

Habitat Monitoring Digitizing Guide

09/2020

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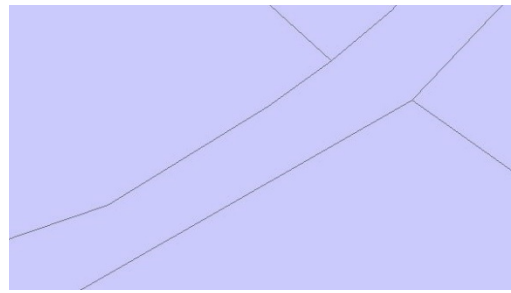
Template Guidelines

- Do not add any new fields to the templates.
- Do not alter the existing fields of the templates in any way (do not rename them, do not change the data types, do not change the domains, etc.)
- Do not reproject or transform the coordinate system of the templates.
- Each patch polygon you digitize MUST have values in these fields filled in: StateID, Point, PatchNum, IsDeveloped, CropTypeID, CnpyOver12, CnpyDecid, CnpyConif, ShrubCover, ObsvType, and ObsvDate. **They cannot be null.** See tables for descriptions of these fields.
- You should be digitizing two separate layers: one with all survey point patch polygons and one with all protective cover polygons. **Do not change the names of the template feature classes.**
 - <StateID>_Patch_Template is where all patches that make up a survey point should be digitized
 - <StateID>_PC_Template is where all protective cover polygons should be digitized
- The final dataset should not contain any gaps between polygons; polygons must have coincident boundaries. The program can only fix these errors within the tolerance of 1 meter. **Zoom in and review all your points to ensure there are no gaps.**

Gap that needs removal



After removal





- Patch polygons should not overlap each other. Boundaries of patches must be discreet.
- The protective cover layer should sit on top of your patch polygons (think of it as layers of a cake). There should not be holes in the patches layer where your protective cover sits. There should not be any holes in the patches layer at all.
- The script is designed to handle slivers but it is encouraged that you review your points to remove any slivers created during the digitizing process.
- **Do not submit data that has been submitted in a prior year!** Submit only one year of data at a time. Export a subset of the data that you would like to submit for the current year and rename the datasets to <StateID>_Patch_Template and <StateID>_PC_Template before compressing the geodatabase and submitting.
- For states with more than one focal area, it is perfectly ok to digitize and submit all areas in one template. You only need to split data into more templates if you have more than one year of data to be submitted.
- **If you choose to digitize your data outside of the template, be sure the field data types in your dataset match the field data types in the template. See tables for details on field data types in the template. Also see "Loading Data into the Template" section.**

Quick Tips for Digitizing


- **Use the snapping toolbar!!!** This will GREATLY reduce the amount of gaps and slivers you create in the digitizing process.
- Zoom-in a lot and pan around your points to ensure that gaps and slivers are not present in your final dataset. They can be very hard to see if you do not zoom in very close.
- Check that your patches meet the minimum mapping unit area (MMU) of 900 square meters.
 - If it does not meet the MMU and is not a patch on the edge of your survey point, absorb the patch into a bordering patch (see the Eliminate tool in ArcMap).
 - If it does not meet the MMU but is a patch located on the edge of your survey point, check if the patch extends beyond the boundary of the survey point, allowing it to meet the MMU based on the area that falls outside the survey point (see page 8 of the [habitat manual](#) for an example). If it continues outside the survey point and it meets the MMU through this added area, you may leave it as is. If it does not, absorb the patch into a bordering patch (see the Eliminate tool in ArcMap).
- Check that your protective cover meets the minimum mapping unit area of 314 square **feet**. If they do not, delete the polygon from the layer.

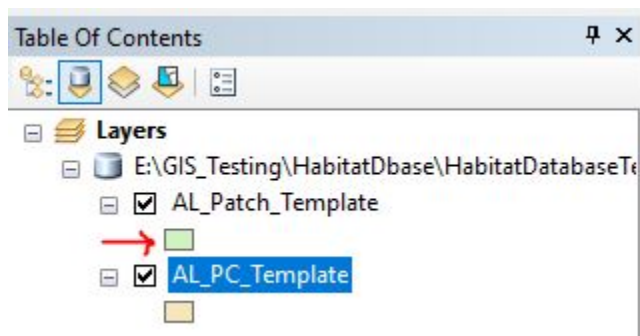
Adding Data to the Map

This section covers the basics of ArcMap such as connecting to a folder, adding data to the map, and adding a basemap layer.

- 1) Open ArcMap. Open the Catalog with this button near the top of your screen 
- 2) With the catalog pane now open on the right-hand side of your screen, click on the “Connect to Folder” button 
- 3) Navigate to the folder where you have saved the unzipped habitat file geodatabase and click “Ok”. In the catalog pane you will now see the folder under the “Folder Connections” section:



- 4) Highlight “<State>_Patch_Template” and drag it into the middle of the map. Do the same with the “<State>_PC_Template” layer.
- 5) Next, add your aerial imagery, either following the same process as above to find your own aerial photos on your computer, or use the ESRI provided basemap imagery. To use an ESRI basemap, click the small black arrow next to the Add Data button: 
- 6) Click “Add Basemap...” and in the dialog that appears, click “Imagery” or “Imagery with Labels.” Your map may take a while to load the basemap, this is normal.
- 7) Lastly, symbolize your Patch Template layer so you can see the basemap underneath. In the Table of Contents on the left side of the screen, click the colored box underneath the layer you would like to symbolize.



