U.S. Fish & Wildlife Service
National Wetlands Inventory
National Standards and Support Team

Wetlands Data Verification Toolset

Installation Instructions and User Information

October 2024

Jeff Ingebritsen
U.S. Fish and Wildlife Service
Division of Ecological Services
Branch of Resources and Mapping Support

Contents

Introduction

The Wetlands Data Verification Toolset is designed to automate the quality control functions necessary to ensure the accuracy of the data in the Wetlands geodatabase. It has been designed to address geospatial errors, digital anomalies, and logic checks. In addition, it has the option to build a cumulative history table of identified errors to track the progress of corrections.

This toolset was created using Python 3.9 and is compatible with ESRI ArcGIS Pro versions 2.7 and up. It will only work on file geodatabases in the NWI schema and replaces previous versions of custom wetlands verification tools.

Folder Contents

The verification toolset and associated files are contained in a folder called 'NWI_QAQC_ToolPro1.3' (Figure 1). This folder can be stored in any location on your machine and contains:

- Readme.txt
- Wetlands Data Verification Toolset Installation and User Information.pdf
- NWI_CONUS_Schema.gdb
- QAQC_Tool_Python13

1. **Readme.txt** provides a general description of the contents and purpose of the folder.
2. The **Wetlands Data Verification Toolset Installation and User Information** document provides descriptions and procedures on the use of the verification models.
3. The **schema geodatabase** organizes feature classes in the format used by the verification tool. Users can import data into respective feature classes and use it as the tool input.
4. The **QAQC_Tool_Python13** folder contains the ArcToolbox that contains the Wetlands QAQC models, compatible with ArcGIS Pro 2.7+.
5. The **QAQC_Tool_Python131_AK** contains the same ArcTOolbox that contains the Wetlands QAQC models compatible with ArcGIS Pro 2.7+, just with a default value of AK for the relevant tool parameters.

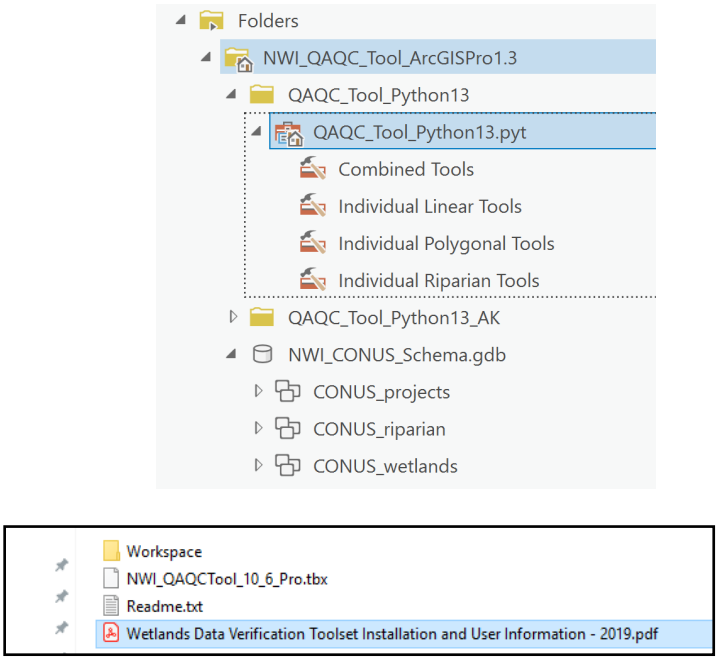


Figure 1. NWI_QAQC_Tool view in ArcGIS Pro Catalog view (top) and Windows Explorer (bottom).

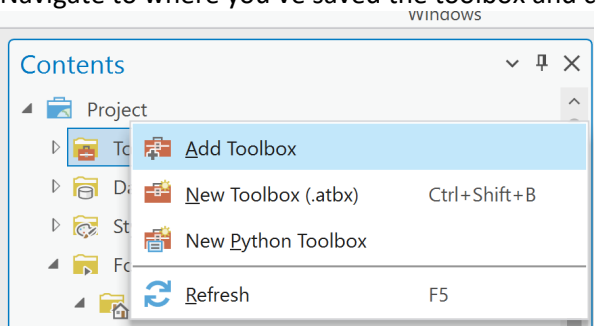
Dataset Compatibility

This toolset was designed to work on **file geodatabases** extracted from the FWS wetlands database and will only work on data following that schema. Specifically, it requires the feature class CONUS_wet_poly in a CONUS_wetlands feature dataset, and CONUS_wet_projects in a CONUS_projects feature dataset (substitute AK, HI, PRVI or PacTrust for CONUS in other mapping areas). The CONUS_wet_projects feature class must contain a polygon that completely covers the area where wetland mapping was conducted. Sample file geodatabases matching these schemas are provided with this tool in the workspace folder. A sample file geodatabase can be copied and loaded with wetlands data or used as a reference to build file geodatabases with the correct schema. Use of this toolbox on other data formats or schemas will fail and is not recommended.

