AppLCC/TWRA Partners Workshop – Crossville, TN – Feb 9 & 10th 2017

Riparian Prioritization for Climate Change Resilience (RPCCR) Case Study

Theme: Given our limited resources, how can I make the best investment now, to protect resources into the future?

Question:

Where are the highest priority riparian corridors within a watershed, which if riparian vegetation is restored, will provide the most efficient way of increasing aquatic connectivity and provide for habitat more resilient to impacts of increasing temperatures resulting from climate change?

Data Layers:

1. RPCCR Analysis for watershed of interest – will be created in Step 1
2. Native Trout Streams in Tennessee
3. EBTJV Priority Areas
4. Probability of Urbanization – TN_SLEUTH.lyr

Data layers can be downloaded here: http://applcc.org/news/events/twra-partners-workshop/twra-partners-workshop

Potential Solution:

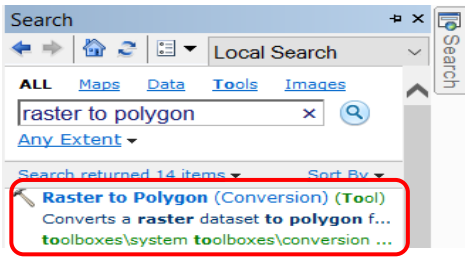
This analysis can be completed by downloading the RPCCR analysis and using ArcGIS (or other compatible GIS software). The instructions provided below are for ArcGIS.

1. Open RPCCR and run an analysis for a sub-watershed within Tennessee. When the analysis is complete, download the geotiff output. You can use the data you created during the RPCCR How-to exercise or create a new data layer.

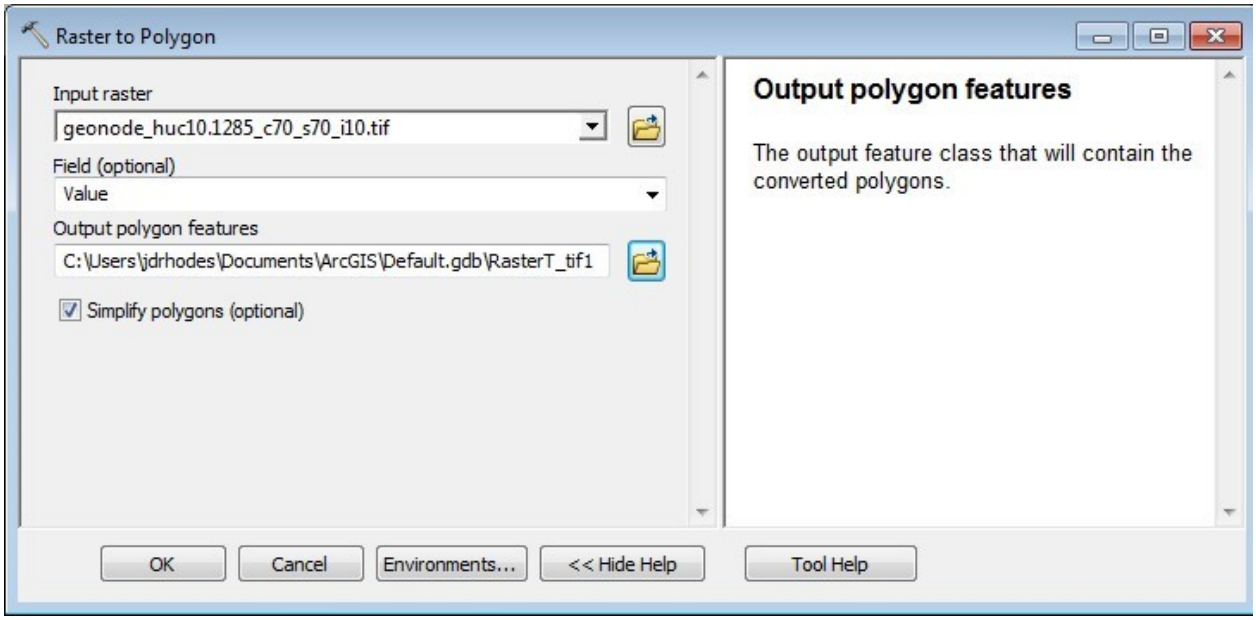
2. Open ArcGIS

3. Add the analysis output from RPCCR. Refer to steps 10-12 of the RPCCR: How-to Instructional Exercise for complete instructions.