- 8) In the new window that appears, set the Fill Color to “None”, the outline width to 1 or 2, and the outline color to something you can easily see (red or yellow usually works). Now you should be ready to start digitizing.

Digitizing Your Data

This section covers how to digitize your data into the template.

1. Add the Editor toolbar to the user interface. On the top menu bar, go to Customize > Toolbars > Editor
2. Add the Snapping toolbar to the user interface. On the top menu bar, go to Customize > Toolbars > Snapping. Turn "Edge Snapping" on.



3. If you have not already done so, add the two template layers, <StateID>_Patch_Template and <StateID>_PC_Template to the map.
4. The templates come with pre-loaded 250-meter buffers that represent your monitoring points. Zoom to the point you wish to begin digitizing patches for.
5. Before you begin editing, open the attribute table. Write down the value in the "SHAPE_Area" field. This will be important to check your work when you are done digitizing the whole point.

DE_Patch_Template					
OBJECTID *	SHAPE *	SHAPE_Length	SHAPE Area	StateID	
28	Polygon	1570.796327	196349.540849	DE	
18	Polygon	1570.796327	196349.540849	DE	

6. Once you have a good view of your point, on the Editor toolbar click Editor > Start Editing
7. On the Editor toolbar, click on the black mouse pointer (there are two of them on the ArcMap interface, be sure to select the one on the Editor toolbar). With that as your pointer, click on the buffer you wish to digitize patches for.



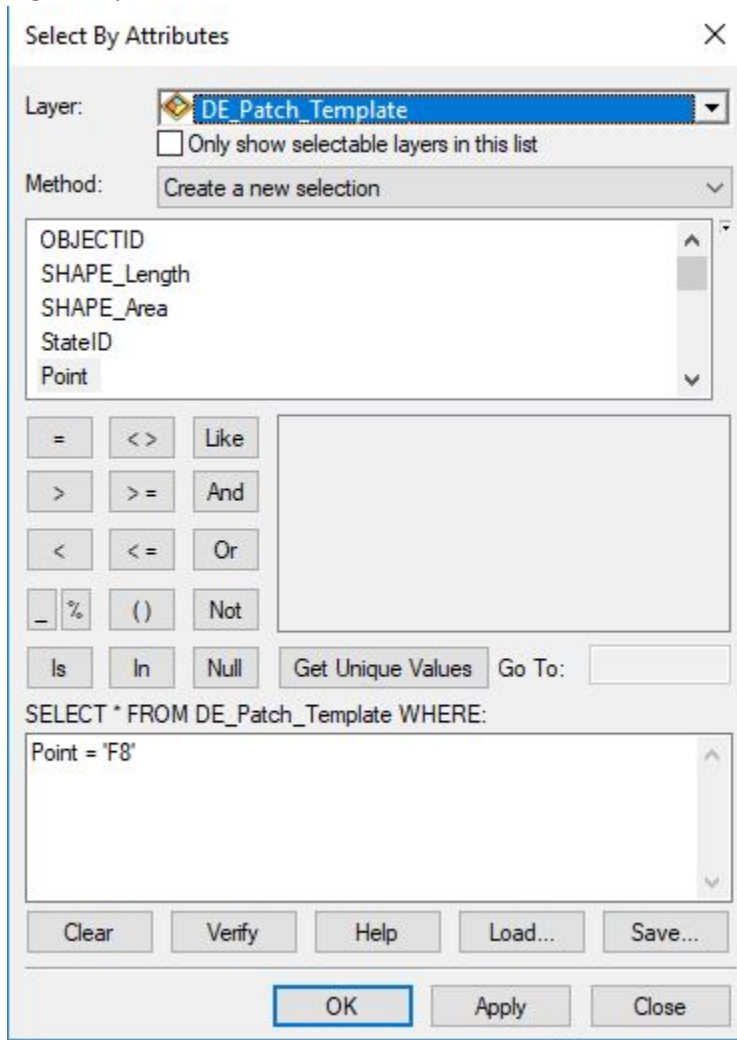
8. With the point selected (you should see a bright blue outline on the buffer), on the Editor toolbar, click on the "Cut Polygons" tool. Begin outlining your first patch. Work from the edges of the circle inward. Double-click to complete your outline. A new feature should be created. If you receive an error message, please see the "Troubleshooting" section of this guide.



9. Open the attribute table of the layer, you will notice that there are two features selected. Only one of these records is the new patch you digitized. To figure out which is which, you may click the small gray area next to the row to highlight the feature in yellow on the map. Type data into the fields for the patch you've created. You may also digitize all your points and do this at the end if you find that more efficient.