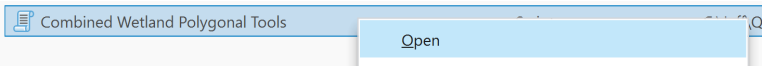
Running the models

To run any of the QAQC models:

1. In ArcPro's Contents Pane, right click on the Toolboxes folder and select "Add Toolbox". Navigate to where you've saved the toolbox and click OK.



2. Open the toolbox, open one of the toolsets (Combined Tools, Individual Polygonal Tools, etc), right click your selected tool and select Open.



3. A window will appear similar to the one in Figure 2, which will allow the user to select input data and provides a description of the tool on the right pane, if the icon is hovered on.

4. Click the browse button next to the Geodatabase text box and browse to the wetlands file geodatabase on which to conduct verification and then press 'OK' (Figure 2).

5. Identify the mapping area (CONUS, AK, HI, PRVI, or PacTrust)

6. Certain tools have additional parameters.

    a. Verified By enters a name or initials or other identifying values into the QAQC Summary table.

    b. Save Summary Table? is a checkbox to determine if you want to create a summary table when running all of the qc tools. Generally, this should be checked.

    c. Temporary Data Type is a checkbox to determing if you want to use in_memory/ data types for intermediate data or if you want to write those intermediate data products to the geodatabase (they will be deleted at the end of the tool's runtime).

        i. Using in_memory can be useful for users with small mapping projects *or* computers with lots of processing power.

        ii. If the project is large or the user's computer does not have an overwhelming amount of RAM, we recommend you leave Temporary Data Type unchecked.

    d. Number of processing divisions determines, in the Sliver Uplands tool, how many subdivisions of the project the various Dissolve processes should use.

