How far can you see?

The viewshed tools identifies areas that can be seen from an observation location. It is useful when you want to know how visible objects might be, such as different landscape features.

Build skills in these areas:

- Filtering layers with logical queries
- Using the Create Viewshed tool
- Visually analyzing imagery

What you need:

- Account required
- Estimated time: over 1 hour

Scenario

You are a retired couple that wants to relocate and build a home in Lake Junaluska, North Carolina. You have contacted a real estate agent in Waynesville, North Carolina, who has three pieces of land for sale in close proximity to the lake. You have asked a GIS analyst to determine which of the three proposed house sites has the best view of the lake.

Build the map

1. Click [ArcGIS.com].
2. Sign into your organizational account.
3. Click Map on the upper ribbon.
4. Click +Add.
5. Search for Layers with the following parameters:
   - Find: IGIMG_Viewshed.
   - In: ArcGIS Online.
6. Click Add.

This layer shows the three potential house sites.

7. Search for layers again and search for IGIMG_lake

8. Click Add.

This layer shows Lake Junaluska, which is the view that the potential homeowners want to see from their house site.

9. Click the Back Arrow and Contents.

10. On the top ribbon, change the basemap to Imagery.

11. Click Save As on the top menu.

12. Use the following parameters:

   • Title: Viewsheds for House Sites in Lake Junaluska, NC
   • Summary: Viewsheds for House Sites in Lake Junaluska, NC
   • Tags: individual tags

13. Click SAVE MAP.

Now that the study area has been identified including the three house sites, the viewsheds must be calculated from each of the house sites.
**Create viewsheds from each house site**

The Create Viewshed tool uses the Esri Elevation Analysis service to determine which areas are visible from specified observer points.

You must create a viewshed for each house site independently. Use the filter tool to select a feature layer in the map. You will select one house site at a time.

1. Click House Sites >> Filter.

2. Construct the expression shown in the figure: (OBJECTID is 1). There are three OBJECTIDs. Each one represents a different house site.

3. Click APPLY FILTER.

The filter isolates or selects one house site, and you are now ready to create the viewshed from house site #1.

4. Click House Sites >> Perform Analysis.

5. Click Find Locations >> Create Viewshed.

6. Use the following options in the Create Viewshed menu:
   - Point features the represent observer is **House_Sites**.
   - Height of observer location is 13 feet. (This is the height above ground of your observer location. In this case, set to 14 feet, which represents an eight-story building and a five-foot person.)
   - Set the Maximum viewing distance at 1 mile. This is a cutoff distance where the computation of visible areas stops.
   - Result layer name should be **Viewshed_1**.
   - Clear Use Current Map Extent.

7. Click RUN ANALYSIS.

The resulting feature shows the viewshed from House Site #1.
8. Repeat steps 1–7 for House Site #2, with the following modifications:
   • Click Filter>>Remove Filter.
   • Create expression for OBJECTID is 2.
   • Run viewshed using the same parameters as for house site #1.
   • Name the viewshed Viewshed_2.
   • Clear Use Current Map Extent.

You need to make Viewshed_2 a different color.

9. Click Change Style.

10. Click OPTIONS.

11. Click Symbols.

12. Select a different color.

13. Click OK.

14. Repeat steps 1–13 for house site #3.

You have now created a viewshed from each of the three house sites.
Intersect views with the lake

Now that the viewsheds have been created, you must isolate what section of the lake can be seen from each one. To isolate areas of the lake, you must combine two layers (viewshed and lake) into a single layer. To do this, you will use an overlay method called intersect. When you use intersect, it will result in only those features or portions of features in the overlay layer that overlay with features in the input layer.

1. Click Lake Junaluska.
2. Click Perform Analysis.
3. Click Manage Data.
4. Click Overlay Layers.

5. Click Intersect and use the following parameters:
   - Choose input layer: Lake Junaluska.
   - Choose overlay layer: Viewshed_1.
   - Output: Areas.
   - Result layer name: Lake_View_1.
   - Clear Use Current Map Extent.

6. Click RUN ANALYSIS.
7. Click DONE.
8. Repeat steps 1–7 for House Site 2 and Viewshed_2.
9. Repeat steps 1–7 for House Site 3 and Viewshed_3.

In this exercise, you created three viewsheds and intersected them with Lake Junaluska to provide the retired couple with a visual representation of what part of the lake they will be able to see from each of the three house sites. From this information, the couple can make an informed decision.