DE_Patch_Template						
OBJECTID *	SHAPE *	SHAPE_Length	SHAPE Area	StateID	P	
21	Polygon	1644.618501	185191.135015	DE	F8	
33	Polygon	458.80545	11158.369782	DE	F8	

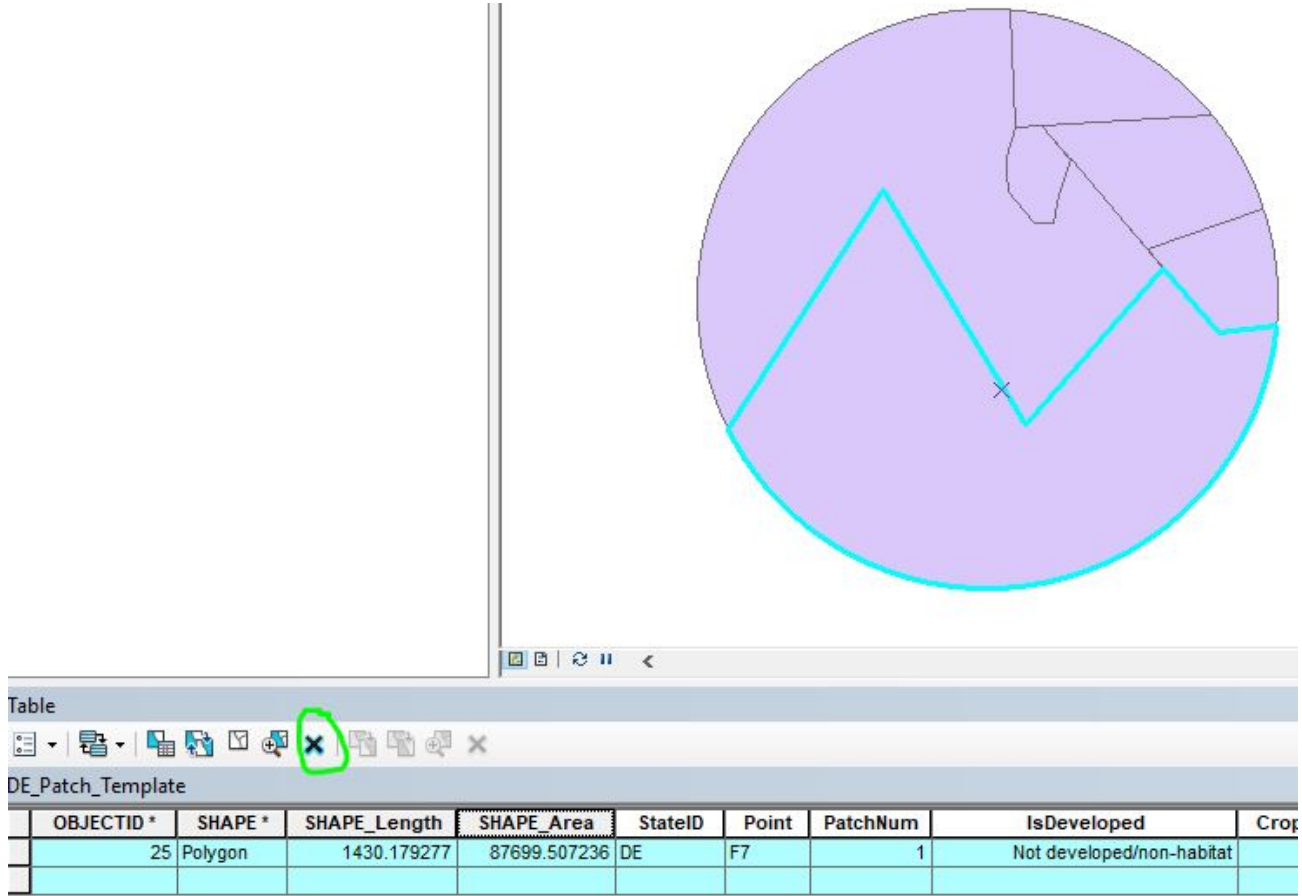
10. When you have completed digitizing all patches on the point, open the attribute table and select all the features that make up the single point. You may do this easily by going to the top menu bar > Selection > Select by Attributes. Enter this expression (with all quotation marks included): Point = '<enter the point name of the digitized point here>'.



11. With all features that make up the point selected, in the attribute table, right-click the "SHAPE_Area" header > Statistics. Look at the "Sum" value. Ensure that it closely resembles the value you wrote down in step 6, it may be decimals off.
12. If there is a portion of the point that you did not collect data for (ex: its private land you do not have permission to access), be sure to delete left over polygon(s) when you have completed digitizing the point. First, clear any selection you may have by clicking the "Clear Selection" button near the top of your screen (your button layout may look different than below).



13. With the black mouse pointer on the Editor toolbar, click the polygon you wish to delete. Open the attribute table and after ensuring the appropriate features are selected, click the X to delete the feature(s).



The screenshot shows a GIS application window. The main area displays a circular map with a cyan-colored polygon. A black 'X' cursor is positioned over the polygon. Below the map is a toolbar with various icons; the delete icon (an 'X') is highlighted with a green circle. Below the toolbar is an attribute table titled 'DE_Patch_Template'.

