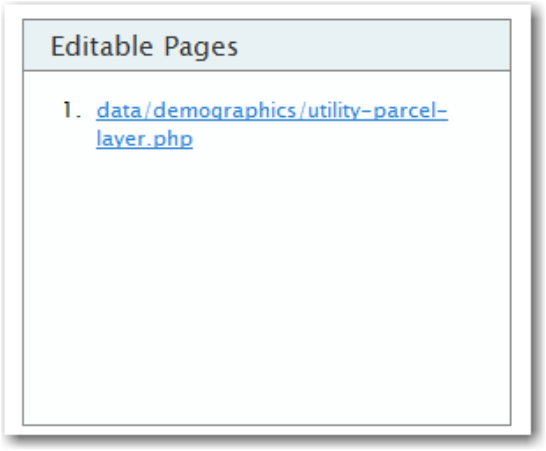
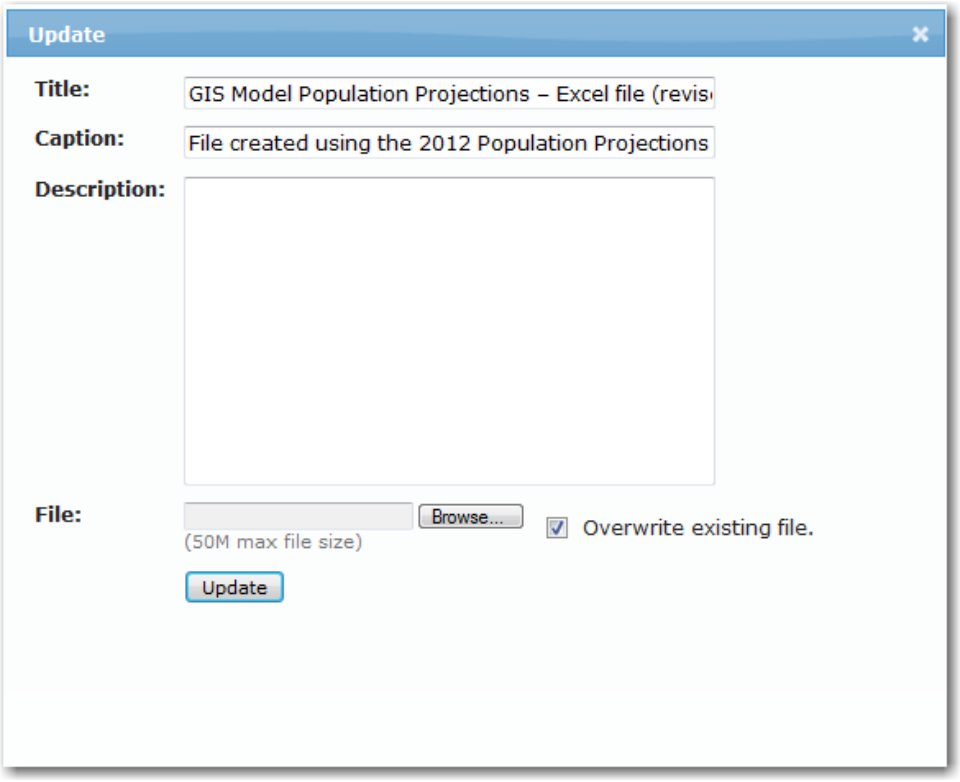


Figure 38- Edit Section C-1 (return)

Figure 39 - Edit under Excel icon (return)

Figure 40 - Browse to File, Modify Title and Caption (return)



Browse to: L:\Mapping-GIS\PLN\GIS\Projects\PSSA_Populations\Excel_Tables

Figure 41 - Save Uploaded File (return)

Figure 42 – Logout (return)

Creator: C. Denninger
Date 06/28/13
Revision # Original
Date last review: 6/9/2016

Updating the Lodging Facilities Layer

Purpose

The purpose of this document is to provide a standard operating procedure for creating a new or updated version of the LODGINGFACILITIES GIS layer.

Scope

The MGIS section is responsible for annually updating the District's lodging facilities layer. This document was written to describe and provide a detailed explanation for updating this layer.

This point feature class assists District staff and utilities in identifying lodging facilities and associated rooms within their public (water) supply service area boundary. The number of rooms are totaled and listed within the data. It will assist in the calculation of functional tourist population for the year of interest. Functional tourist population is the estimated average annual number of tourists in the service area per day. Please note that some of these lodging facilities are self-supplied (i.e. they have their own WUP).