4. This layer will be in raster format. For our analysis, we will need to convert the file to vector format. Open the Search Box in ArcGIS and enter the terms “raster to polygon” (this tool can also be located in ArcToolbox). Click on “Raster to Polygon” to open the

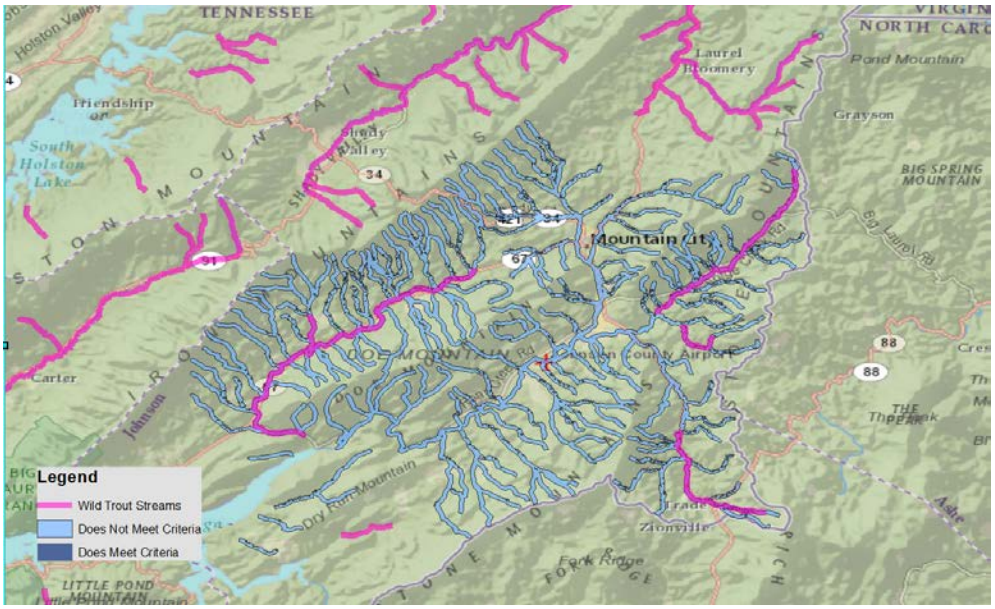
tool. 

5. The input raster will be the file you created using RPCCR. The field should be value (this is the default). The output polygon features is the location in which the newly created file will be saved to. The simplify polygons box is checked by default. Click "OK".

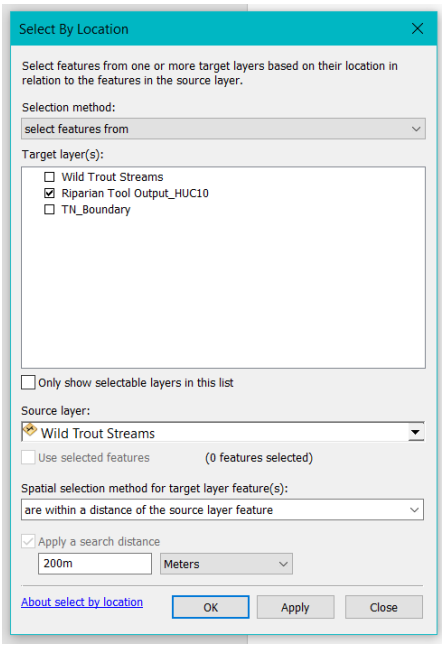


6. When the analysis is complete, you may be asked to add the newly created file to the map. If you do not see this prompt, use the add data button to import the file.