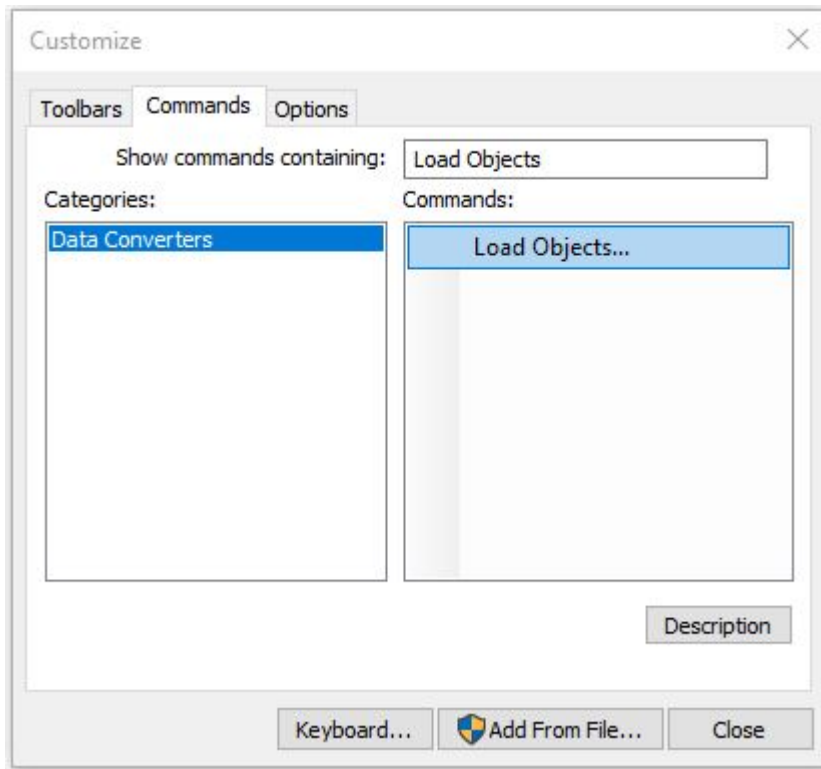
OBJECTID *	SHAPE *	SHAPE_Length	SHAPE_Area	StateID	Point	PatchNum	IsDeveloped	Crop
25	Polygon	1430.179277	87699.507236	DE	F7	1	Not developed/non-habitat	

14. Repeat steps 5-14 for all points.

Loading Data into the Template

This section covers how to load your data into the template from another shapefile or geodatabase if you did not choose to digitize your patches directly into the template.

1. Open ArcMap and add the Editor toolbar to the user interface. On the top menu bar, go to Customize > Toolbars > Editor
2. Add the “Load Objects” command to the Editor toolbar.
 - a. On the top menu bar, go to Customize > Customize Mode... > Commands tab > Type “Load Objects” into the search bar.



- b. Under the “Commands” side of the dialogue box, click and drag the “Load Objects” command to the Editor toolbar and drop it. The Editor toolbar will now look something like this (the order of the buttons doesn’t matter):

