**Protocol for creating KML area files for areas of interest**

This document provides the steps to follow to create KML files identifying the area covered by sites of interest for habitat suitability models. Steps are also provided for creating sections within the sites to help process larger areas. Protocols for use of Google Earth Pro and for use of Google Earth are provided, but other applications can be used if the final output is the same.

1. **Using Google Earth Pro**
   1. Open Google Earth Pro.
   2. Navigate the view until the entire estuary or area of interest is visible in the window.
   3. Create the whole estuary area (Figure 1).
      1. Select the “Add Polygon” tool A screenshot of a computer

         Description automatically generated with medium confidence
      2. Rename the polygon using the estuary code.
      3. Select the “Style, Color” tab and change the Area color opacity to 40%.
      4. Click to add points around the estuary, following roads, shorelines, or landmarks as needed.
         1. Right-click on a point to remove it.
         2. Click and drag a point to move its location.
         3. Select “OK” in the pop-up window once completed.
   4. In the list of places on the lefthand side of the screen, right-click on the newly created area polygon. Select “Copy”. Right-click on the white space in the “Places” section, and select “Paste”
   5. Create estuary sections (Figure 2).
      1. Right-click on the second copy of the estuary area. Select “Properties”.
      2. Rename the polygon to Site Code-Section name (i.e. SL-Central, CR-East). Make sure there are no spaces in the name.
      3. On the “Style, Color” tab, select a new Area color.
      4. Click on one of the polygon edge points furthest from the current working section, causing it to be highlighted in a different color. Right-click on polygon edge points close to but outside of the current working section to remove points from the polygon which are not bordering the desired section.
         1. Can also left-click then right-click on specific points to remove them.
      5. Move, remove, and add points as needed to create a border around the estuary area. Make sure the final outside border still lines up with the original whole estuary area.
   6. For each additional section, copy and paste the original whole estuary area polygon, rename with Site Code and section name, and modify points as necessary making sure edge points still line up with the original polygon and internal edges line up among sections. Zoom in and out as needed to prevent section overlap (Figure 3).
   7. Once all sections have been created, right-click the whole estuary section and select “Save Place As”. Save the file type as .kml using the same layer name. Save the file to the Reference files/KML folder.
2. **Using Google Earth**
   1. Navigate to the [Google Earth home page](https://earth.google.com/web). Once logged in, click the “+ New” button and create a new project.
   2. In the top left corner of the screen, rename the project using the two-letter site code followed by an underscore, and “all” (i.e., TB\_all).
   3. Use the search tool to navigate to the general area of interest. Once the desired area is in view, move the map and zoom in or out as necessary until the entire area for the site of interest is visible in the view window.
   4. From the tool selection bar, select the “Add path or polygon tool”.
   5. Click on the map to add points around the site of interest, following roads, shorelines, or landmarks as needed.
      1. Click on an existing point and press “Delete” to remove points.
      2. Complete the polygon by placing the last point on top of the first point created.
      3. Click on a point to highlight it and drag to move its location.
      4. To add a point, click on the smaller, faded points located between two existing points.
   6. Once the polygon is completed, click “Save to project”. Rename the polygon using the two-letter site code designation.
   7. A list of polygons should appear on the lefthand side of the screen after the creation of the new polygon. If the list does not show, navigate to the correct project where the site polygon was saved.
   8. Right-click on the newly created site area polygon or click on the three vertical dots next to the polygon on the list. Select “Copy feature”. Right-click somewhere on the map view screen and select “Paste feature from clipboard”.
   9. Right-click on the newly created polygon and select “Edit”. Rename the polygon using the two-letter site code followed by a dash then the name of the section to be created. (i.e. TB-North). Make sure there are no spaces in the name. Change the outline color to help distinguish between the different polygons created.
   10. Move, remove, and add points as needed to create a border around the area of the site’s section. Make sure the final outside border still lines up with the original whole site area.
   11. For each additional section, copy and paste the original whole site area polygon, rename with the site code, dash, and section name, and modify points as necessary making sure edge points still line up with the original polygon and internal edges line up among sections. Zoom in and out as needed to prevent section overlap.
   12. Once all sections have been created, the polygons will be exported as a single file. Click on the vertical three dots at the top of the project list. Select “Export as KML file”.
   13. Navigate to the local location where the download was saved and check that the file name is the two-letter site code, an underscore, and “all” (i.e., “TB\_all”). If only one polygon was created, leave the file name as just the two-letter site code.
   14. Copy the KML file from the local download location to the “Reference files/KML/PreProcessing” folder if all sections are saved as one file or into the “Reference files/KML” folder if each section is its own file.
   15. Open the “HSM-and-mapping” R project in the main folder. After running the first chunk of the “1\_SetUp\_Folders” R code, run the second chunk to separate the polygons created or copy existing individual files as specified within the R code.

**FIGURES**

A screenshot of a computer

Description automatically generated with medium confidence

Figure . GoogleEarth Pro screen showing the creation of an area of interest with pop-up window showing shape name, color, and opacity setting.

A screenshot of a computer

Description automatically generated with medium confidence

Figure . GoogleEarth Pro screen showing the creation of sections within the area of interest with pop-up window showing shape name, color, and opacity setting.

A screenshot of a computer

Description automatically generated with medium confidence

Figure . GoogleEarth Pro screen showing all sections within the area of interest overlaying the whole area shape with all shape names listed in the Places window.