Procedures

Since the layer's original creation in 2009, SWFWMD has simply modified the existing layer to add new facilities and remove those that are no longer in business (or those who no longer have a license). These licenses are issued by the Florida Department of Business and Professional Regulation (DBPR) during the previous fiscal year (July 1st- June 30th, for the state). In short, the process is to acquire the new tables published each year, prepare them for analysis (using steps below), compare new tables to existing layer, identify new licensees, delete existing licensees who no longer have an active license, geocode new facilities, add them to the layer, check for duplicates (remove if necessary), update metadata, and provide new feature class to database administrator for dissemination. Here are the necessary details below.

Here is the process:

1. Download the existing and new Licenses in Districts 3, 4, 5, 7, and the New Lodging Establishments - Current tables from DBPR website: http://www.myfloridalicense.com/dbpr/sto/file_download/public-records-lodging.html
2. Open MS Excel and merge (or Copy/Paste) all of the DBPR spreadsheets together into a single file.
3. Insert blank column titled LOCCONAME (see Table 2, Column 24), right before (to the left) of Column 25 – PHONE2.
4. Insert new row at top and rename field names as they are described in Table 2 (see below). A previous year's column header can be copied/pasted into new spreadsheet row 1.
5. Populate new column LOCCONAME (24) using the Excel formula located in the Appendices. Paste into Cell X2, then drag into the entire column.
6. Save the Excel file.
7. At this point, open ArcMap, add the Excel file you created. Export the entire file to a

Geodatabase table.
NOTE: Using the Excel spreadsheet within ArcMap, and querying and sorting data is inherently problematic and can often yield erroneous results.

8. As a result of the Excel formula pasted into the LOCCONAME field, those counties not meeting one of the criteria will return a “FALSE” result (and not an actual county name). Using the *Select by Attributes* functionality within ArcMap, Select "LOCCONAME" <> 'FALSE' AND "LICTYPE" <> 2003. This will result in a selection of only those LOCCONAMEs that are located within the District + Lee County, as well as removing the LICTYPE = 2003 – Apartments, which should not be included in the final layer.
    a. Alternatively, this can be accomplished using the *Select by Attributes* functionality to remove counties not under District jurisdiction; however keep Lee County (46). This is because there are a few utility’s who have jurisdiction in Lee County (e.g. Gasparilla Island Water Association). The county Codes to keep are: 18, 19, 24, 35, 37, 38, 39, 45, 46, 48, 51, 52, 61, 62, 63, 68, and 70 (see
    b. Table 1). Be sure to remove the LICTYPE = 2003 as well; however the method described previously is preferred.
9. Export the Selected records to a new geodatabase table.
10. Create a copy of the current LODGINGFACILITIES GIS layer found of the SWFWMD GIS servers.
11. In ArcMap, create a relationship on the ‘LICNUM’ with a copy of the current/existing Lodging Facilities GIS layer.
12. Using the ‘Relate’, identify those business locations that exist in the new merged geodatabase table, but do not exist in current layer.
13. Export those ‘new’ records to a new geodatabase table.
14. Check the LOCST1 and LOCZIP fields:
    a. Check and correct blank or invalid addresses
    b. Check and correct invalid ZIP Codes (e.g., foreign postal codes, NULLS) using Google Maps, Bing Maps, etc. by copying & pasting the address from the LOCST1 into the address search of the website, as well adding any other known address information (e.g. Zip, State, stc.)
15. Geocode those locations using right-click functionality within ArcMap on the table within the table of contents (TOC).
16. Using the Relate, identify and delete from the original (copied) layer those license numbers that existed previously, but are not present in the new database.
17. Manually locate those features Geocoding could not match (if necessary). If there are none, skip to step 19.
18. MapQuest and Google Maps can be used in this capacity.
19. Create a separate column with the street name.
20. Arrange alphabetically by street name.
21. Use Google Maps, Bing Maps, etc to find the street name LOCZIP combination.
22. If you place LOCST1 and LOCZIP side by side, you can just paste to Google.
23. Manually add these unmatched features as points to the Geocoded layer.
24. Using temporary JOINS and queries, identify and update information for active licenses where new information is different from current layer information. This is controversial step since the most current information may be incorrect. However, it is too time-consuming to verify each licensee. Updated information is best available information in this case. Check all fields with a simple Field_Old <> Field_New; after further scrutiny, those fields where the new information appears of higher quality and accuracy should be used (via a Field Calculator) to update the old field(s). If the new table fields have misspellings or other errors, single- out and remove those selections; using *Sort*

functionality will assist in this effort. This ensures that the data remains of high quality.