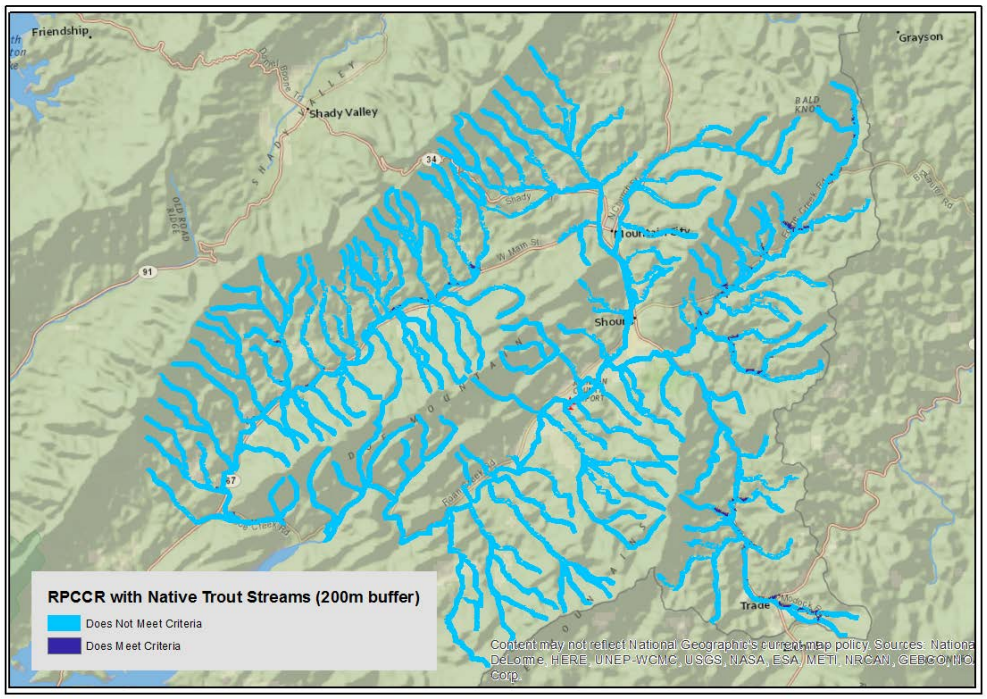
7. The next step is to refine the prioritization by incorporating additional data layers. For this example, the objective is to identify high priority areas for restoration to benefit cold-water species. Brook trout are sensitive to stream temperatures and are considered a sentinel species and for this example, they are going to serve as a representative species. We will first consider riparian corridors identified by RPCCR that are within a specified distance (200 meters) of a stream that also supports naturally reproducing trout populations as identified by TWRA. Add the Native Trout Streams layer to your map. In this example, there are several segments identified by RPCCR that overlap with natural trout production.

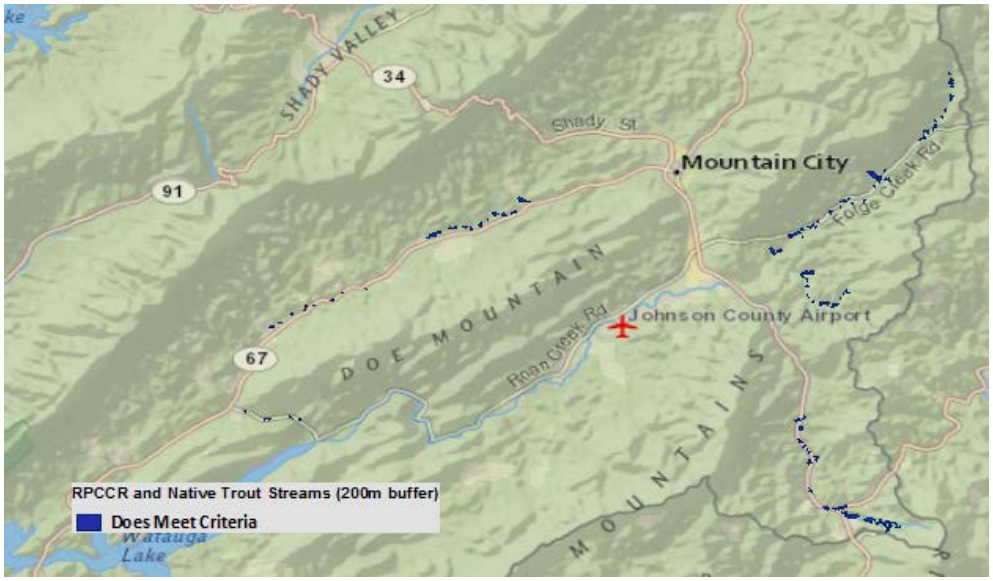


8. The next step is to select all areas that meet the criteria from RPCCR that also are within 200 meters of a stream that supports native trout. Use the “Select By Location” tool to identify all areas meeting the RPCCR criteria that are also within 200 meters of a stream with naturally reproducing trout.