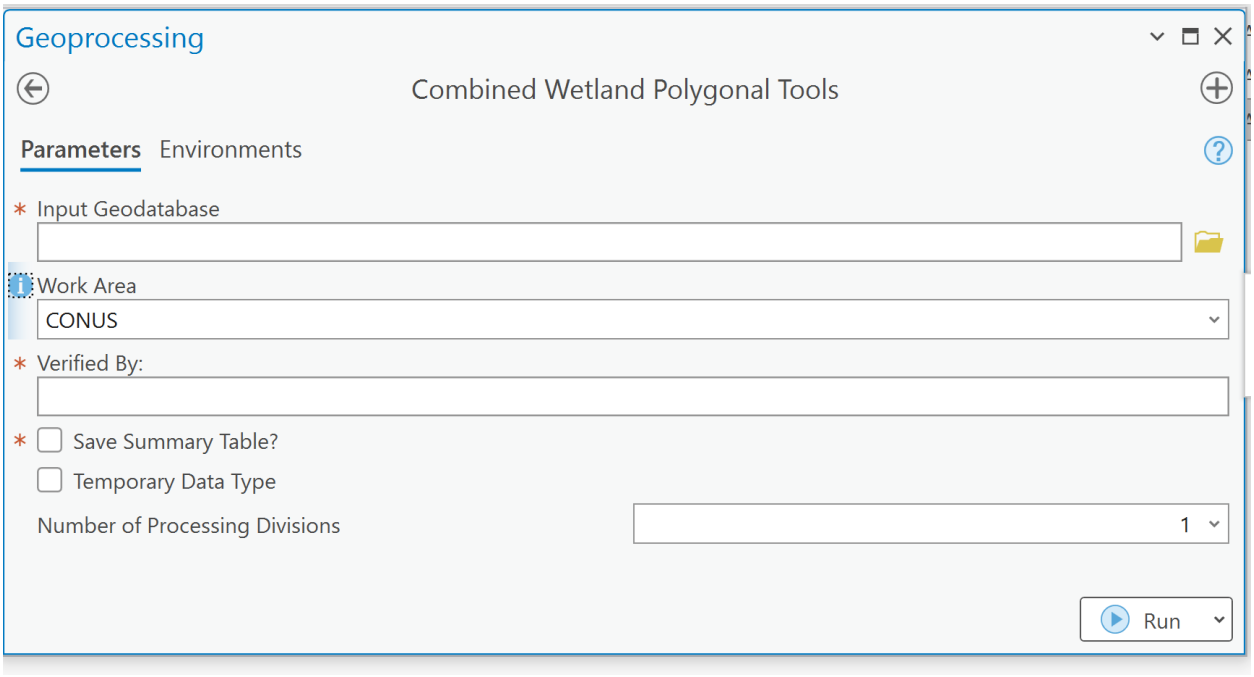


Figure 1. Example of a model user interface. Verify the mapping area and browse to the file geodatabase on which to conduct verification. Hovering over the icon shows a description of the selected tool.

Explanations of Verification Models

Combined Tools

Combined Riparian Tools

This tool performs complete data verification by running each individual model and then summarizing the results in a summary table. It includes the QAQC Code Reset, Incorrect Wetland Codes, Adjacent Wetlands, Sliver Wetlands, Sliver Uplands, Lake and Pond Size, Overlapping Wetlands, Wetland Type Calculation, and QAQC Summary models.

NOTE: Running the All QAQC Checks on projects that contain a high number of polygons or complex polygons may fail due to limitations in computer resources. It may be more efficient to run all the individual checks separately for these types of projects.

Combined Wetland and Riparian Tools

This tooll performs complete data verification by running each individual model and then summarizing the results in a summary table. It includes the QAQC Code Reset, Incorrect Wetland Codes, Adjacent Wetlands, Sliver Wetlands, Sliver Uplands, Lake and Pond Size, Overlapping Wetlands, Wetland Type Calculation, and QAQC Summary models.

NOTE: Running the All QAQC Checks on projects that contain a high number of polygons or complex polygons may fail due to limitations in computer resources. It may be more efficient to run all the individual checks separately for these types of projects.

Combined Wetland Linear Tools

This tool performs complete data verification by running each individual model and then summarizing the results in a summary table. It includes the QAQC Code Reset, Incorrect Wetland Codes, Adjacent Wetlands, Sliver Wetlands, Sliver Uplands, Lake and Pond Size, Overlapping Wetlands, Wetland Type Calculation, and QAQC Summary models.

NOTE: Running the All QAQC Checks on projects that contain a high number of polygons or complex polygons may fail due to limitations in computer resources. It may be more efficient to run all the individual checks separately for these types of projects.

Combined Wetland Polygonal and Linear Tools

This tooll performs complete data verification by running each individual model and then summarizing the results in a summary table. It includes the QAQC Code Reset, Incorrect Wetland Codes, Adjacent Wetlands, Sliver Wetlands, Sliver Uplands, Lake and Pond Size, Overlapping Wetlands, Wetland Type Calculation, and QAQC Summary models.

NOTE: Running the All QAQC Checks on projects that contain a high number of polygons or complex polygons may fail due to limitations in computer resources. It may be more efficient to run all the individual checks separately for these types of projects.

Combined Wetland Polygonal Tools

This tool performs complete data verification by running each individual model and then summarizing the results in a summary table. It includes the QAQC Code Reset, Incorrect Wetland Codes, Adjacent Wetlands, Sliver Wetlands, Sliver Uplands, Lake and Pond Size, Overlapping Wetlands, Wetland Type Calculation, and QAQC Summary models.

NOTE: Running the All QAQC Checks on projects that contain a high number of polygons or complex polygons may fail due to limitations in computer resources. It may be more efficient to run all the individual checks separately for these types of projects.

Additional Inputs

Verified By – Enter the individual or organization conducting the verification. This information will be output to the QAQC Summary table and QC History table (if option is selected).

Save History Table – This option will create a QAQC_History table and append subsequent iteration results of the QAQC_Summary table. Each group of errors appended from the QAQC_Summary table will be identified by a count iterator shown in the 'Run' field. The QAQC_History table will continue to grow with each iteration until it is manually deleted. This allows the user to track the progress of dataset edits between verification runs.

Temporary Data Type - This is a checkbox to determine if you want to use in_memory/ data types for intermediate data or if you want to write those intermediate data products to the geodatabase (they will be deleted at the end of the tool's runtime). Using in_memory can be useful for users with small mapping projects *or* computers with lots of processing power. If the project is large or the user's computer does not have an overwhelming amount of RAM, we recommend you leave Temporary Data Type unchecked.