25. Merge the modified original GIS layer and the successfully geocoded layer for the final output. Alternatively, an empty point feature class can be created and the data loaded (in ArcCatalog) from the two feature classes (i.e. facilities still licensed and new geocoded facilities).
26. Modify DATESTAMP field to match the day the points were added/modified.
27. Run a Frequency to identify any duplicates; as often appears in the "*New Lodging Establishments"* table.
28. Remove duplicates records (if necessary).
29. Update the metadata accordingly.
30. Give copy of new/revised feature class to Economists (Staff Economist) for review.
31. After successful QA/QC, create a properly titled feature class (LODGINGFACILITIES) and shapefile (for downloading package for external customers).
32. Give a copy of the new feature class to SWFWMD GIS Database & Server Administrator for uploading to server and website.

References

DBPR Download site:
http://www.myfloridalicense.com/dbpr/sto/file_download/hr_lodging.shtml

District Lodging Facilities site:
http://www.swfwmd.state.fl.us/data/demographics/estimating-population.php#b.4

District Lodging Facilities shapefile download site:
http://www.swfwmd.state.fl.us/data/gis/layer_library/category/demographics

Appendices

Table 1 – County Codes (return)

County	Location County Code	County	Location County Code	County	Location County Code
Charlotte	18	Hillsborough	39	Pasco	61
Citrus	19	Lake	45	Pinellas	62
DeSoto	24	Lee	46	Polk	63
Hardee	35	Levy	48	Sarasota	68
Hernando	37	Manatee	51	Sumter	70
Highlands	38	Marion	52		

Table 2 – Attribute Field Names and Field Aliases (return)

Column #	Variable	Abbreviated Field Name
1	Board Code (200 identifies HR within the department)	BOARDCODE
2	License Type Code	LICTYPE
3	Licensee Name	LICNAME
4	Rank Code	RANKCODE
5	Modifier Code	MODCODE
6	Mailing Name (if different from Licensee Name)	MAILNAM
7	Mailing Street Address Line 1	MAILST1
8	Mailing Address Line 2	MAILST2
9	Mailing Address Line 3	MAILST3
10	Mailing City	MAILCIT
11	Mailing State	MAILST
12	Mailing Zip Code	MAILZIP
13	Mailing County Code	MAILCO
14	Primary Telephone Number	PHONE1
15	Business Name (Location)	BUSNAME
16	Filler	FILLER
17	Location Street Address Line 1	LOCST1
18	Location Address Line 2	LOCST2
19	Location Address Line 3	LOCST3

20	Location City	LOCCIT
21	Location State	LOCST
22	Location Zip Code	LOCZIP4
23	Location County Code	LOCCO
24	Location County Name	LOCCONAME
25	Secondary Telephone Number	PHONE2
26	District	DISTRICT
27	Region	REGION
28	License Number	LICNUM
29	Primary Status Code	PRISTA
30	Secondary Status Code	SECSTA
31	Expiry Date	EXPIRY
32	Last Inspection Date	LASTINSP
33	Number of Seats (food service) or Rental Units (lodging)	ROOMS

LOCONAME (Column X) formula: (return)

=IF(W2=18,"CHARLOTTE",IF(W2=19,"CITRUS",IF(W2=24,"DESOTO",IF(W2=35,"HARDEE",IF(W2=37,"HERNANDO",IF(W2=38,"HIGHLANDS",IF(W2=39,"HILLSBOROUGH",IF(W2=46,"LEE",IF(W2=45,"LAKE",IF(W2=48,"LEVY",IF(W2=51,"MANATEE",IF(W2=52,"MARION",IF(W2=61,"PASCO",IF(W2=62,"PINELLAS",IF(W2=63,"POLK",IF(W2=68,"SARASOTA",IF(W2=70,"SUMTER"))))))))))))))))))

Lodging facility types to be included for the analysis (LICTYPE): (return)

- 2001 - Hotel (HOTL)
- 2002 - Motel (MOTL)
- 2005 - Bed & Breakfast (BNB)
- 2006 – Resort Condominium (CNDO)
- 2007 – Resort Dwelling (DWEL)

Work Order System – Mapping & GIS

Purpose

The purpose of this document is to provide a SOP for the MGIS Work Order Tracking System. These procedures should be followed to submit and track all work requested of Mapping & GIS (MGIS) staff. Requests can be submitted by all internal personnel. If required to track outside requests, then they must be submitted by internal staff in lieu of the requestor.