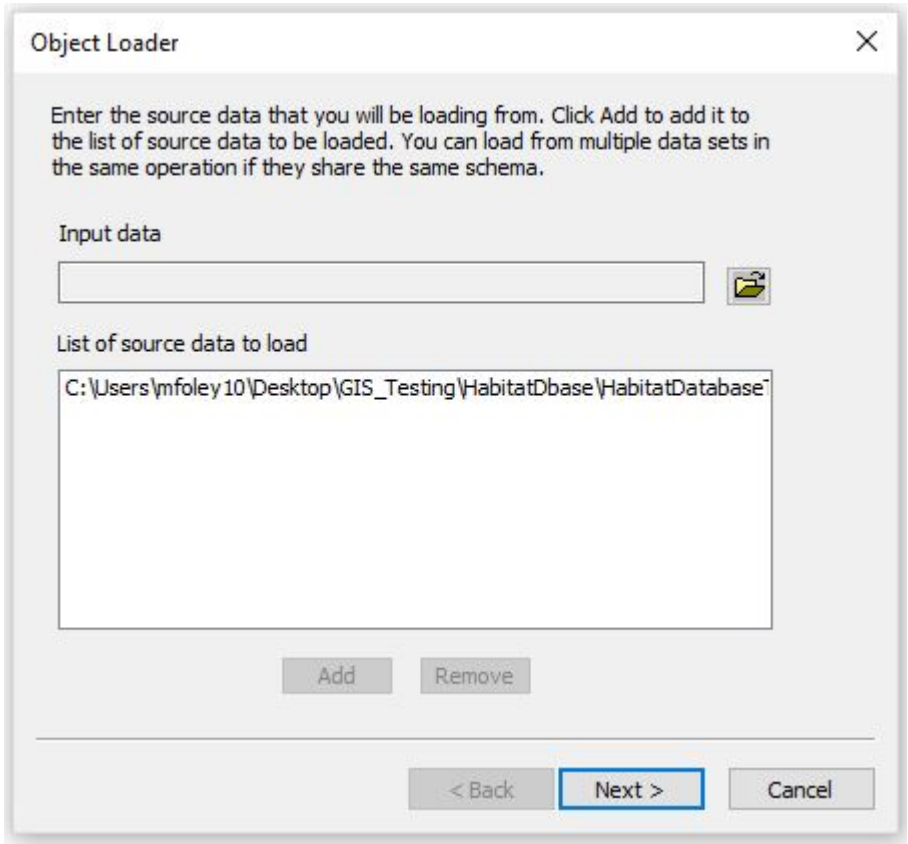


3. Add the dataset that contains your digitized patch data to the map. If it contains habitat data you have already submitted in previous years, select the data you would like to submit for the current year and export it to a new file. **Please do not submit data that has already been submitted in prior years!**
 - a. You can use the [“Select by Attributes”](#) tool to select a subset of data in your dataset.
 - b. After selecting the subset, right-click the layer name in the table of contents > Data > Export Data... and leave Export set to “Selected Features”, use the same coordinate system as the layer’s source data, and save the output feature class where you can access it. You may choose whether to save it as a feature class (which must be saved inside a geodatabase) or as a shapefile.
 - c. Add the exported data to the map when prompted.
4. Add both <StateID>_Patch_Template and <StateID>_PC_Template layers to the map

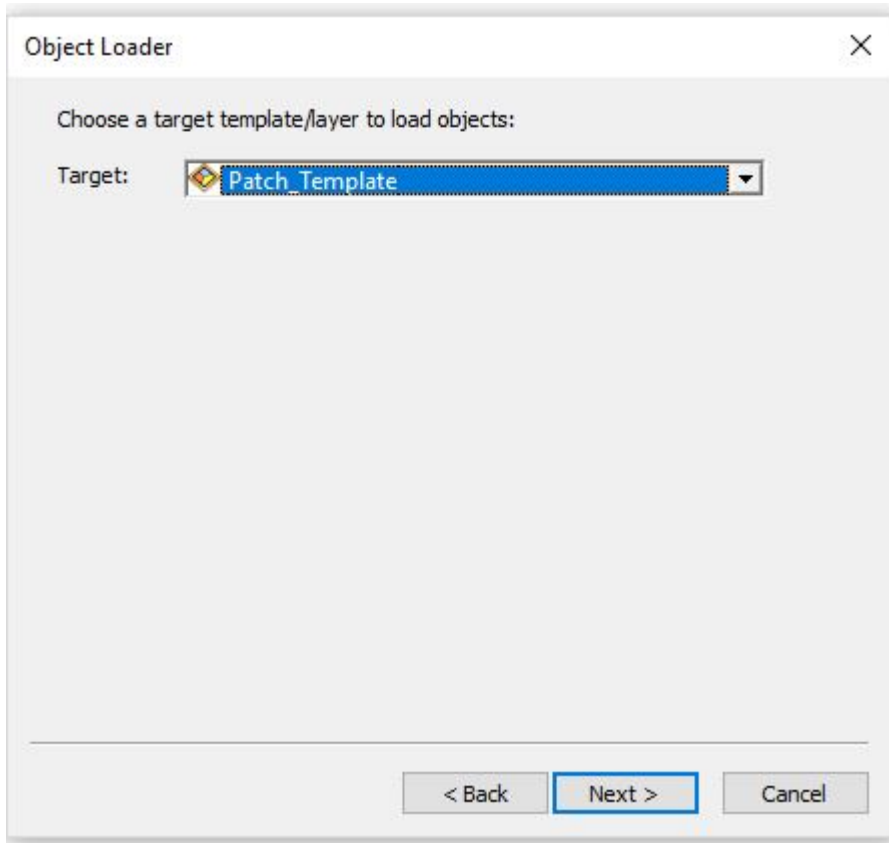
- 5. Open the <StateID>_Patch_Template attribute table. In the Table of Contents (typically left side of screen), right-click the layer and click "Open Attribute Table."
- 6. On the Editor toolbar, click Editor > Start Editing. In the dialogue that opens, click on <StateID>_Patch_Template.
- 7. Click the "Table Options" button > Select All > click the X to delete all the records. This will delete the pre-loaded 250 meter buffers. Since you have already digitized your dataset, we do not want to submit these buffers with it. Iowa may skip this step.



- 8. On the Editor toolbar, click "Load Objects"
- 9. In the dialogue that opens, click the browse folder button and navigate to your digitized patch dataset or the exported patch dataset you created in step 3 if applicable. Click "Open" when you have chosen the correct file, then click "Add"



10. Click "Next"
11. Ensure the target dataset is set to <StateID>_Patch_Template.



12. Click "Next"
13. Match fields from the target dataset up with the fields in your digitized dataset ("Matching Source Field"). If the *field data type* (string, int, float, etc.) does not match the target dataset's field data type, the tool will run but the column or rows may not populate with values as you would expect. You must then fix the rows in your digitized dataset so they match the target dataset and run the tool again. The names of the fields do not need to match but the field data types do.

Object Loader ✕

For each target field, select the source field that should be loaded into it.