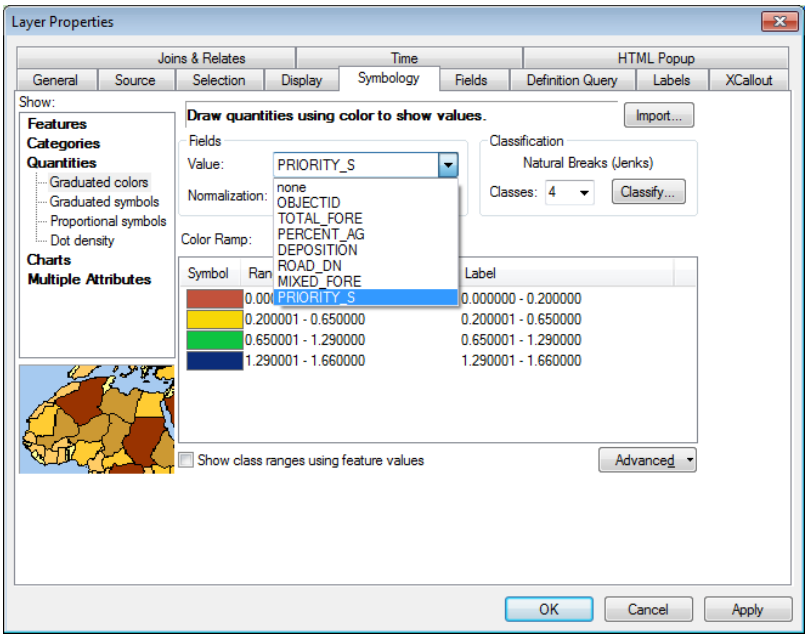


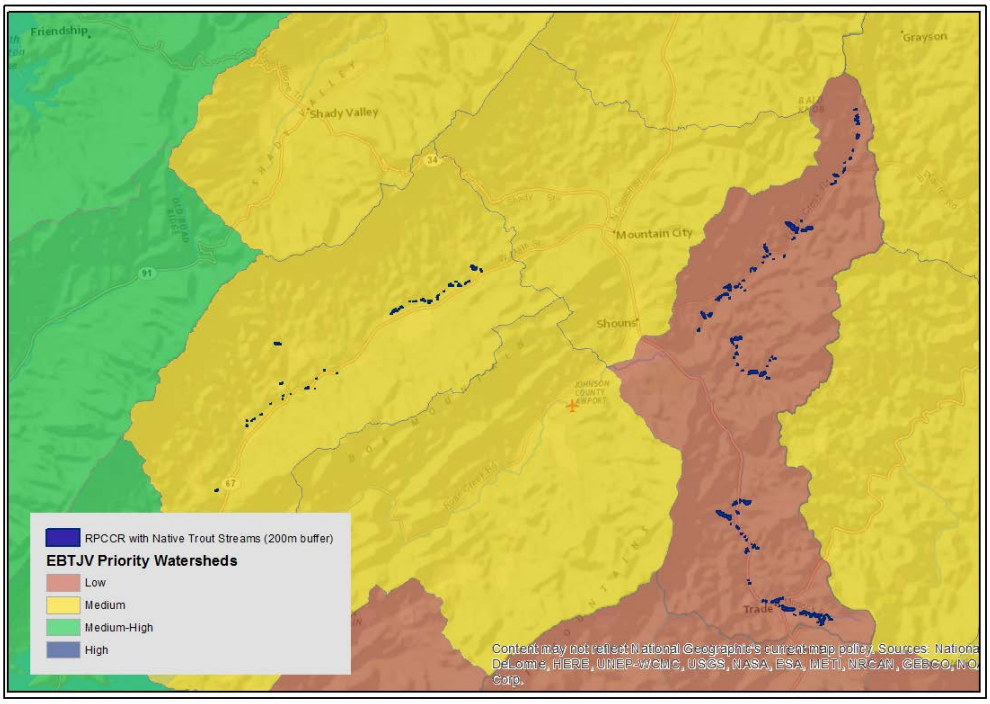
9. Right click on the data layer in the Table of Contents and select “Data” then “Export Data” to create a new shapefile of the selected area and add this new shapefile to your map. You will need to edit the symbology to differentiate what does and does not meet criteria. You can choose to remove the Does Not Meet Criteria to remove those areas from your map.