Scope

This document covers the procedures necessary to submit work requests of MGIS staff. All work requested of MGIS staff should be done through this system. If the request is not for work to be completed by a member of the Mapping & GIS section of the Data Collection Bureau, then a different work request system should be selected.

Procedures

Log-in Procedures

1. Go to the District's intranet site: http://currents.ad.swfwmd.net/
2. Hover mouse over "APPLICATIONS" and click "Work Requests" (See Figure 1)

Figure 4 - CURRENTS Work Requests

3. Select "Mapping & GIS >>" (See Figure 2)

Figure 5 - Mapping & GIS Work Request System Link

4. Type in AD "User ID" and "Password" and select "GO" (See Figure 3)

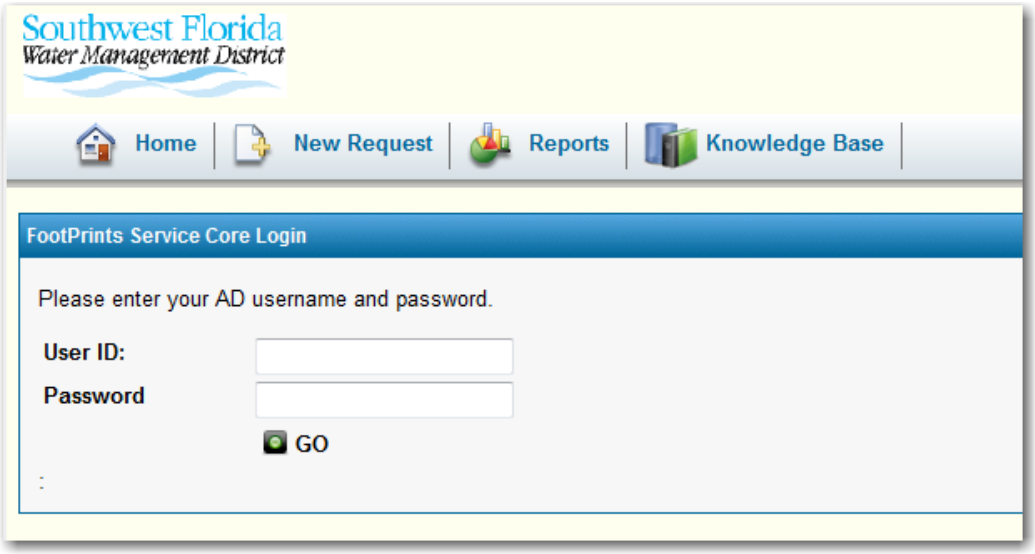


Figure 6 - MGIS Work Order System Log-In

Submit a New Request

1. Click “New Work Request”
2. A new FoortPrints ticket will be opened. Enter the appropriate information into the ticket. Below is a short description of the fields. Fields with an asterisk (*) are required.

New Work Request for MGIS Work Order System	
Title*	A short description of the work request.
Priority*	The value defaults to Normal. Change if appropriate.
Status*	Defaults to Open. Change as appropriate.
Contact Information	
Last Name*	Enter the last name of the person making the request. If the contact has been saved previously, chose Select Contact. FootPrints will return all address book records with the last name.
First Name*	Enter the first name of the person making the request.
Call Back Number*	Phone number or extension of the requestor.
Email Address*	Enter the email address for the contact, if applicable.
Department*	Bureau of the requestor.
Dept Section*	Section within the Bureau of the requestor.
Location*	City or Service Office of requestor.
Mail_Code*	Internal SWFWMD Mail Code of the requestor; if applicable.