Number of Processing Divisions – This variable determines, in the Sliver Uplands tool, how many subdivisions of the project the various Dissolve processes should use. Options are 1, 4, 9, 16, or 25. At this time, our recommendations are to try smaller subdivisions (1,4) and increase if the sliver uplands tool fails.

Individual Polygonal Tools

QAQC Code Reset

This tool calculates the QAQC_Code = 'NNNNNN'. This erases all recorded errors in the dataset and properly attributes the field for use by all other models. Users should run this tool to reset error codes after each round of edits.

Incorrect Wetland Codes

This tool creates a list of unique 'ATTRIBUTE' values in the input wet_poly feature class. It then checks those 'ATTRIBUTE' values using a series of logical checks according to the Cowardin classification system, assigning those 'ATTRIBUTE' values that fail the logical checks to a Bad Code List. The tool then changes the first character of the QAQC_Code to 'C' for those features with 'ATTRIBUTE' values in the Bad Code List.

To correct this error, users should change the attribute of the identified record to a valid wetland code.

Adjacent Wetlands

This tool identifies wetland polygons that are adjacent to other wetland polygons with the same 'ATTRIBUTE', or multipart features. For identified errors, this model changes the second character of the QAQC_Code to 'A'. Multipart features are exported to a feature class in the input geodatabase named Multipart_Wetland_Features to help identify them.

To correct this error, users should join adjacent polygons sharing the same attribute, change one of the attributes, or explode the multipart feature.

Sliver Wetlands

This tool identifies wetland polygons less than 0.01 acres, which is smaller than the minimum mapping standard. For identified records, this model changes the third character of the QAQC_Code to 'S'.

Genuine wetland features flagged as sliver wetlands can be justified as correct in the comments field of the QAQC_Summary table. Other features should be deleted or merged with adjacent polygons.

Sliver Uplands

This tool identifies several related potential errors:

First, it finds upland islands or gaps in wetlands that are less than 0.01 acres. Because this model identifies gaps and missing areas, it changes the fourth character of the QAQC_Code to 'U' in wetland polygons **adjacent** to the upland sliver. In addition, this tool creates a "Sliver_Uplands" feature class in the input geodatabase to assist in locating these small geographic features. This tool requires that 'CONUS_wet_projects' has a feature(s) that defines the wetland mapping project and completely covers all features in the 'CONUS_wet_poly' feature class.

Like sliver wetlands, these upland polygons may be genuine upland features and can be justified as such in the comments field of the 'QAQC_Summary' table. Otherwise, these areas can be copied from the generated feature class and merged with the appropriate adjacent polygon.

Second, this tool identifies areas along the project boundary where gaps in the produced data exist. If wetland features are within 5 meters of the project boundary but do not intersect the project boundary, those features' fourth character of the QAQC_CODE are flagged with a 'G'. In addition, a feature class in the input geodatabase named "Potential_Boundary_Gaps". This feature class can be used to help locate the area that is causing the issue in the dataset.

NOTE: This tool is among the most computationally intensive and may fail on geographically large project areas with many polygons. If this continues to happen after increasing the subdivision parameter, one possible remedy of this failure is to split a portion of 'CONUS_wet_poly' polygons into a new geodatabase, run the tool on each geodatabase, and then merge the resulting outputs to a single feature class.

Lake and Pond Size

This tool identifies lake polygons that are less than 20 acres in size and ponds that are greater or equal to 20 acres in size. For identified records, it changes the fifth character of the QAQC_Code to 'L' for small lakes or 'P' for large ponds. Generally, 20 acres is the threshold between classification of a pond and lake, but certain small lakes may be justified based on water depth as outlined in the wetlands mapping standards. In those cases, comments should be added to the QAQC_Summary table for flagged wetland features. Otherwise, codes should be changed as appropriate.

Overlapping Wetlands

This tool identifies overlapping wetland polygons and changes the sixth character of the QAQC_Code to 'O'. The overlapping portions of these polygons are stored in the input geodatabase as an 'Overlapping_Polygons' feature class to assist in locating these features. Overlapping polygons should be edited so that polygons are not concurrent.

Wetland Type Calculation

This tool populates the 'WETLAND_TYPE' field based on the wetland code in the 'ATTRIBUTE' field. The 'WETLAND_TYPE' field provides a general description of the wetland and is used in the cartographic representation of the different wetland types on the Wetlands Mapper.