Target Field	Matching Source Field
StateID [string]	StateID [string] ▼
Point [string]	Point [string]
PatchNum [int]	PatchNum [int]
IsDeveloped [int]	IsDeveloped [int]
CropTypeID [int]	CropTypeID [int]
CropResidue [float]	CropResidue [float]
CnpyOver12 [float]	CnpyOver12 [float]
CnpyDecid [float]	CnpyDecid [float]
CnpyConif [float]	CnpyConif [float]
ShrubCover [float]	ShrubCover [float]

Reset

< Back Next > Cancel

14. Click "Next"
15. On the next dialogue, click "Load all of the source data" and click "Next"
16. Click "No" on the input features being snapped. Click "Yes" to validate the new features. Click "Next"
17. Review the information and click "Finish"
18. Right-click the <StateID>_Patch_Template in your table of contents and open the attribute table. Review the features to determine that all have loaded successfully. If any of them are highlighted in blue, they did not pass validation and something went wrong during data transfer.

- a. Change the view on the attribute table to only show selected records; at the bottom of the attribute table, there are two buttons, click the one on the right that is completely blue.



- b. This view contains all the features that were marked invalid. Select a single record by clicking the gray box to the left of the row.

	OBJECTID *	SHAPE *	SHAPE_Length	SHAPE_Area	StateID	Point	PatchNum	IsDeveloped
▶	13	Polygon	3047.456191	156783.088441	VA	BP0	1	Not developed/non-habitat

- c. With that record selected, go the Editor Toolbar, click Editor > Validate Features
- d. The message that appears will give you some information about why the feature is invalid. You may repeat this on the other invalid features to determine if the error is the same for all them.
- e. Fix what is causing the issue in your digitized dataset.
- f. Delete the features in the template dataset. Switch back the view to display all records (click the left button seen in step 18a). Click the Table Options button > Select All. All records will be highlighted in blue. Click the "X" on the table toolbar to delete them.

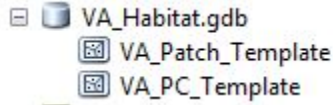


- g. Repeat steps 5, 6, and 8 - 18 to try loading the features again.
19. Repeat this process with your digitized protective cover, ensuring you are choosing the appropriate protective cover layers for steps 9 and 11 (and 3 if applicable).
20. When you have loaded features into both the Patches_Template and the PC_Template and they have been validated, save your edits and stop editing. On the Editor toolbar, go to Editor > Stop Editing. Save the edits when prompted.

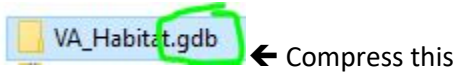
Submitting Your Data

Using the NBCI Habitat Monitoring and Management Data Explorer, you can submit your data in the form of a zipped file geodatabase.

1. Check that your data is structured appropriately before compressing the file geodatabase. Your file geodatabase should contain **only** two layers: <StateID>_Patch_Template and <StateID>_PC_Template. They **must** be named in this exact format. In ArcCatalog, it should look something like this:



2. Compress the geodatabase using Windows File Explorer. Be sure to compress the folder that ends in the extension .gdb. Do not submit zip files where the .gdb folder is nested inside another folder. Do not create a new folder called State_Habitat.gdb and place the State_Habitat.gdb file geodatabase inside and zip the containing one. Zip the only one that is visible in windows file explorer (it already exists).



After it has been zipped, it should look like this:



3. Open the Data Explorer. Click the classification icon on the right side of the map:



4. In the dialogue that opens, choose your state and add your zipped geodatabase. Click "Classify Habitat"

5. Results should be viewable in ten minutes. You will receive an email from nbciquailcount@gmail.com when your data has finished processing (or encountered an error).

<StateID>_Patch_Template Attribute Table Fields

Field Name	Field Data Type	Description	Example Value(s)
StateID	Text; does not allow nulls	The two letter abbreviation of your state. When you create a new feature in the template, it will default to your StateID.	KY
Point	Text; does not allow nulls	A dropdown list where you can pick the name and/or number of the survey point the feature is located on. This field is specific to your state, please see last page for your state's point naming schema (this was the schema you designed when your state submitted your monitoring points to us). Corresponds to "Point ID" cell on datasheet.	RA20; OH-ICRA-16; M_41; 1;
PatchNum	Long; does not allow nulls	Each survey point contains multiple patches, each patch has a number. This corresponds to the "Patch Number" cell on the paper datasheet.	6
IsDeveloped	Long; does not allow nulls	Corresponds to "Is this developed land or non-habitat?" on paper datasheet. Appears as dropdown list in template; if digitizing outside of template , use 1 for Yes and 0 for No.	Patch is developed or non-habitat; Patch is not developed or non-habitat
CropTypeID	Long; does not allow nulls	Corresponds to "Crop Type" on paper datasheet. Appears as dropdown list in template; if digitizing outside of template , use integer values below appropriately: 0 – None 1 – Corn 2 – Potato 3 – Soybean 4 – Wheat 5 – Grain sorghum 6 – Sweet Potato 7 – Tobacco 8 – Barley 9 – Cotton 10 – Oats 11 – Flax 12 – Rye 13 – Cereal 14 – Peanuts 15 – Tomato 16 – Cabbage	Corn