User Id*	Automatically filled-in by the system if a name was selected from the list; if applicable.
	MGIS Work Order*
Date Needed*	Date the final product needed no later than.
Is This Request CFWI Project Related?*	Is this project related to any effort for the Central Florida Water Initiative (CFWI), Yes or No
Is This Request Related to a PIMS Project?*	Is this request related to a project that is within PIMS, Yes or No.
Request Type	• **Analysis (including Modeling and Scripting):** GIS analysis and modeling, development of scripts or tools to automate processes. • **Data Request:** Spatial data including shapefiles or geodatabases, elevation data and imagery. • **Map Request:** Map requests including hard copy, digital, or web-based maps. • **Data Maintenance:** Includes adding new data layers to the District's enterprise geodatabase and making corrections or modifications to existing data. • **Help Desk:** Requesting assistance for technical problems or questions related to GIS software including Citrix ArcGIS support. • **Training:** Classes developed by MGIS staff or customized one-on-one or group training for ArcGIS Desktop, tools like LP360, GPS field data collection techniques, etc. • **Other:** Not captured in the other choices.
Comments	Provide specific information about the request. Be as detailed as possible.
Intended Audience	Please describe the audience who will be viewing and/or analyzing the final deliverables from this work request. For example, if you are requesting a map, the intended audience might be: Board Members or Citizens at a Public Meeting or Internal Staff, etc.
File Link for Final Output Results	The location where the final project working files are saved. The intent is to allow MGIS staff to find the project's working documents (e.g. mxds,

gdbs, etc) in the future if they need to access the data files again for any reason.

Description
Enter a detailed description of the work request or comments added later by the MGIS member assigned to the request.

Attachments
Upload any attachments necessary for the GIS Analyst to complete the work request.

Assignees
If not already predetermined between the requestor and GIS Analyst, then MGIS staff will assign to the appropriate staff member to complete the work request.

Time Tracking
Track daily time spent (hours, minutes) spent working on this specific work request.

TO REASSIGN A WORK REQUEST –

1. Open the ticket in FootPrints
2. Go to “Assignees and Notifications”
3. In the Assignees section, select the staff member(s) you wish to reassign the ticket to. Select the Workspace Group and/or specific GIS Analyst within the Request Type category. Use the blue arrow in the middle to move the group/individual(s) over to “Assignees” on the right. See below for an example that is for a Regulation request for the GIS Technician.

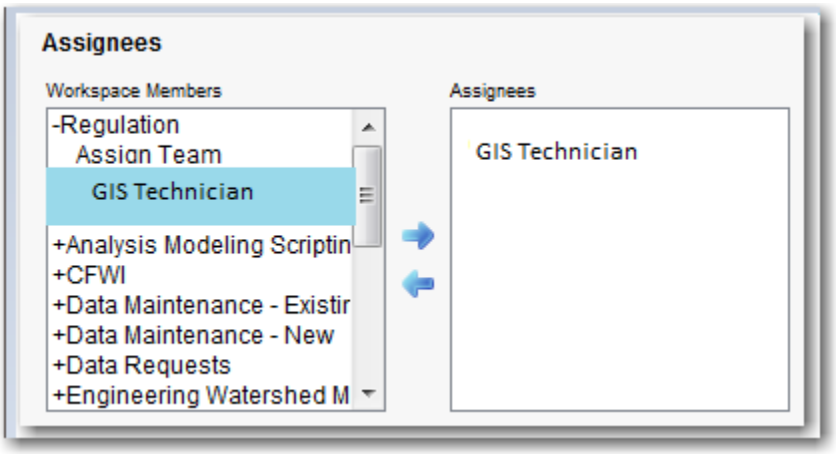


Figure 7 - Assigned to Regulation → GIS Technician

4. Click “SUBMIT” to complete the process. Note that the Assignees will automatically receive an email so there is no need to fill in the “Send Email To” section unless you would like another individual notified.

Procedure to Modify or Close a Work Request

1. Open the ticket in FootPrints

2. Modify the ticket, including any of the following:
    a. Add a description
    b. Add time for Time Tracking
        i. Enter the Hours and Minutes (and comment if appropriate) for the amount of time spent to fulfill the work request.
    c. Revise Date Needed
    d. Add File Link for Final Output Results
    e. Update Status (ultimate category is **Closed**)
        i. Work In Progress
        ii. On Hold
        iii. Work Completed
        iv. Under Review
        v. Reviewed
        vi. Closed (all tickets should eventually be changed to 'Closed')