Create NWI_ID

This tool populates the 'NWI_ID' field. 'NWI_ID' values should not be edited manually. This tool is part of the combined tools and just needs to be run once immediately prior to data submission.

QAQC Summary

This tool summarizes the QAQC_CODE field into a 'QAQC_Summary' table in the wetlands file geodatabase. It also defines each error type and records the user conducting the data verification along with a date/time stamp. Records shown in the 'QAQC_Summary' represent polygon counts for each unique code combination. Comments can be added to the 'comments' field of the QAQC_Summary table to justify specific types of errors.

QAQC_Summary

Field: Add Delete Calculate | Selection: Zoom To Switch Clear Delete Copy

OBJECTID	FREQUENCY	QAQC_CODE	Error_Type	Verified_By	Verification_Date	Verification_Comments	RUN
1	2	CNNNNN	Bad Code	Name	12/10/2018 4:48:18 PM	<Null>	1
2	3	NANNNN	Adjacent Polys	Name	12/10/2018 4:48:18 PM	<Null>	1
3	1	NANNPN	Adjacent Polys, Large Pond	Name	12/10/2018 4:48:18 PM	<Null>	1
4	3	NANUNN	Adjacent Polys, Sliver Upland	Name	12/10/2018 4:48:18 PM	<Null>	1
5	2	NANUNO	Adjacent Polys, Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
6	3	NASNNN	Adjacent Polys, Sliver Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
7	1	NASNPN	Adjacent Polys, Sliver Wetland, Large Pond	Name	12/10/2018 4:48:18 PM	<Null>	1
8	1	NNNNLN	Small Lake	Name	12/10/2018 4:48:18 PM	Valid based on depth info.	1
9	27	NNNNNN	Passed Verification	Name	12/10/2018 4:48:18 PM	<Null>	1
10	2	NNNNNO	Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
11	4	NNNUNN	Sliver Upland	Name	12/10/2018 4:48:18 PM	<Null>	1
12	4	NNNUNO	Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
13	4	NNSNNN	Sliver Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
14	3	NNSNNO	Sliver Wetland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
15	1	NNSUNO	Sliver Wetland, Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
Click to add new row.							

Figure 2. Because many polygons within a wetlands dataset will be flagged with multiple errors, the QAQC_Summary table shows the frequency of each unique combination of errors, and provides a comments field for justification.

Individual Riparian Tools

QAQC Code Reset

This tool calculates the QAQC_Code = 'NNNNN'. This erases all recorded errors in the dataset and properly attributes the field for use by all other models. Users should run this tool to reset error codes after each round of edits.

Incorrect Riparian Codes

This tool creates a list of unique 'ATTRIBUTE' values in the input rip_poly feature class. It then checks those 'ATTRIBUTE' values using a series of logical checks according to the FWS Riparian classification system, assigning those 'ATTRIBUTE' values that fail the logical checks to a Bad Code List. The tool then changes the first character of the QAQC_Code to 'C' for those features with 'ATTRIBUTE' values in the Bad Code List.

To correct this error, users should change the attribute of the identified record to a valid riparian code.

Adjacent Riparian

This tool identifies riparian polygons that are adjacent to other riparian polygons with the same 'ATTRIBUTE', or multipart features. For identified errors, this model changes the second character of the QAQC_Code to 'A'. Multipart features are exported to a feature class in the input geodatabase named Multipart_Riparian_Features to help identify them.

To correct this error, users should join adjacent polygons sharing the same attribute, change one of the attributes, or explode the multipart feature.

Sliver Riparian

This tool identifies riparian polygons less than 0.01 acres, which is smaller than the minimum mapping standard. For identified records, this model changes the third character of the QAQC_Code to 'S'.

Genuine riparian features flagged as sliver riparian features can be justified as correct in the comments field of the QAQC_Summary table. Other features should be deleted or merged into adjacent polygons.

Sliver Uplands Riparian

This tool identifies upland islands or gaps in riparian features that are less than 0.01 acres. Because this model identifies gaps and missing areas, it changes the fourth character of the QAQC_Code to 'U', in riparian polygons **adjacent** to the upland sliver. In addition, this tool creates a "Sliver_Uplands_Riparian" feature class in the input geodatabase to assist in locating these small geographic features. This tool requires that 'CONUS_wet_projects' has a feature(s) that defines the wetland mapping project and completely covers all features in the 'CONUS_rip_poly' feature class.

Like sliver riparian features, these upland polygons may be genuine upland features and can be justified as such in the comments field of the 'QAQC_Summary' table. Otherwise, these areas can be copied from the generated feature class and merged with the appropriate adjacent polygon.