		17 – Sugarcane 18 – Watermelon 19 – Pumpkin 20 – Sugar beets 21 – Other	
CropResidue	Float	Corresponds to “What % of field has standing crop residue in spring?”	20
CnpyOver12	Float; does not allow nulls	Corresponds to “What is the % canopy of vegetation >12 ft tall?”	15
CnpyDecid	Float; does not allow nulls	Corresponds to “What % of the canopy are deciduous trees?”	75
CnpyConif	Float; does not allow nulls	Corresponds to “What % of the canopy are coniferous trees?”	25
ShrubCover	Float; does not allow nulls	Corresponds to “What is the % of the shrub cover in the understory?”	5
ShbHiStemsDens	Float	Corresponds to “What % of the shrub cover has high stem densities near the ground?”	5
GrassCover	Float	Corresponds to “What is the % grass cover in the understory?”	25
ForbCover	Float	Corresponds to “What is the % forb cover in the understory?”	35
FrbAsProtect	Float	Corresponds to “What % of the forb cover can act as protective cover?”	20
ForbSpecies	Long	Corresponds to “How many forb species are present?”	3
BareGround	Float	Corresponds to “What is the % bare ground, including underneath vegetation?”	50
HerbHeight	Long	Corresponds to “Is the herbaceous vegetation height >8 in for >50% of the year?” Appears as dropdown list in template; if digitizing outside of template , use 1 for Yes and 0 for No.	Yes; No
IsQuailHab	Long	Corresponds to “Do you think this patch is quail habitat?” Appears as dropdown list in template; if digitizing outside of template , use 1 for Yes and 0 for No.	Yes; No
ObsvType	Long; does not allow nulls	Did you walk the entire patch, estimate from the road, interpret from a photo, or use some other method to gather structural data? The default value is Walked. Appears as dropdown list in template; if digitizing outside of template , use integer values below appropriately. 1 – Walked 2 – Road observation 3 – Photo interpretation 4 – Other	Walked

ObsvDate	Date; does not allow nulls	Corresponds to "Date" cell on paper datasheet. Format as MM/DD/YYYY (ArcMap changes 01/01/2015 to 1/1/2015, that's ok).	1/1/2018; 12/15/2016
FirstName	Text	Corresponds to "Observer" cell on paper datasheet; only put their first name in this field.	Molly
LastName	Text	Corresponds to "Observer" cell on paper datasheet; only put their last name in this field.	Foley
Comments	Text	Any comments you wish to add about a particular patch	Saw a bobwhite here.

<StateID>_PC_Template Attribute Table Fields

Field Name	Field Data Type	Description	Example Value(s)
StateID	Text; does not allow nulls	The two letter abbreviation of your state. When you create a new feature in the template, it will default to your StateID.	KY
Type	Long; does not allow nulls	Identifies the protective cover as either herbaceous or woody type. The default value is Woody. Appears as dropdown list in template; if digitizing outside of template , use 1 for Herbaceous and 2 for Woody	Herbaceous; Woody
Comments	Text	Any comments you wish to add about a particular protective cover patch	Lots of blackberry.

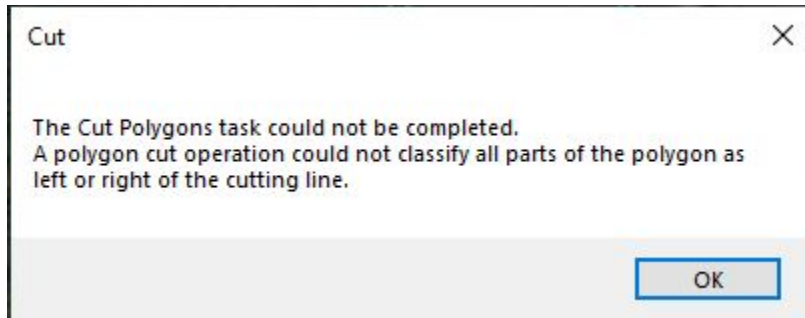
State Survey Point Naming Schemas

State	Focal Area Point Names	Reference Area Point Names
Alabama	QP1 through QP5, QP6R8, QP7 through QP12, QP13R8, QP14 through QP20, QP21R8 through QP24R8	RAQP1 through RAQP20, RAQP21R8, RAQP22 through RAQP24
Arkansas	AR_PR_01 through AR_PR_12	N/A
Delaware	F1 through F14	R1 through R14
Georgia	(for West SL) SL1, SL14, SL22, SL38 through SL40, SL43, SL45 through SL51 (for Chickasawhatchee) C1 through C48	MC1 through MC21
Illinois	BA_FA00 through BA_FA24	BA_RA00 through BA_RA20
Iowa	(for Ringgold) 1 through 44; (for Shawtee) 3601 through 3630	101 through 134