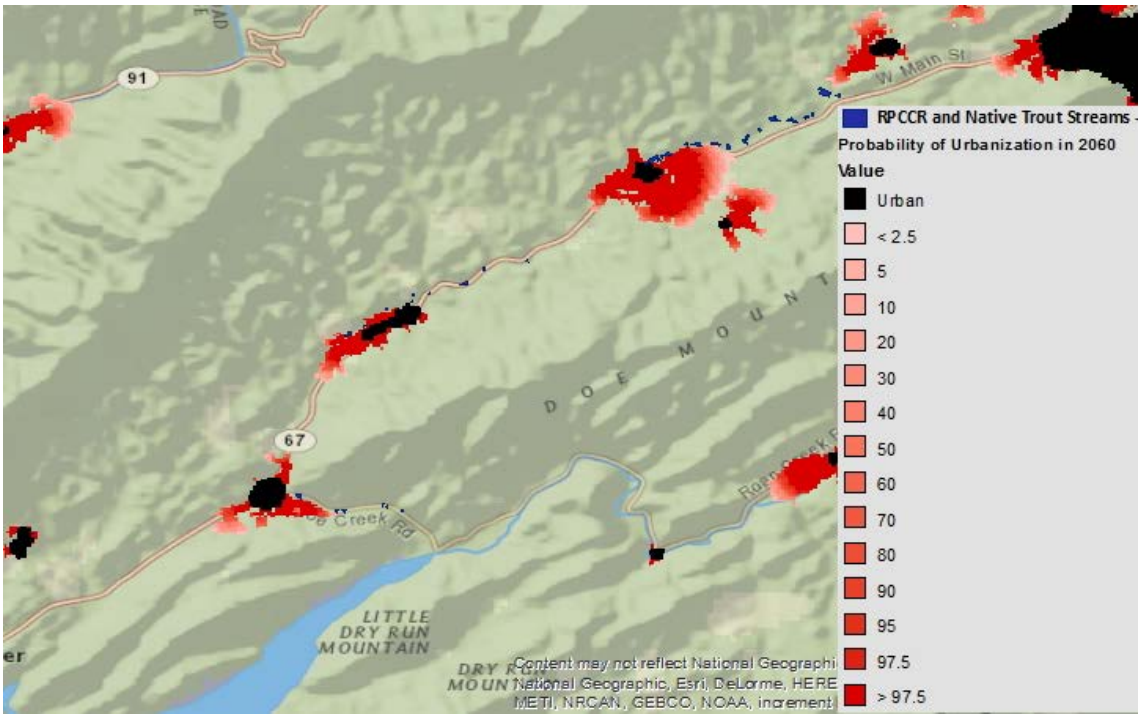
10. The next level in the prioritization is to look at where these areas are in relation to established priority areas. For this example we are going to use the EBTJV priority scores. When the data is added to ArcGIS, the symbology is displayed as a single symbol by default. To display the data according to the priority of each watershed, the symbology will need to be changed. Double-click on the layer name to open the Layer Properties dialog box. On the symbology tab, select “Quantities”. From the Value dropdown, select “PRIORITY_S” (see screenshot below). The default classification is Natural Breaks. Change the number of classes to 4. When finished, click “OK”.





11. Restoration efforts should be focused in the higher priority areas and would further reduce the areas under consideration.

12. To reduce the areas under consideration further, next add the Probability for Urbanization (TN_SLEUTH) layer. Here you can choose how far out into the future you want to examine the risk of urbanization to areas under consideration. For this example, Probability of Urbanization in 2060 has been chosen and the below image has been zoomed in to areas where the EBTJV Priority = Medium.



13. The analysis could further be reduced according to land ownership status or adjacency to conservation lands using the same procedure as described above.

Summary

In this case study activity, we have incorporated four data layers and have significantly reduced the areas being considered to identify the highest priority areas for riparian corridor restoration. Other areas not identified may still provide benefit if they are restored, but are not considered the highest priority. This is just one example of how output from RPCCR can be used in conjunction with other data layers to prioritize areas for conservation. Based on organization priorities, different layers may be incorporated using a similar approach.