NOTE: This tool is among the most computationally intensive and may fail on geographically large project areas with many polygons. One possible remedy of this failure is to split a portion of 'CONUS_rip_poly' polygons into a new geodatabase, run the tool on each geodatabase, and then merge the resulting outputs to a single feature class.

Overlapping Riparian

This model identifies overlapping riparian polygons and changes the fifth character of the QAQC_Code to 'O'. The overlapping portions of these polygons are stored in the input geodatabase as an 'Overlapping_Riparian' feature class to assist in locating these features. Overlapping polygons should be edited so that polygons are not concurrent.

Wetland Type Calculation

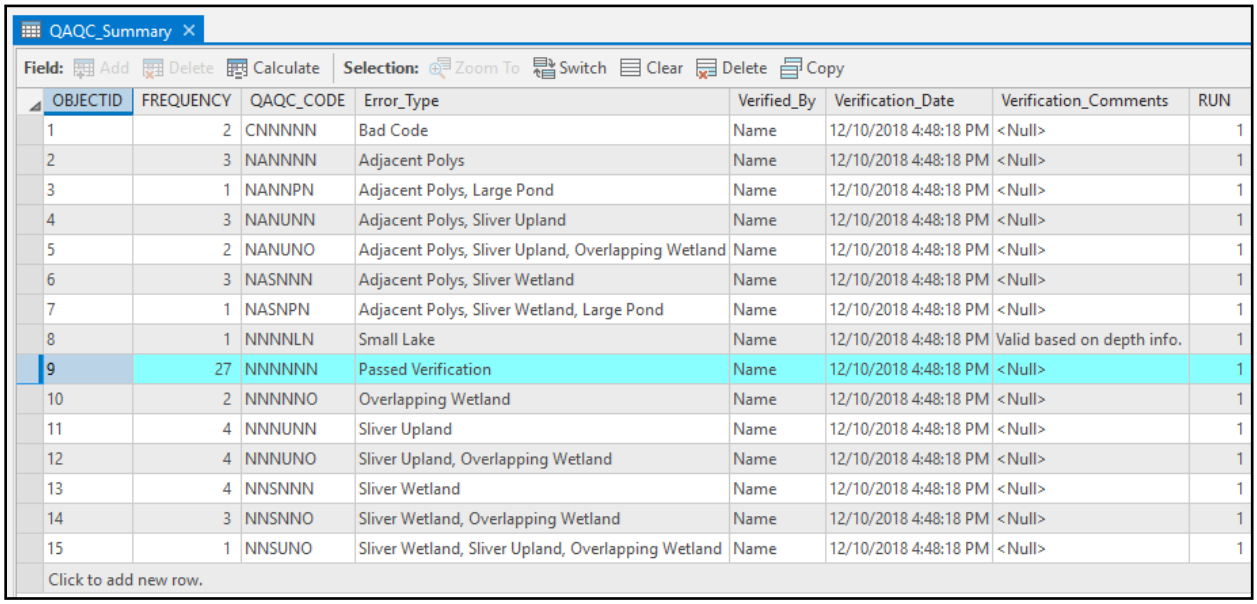
This model populates the 'WETLAND_TYPE' field based on the wetland code in the 'ATTRIBUTE' field. The 'WETLAND_TYPE' field provides a general description of the riparian feature and is used in the cartographic representation of the different wetland types on the Wetlands Mapper.

Create NWI_ID

This tool populates the 'NWI_ID' field. 'NWI_ID' values should not be edited manually. This tool is part of the combined tools and just needs to be run once immediately prior to data submission.

QAQC Summary

This model summarizes the QAQC_CODE field into a 'QAQC_Summary' table in the wetlands file geodatabase. It also defines each error type and records the user conducting the data verification along with a date/time stamp. Records shown in the 'QAQC_Summary' represent polygon counts for each unique code combination. Comments can be added to the 'comments' field of the QAQC_Summary table to justify specific types of errors.



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3	1	NANNPN	Adjacent Polys, Large Pond	Name	12/10/2018 4:48:18 PM	<Null>	1
4	3	NANUNN	Adjacent Polys, Sliver Upland	Name	12/10/2018 4:48:18 PM	<Null>	1
5	2	NANUNO	Adjacent Polys, Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
6	3	NASNNN	Adjacent Polys, Sliver Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
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Click to add new row.