Kentucky	(for Livingston) F1 through F24 (for Peabody) P2, P4 through P6, P8 through P15, P17, and P18. (for Wendell Ford) W3 through W15	C1 through C24
Louisiana	FA1 through FA25	RA1 through RA25
Mississippi	F1 through F15	R1 through R15
Missouri	25 through 48; BR6, BR7, BR8, BR14, BR15, BR19 and BR64 through BR80	1 through 24; BR41 through BR63
Nebraska	M_1 through M_60	R_1 through R_60
New Jersey	F1 through F25	R1 through R25
Ohio	OH-FQHA-0 through OH-FQHA-41	OH-ICRA-0 through OH-ICRA-41
Oklahoma	C-FA00 through C-FA19	A-RA00 through A-RA10; J-RA00 through J-RA07
Pennsylvania	L1 through L15; M1 through M10	N/A
South Carolina	F1 through F12	R1 through R12
Tennessee	WR1 through WR13	MA1 through MA13
Texas	SEFOCUSAREA01 through SEFOCUSAREA40	SEREFERENCEAREA01 through SEREFERENCEAREA43
Virginia	(for Sussex) BP1 through BP31 (for Manassas) MB01 through MB09, MB11 MB13, MB14, MB16, MB19, MB20, MB22, MB25, MB28, MB30	(for Sussex) SR0 through SR30 (for Manassas) SB01, SB03 through SB08, SB10, SB12, SB13, SB15 through SB21, SB23, SB24

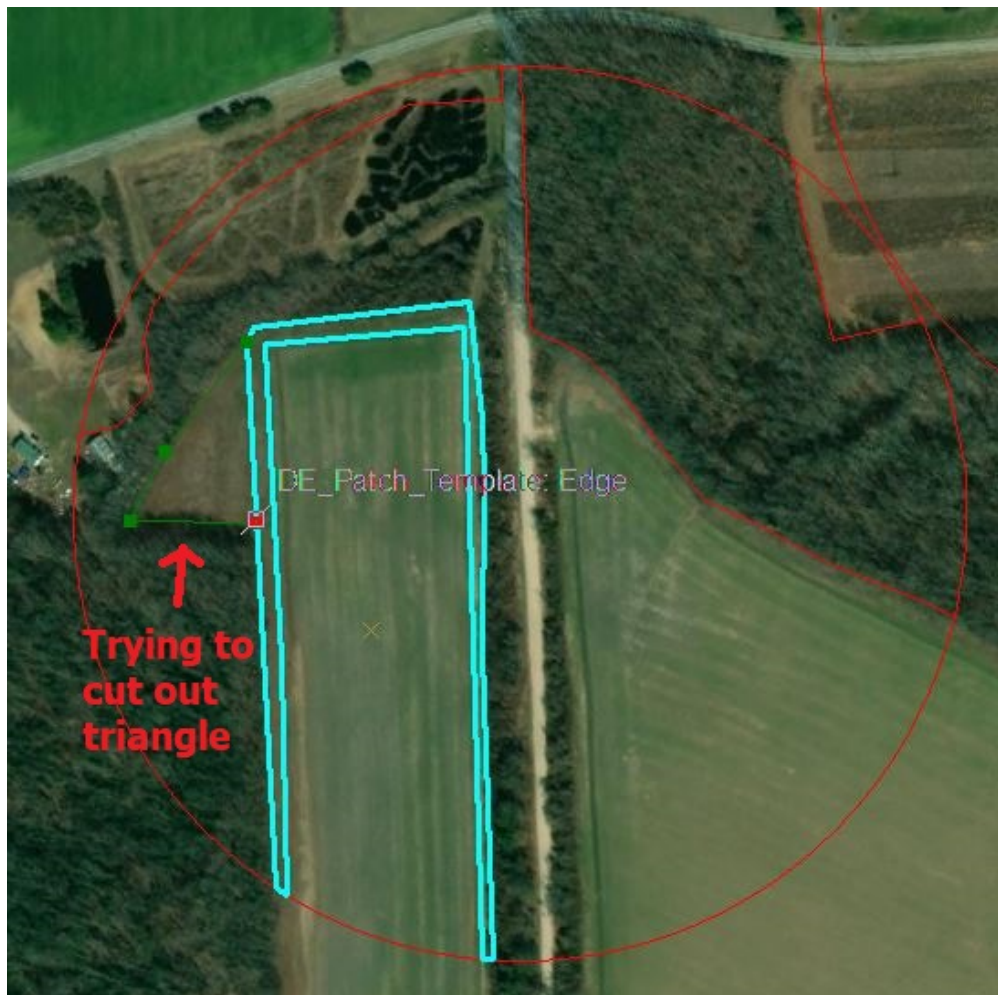
Troubleshooting

Sometimes when you are digitizing you will receive this error message:



This error occurs because the polygon you are cutting out is not completely surrounded by edges of another selected polygon ("container polygon"). For example:

This will result in the error. You can see that the upside-down U-shaped polygon is selected and I am trying to cut out a polygon that does not lie inside its blue-colored lines.



This will cut the polygons as intended. You can see the blue-colored lines of the polygon that is selected completely contains the polygon I am attempting to cut out.



If you receive this error because you have the wrong polygon selected, click the black cursor on the *Editor toolbar* and use it to click the intended container polygon. Then use the Cut Polygons tool to attempt to draw your new polygon again.

The Edit cursor looks like this: 