Figure 3. Because many polygons within a wetlands dataset will be flagged with multiple errors, the QAQC_Summary table shows the frequency of each unique combination of errors, and provides a comments field for justification.

Individual Linear Tools

QAQC Code Reset

This tool calculates the QAQC_Code = 'NNNNN'. This erases all recorded errors in the dataset and properly attributes the field for use by all other models. Users should run this tool to reset error codes after each round of edits.

Incorrect Wetland Codes

This tool creates a list of unique 'ATTRIBUTE' values in the input wet_line feature class. It then checks those 'ATTRIBUTE' values using a series of logical checks according to the Cowardin classification system, assigning those 'ATTRIBUTE' values that fail the logical checks to a Bad Code List. The tool then changes the first character of the QAQC_Code to 'C' for those features with 'ATTRIBUTE' values in the Bad Code List.

To correct this error, users should change the attribute of the identified record to a valid wetland code.

Linear Overlaps

This tool identifies wetland lines that overlap wetland polygons with these classes: Unconsolidated Bottom, Unconsolidated Shore, Aquatic Bed, Reef, Stream Bed, Rocky Shore, or Rock Bottom. For identified errors, this model changes the second character of the QAQC_Code to 'A'.

To correct this error, users should clip these line features by the overlapping polygons.

Sliver Wetlands

This tool identifies wetland lines less than 2.66 acres, which is smaller than the minimum mapping standard. For identified records, this model changes the third character of the QAQC_Code to 'S'.

Genuine wetland features flagged as sliver wetlands can be justified as correct in the comments field of the QAQC_Summary table. Other features should be deleted or joined to adjacent polygons.

Overlapping Wetlands

This tool identifies overlapping wetland lines and changes the fourth character of the QAQC_Code to 'O'. The overlapping portions of these polygons are stored in the CONUS_wetlands feature dataset as an 'Overlapping_Linear_Wetlands_line' feature class to assist in locating these features. Overlapping polygons should be edited so that polygons are not concurrent.

Linear Gaps

This tool identifies wetland lines that are within 5 meters of the project boundary that do not intersect the project boundary. For identified records, it changes the fifth character of the QAQC_Code to 'G'. There are instances where the line feature truly does not cross the boundary, and those features should be commented as reviewed in the QAQC Summary table. Otherwise, codes should be changed as appropriate.

Wetland Type Calculation

This tool populates the ‘WETLAND_TYPE' field based on the wetland code in the 'ATTRIBUTE’ field. The 'WETLAND_TYPE' field provides a general description of the wetland and is used in the cartographic representation of the different wetland types on the Wetlands Mapper.

Create NWI_ID

This tool populates the 'NWI_ID’ field. ‘NWI_ID’ values should not be edited manually. This tool is part of the combined tools and just needs to be run once immediately prior to data submission.

QAQC Summary

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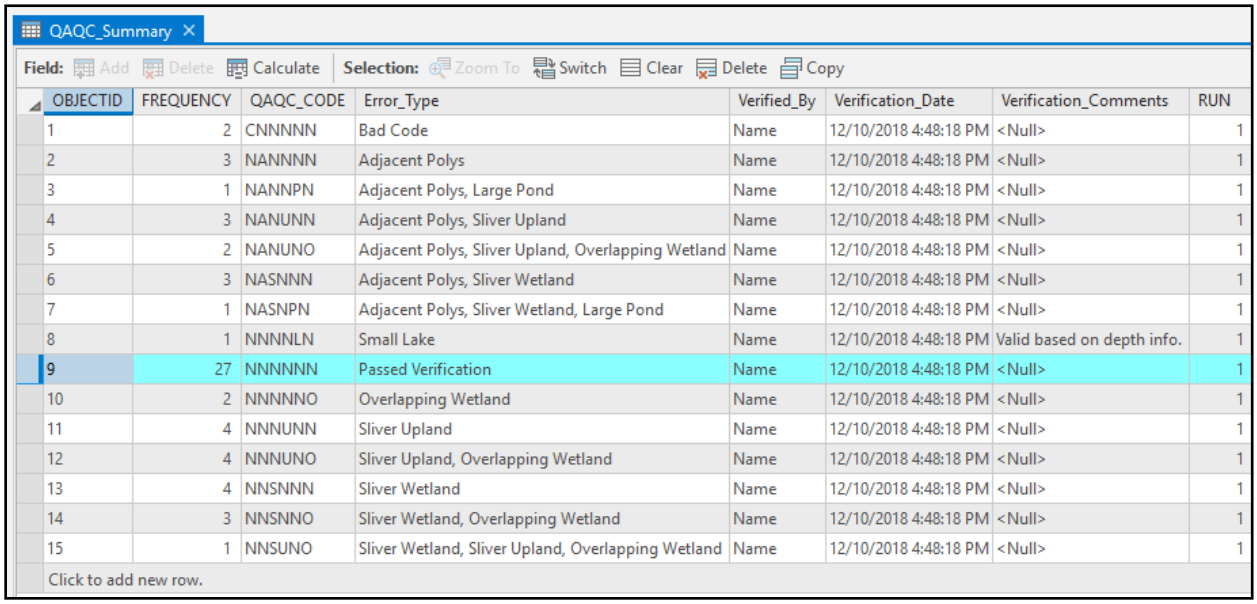

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5	2	NANUNO	Adjacent Polys, Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
6	3	NASNNN	Adjacent Polys, Sliver Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
7	1	NASNPN	Adjacent Polys, Sliver Wetland, Large Pond	Name	12/10/2018 4:48:18 PM	<Null>	1
8	1	NNNNLN	Small Lake	Name	12/10/2018 4:48:18 PM	Valid based on depth info.	1
9	27	NNNNNN	Passed Verification	Name	12/10/2018 4:48:18 PM	<Null>	1
10	2	NNNNNO	Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
11	4	NNNUNN	Sliver Upland	Name	12/10/2018 4:48:18 PM	<Null>	1
12	4	NNNUNO	Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
13	4	NNSNNN	Sliver Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
14	3	NNSNNO	Sliver Wetland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1
15	1	NNSUNO	Sliver Wetland, Sliver Upland, Overlapping Wetland	Name	12/10/2018 4:48:18 PM	<Null>	1

Click to add new row.

Figure 4. Because many features within a wetlands dataset will be flagged with multiple errors, the QAQC_Summary table shows the frequency of each unique combination of errors, and provides a comments field for justification.

Data Model Prep

This tool dissolves the linear feature class on ‘ATTRIBUTE’ and then explodes the features to ensure there are no multipart features. This process prepares the linear feature class to be in the NWI wet line data model.

Reviewing Verification Errors

To find specific instances of an error, in ArcMap or ArcGIS Pro, sort the 'CONUS_wet_poly' attribute table by QAQC_CODE and double-click the gray box associated with a given record on the far left side of the table (Figure 4). This will zoom the map display to that polygon.

Table

CONUS_wet_poly

OBJECTID *	ATTRIBUTE *	HGM_CODE	QAQC_CODE	WETLAND_TYPE	ACRES
4435	PEM1C	<Null>	NNSUNO	Freshwater Emergent Wetland	0.000733
4431	PSS1C	<Null>	NNSNNO	Freshwater Forested/Shrub Wetland	0.006964
4432	R2UBH	<Null>	NNSNNO	Riverine	0.00626
4427	PEM1A	<Null>	NNSNNN	Freshwater Emergent Wetland	0.000001

Figure 5. The 'QAQC_CODE' field in the 'CONUS_wet_poly' attribute table can be used to sort and review error codes.

The 'Select by Attribute' function, shown in Figure 5, can also be used to select all records of a defined QAQC_CODE value. Example below:

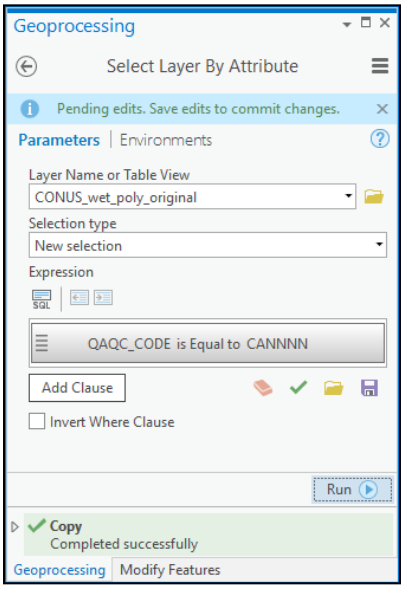

Figure 6. 'Select by Attributes' can help select and navigate to specific polygon errors.

To view the errors cartographically, create symbology rules on the CONUS_wet_poly feature class using the QAQC_CODE field. (e.g. QAQC_CODE = 'NNNNNN' symbolize green, all other values symbolize red).

For further information, assistance or questions contact: wetlands_team@fws.gov