

Styling Vector Basemaps

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What is a Basemap?

A map that is designed to provide a *foundation* for one or more online maps.

What are Vector Tile Basemaps?

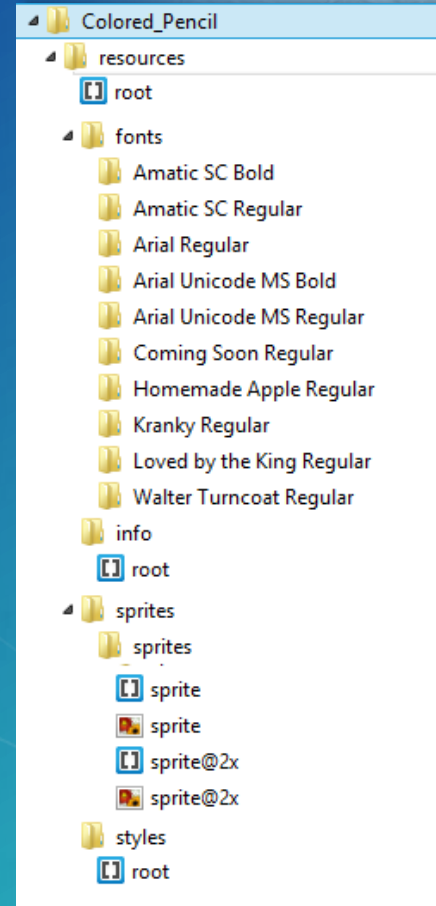
- Basemaps are cached and delivered as vector tiles (PBF format)
- Rendered client-side
- Based on resource files delivered with vector tiles

Fonts

Info (font list)

Sprites (patterns & symbols)

Styles (root.json)



Esri Vector Tile Basemaps

- The maps and data are prepared in ArcGIS Pro
- Can be viewed in ArcGIS Pro, but not ArcMap
- They display in most current web browsers



Esri Vector Tile Basemaps

... are available in some desktop and mobile apps, and we are increasing the number of those all the time.



Web

- ArcGIS Online
- JavaScript API Map Viewer
- Scene Viewer
- Web App Viewer
- Story Maps

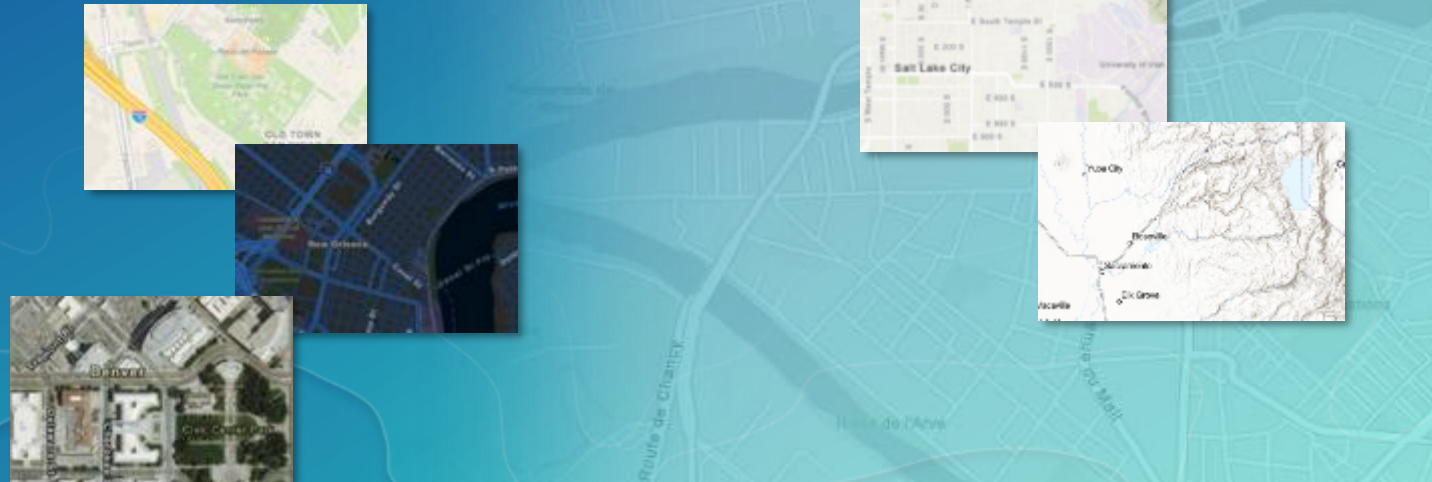


Runtime/Quartz Mobile Applications

- Explorer
- Collector

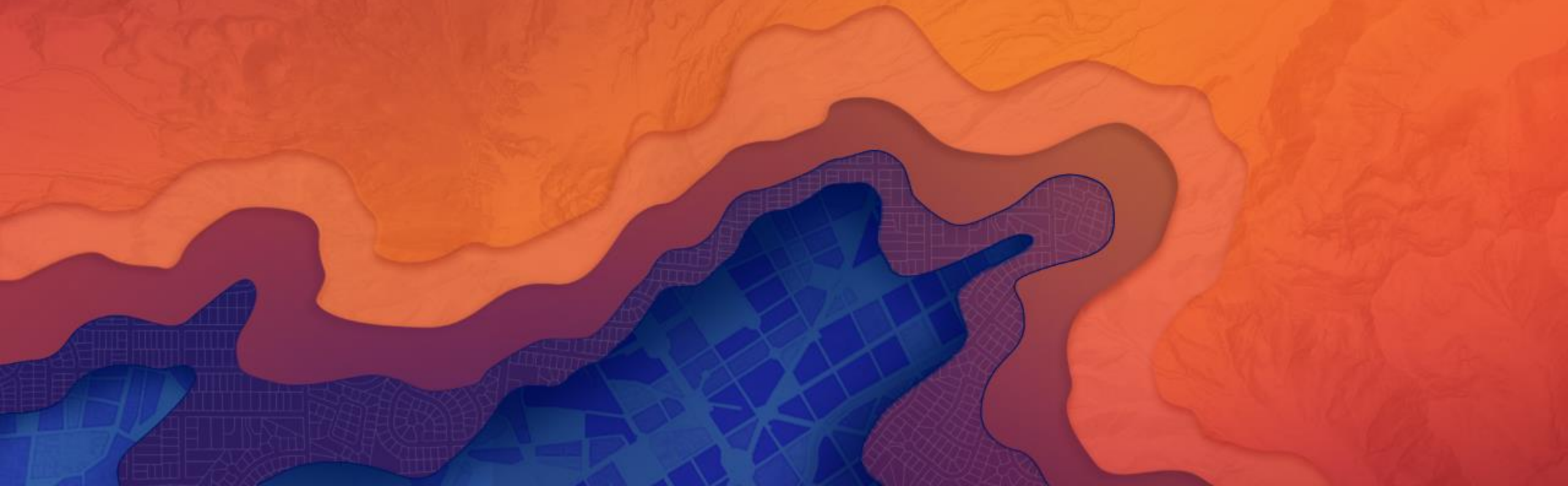
Esri Vector Tile Basemaps

- We provide a core set of pre-prepared map styles
- All built from one vector tile service
- Some are like existing Esri basemaps
- Others are new.



Customizing our Basemaps

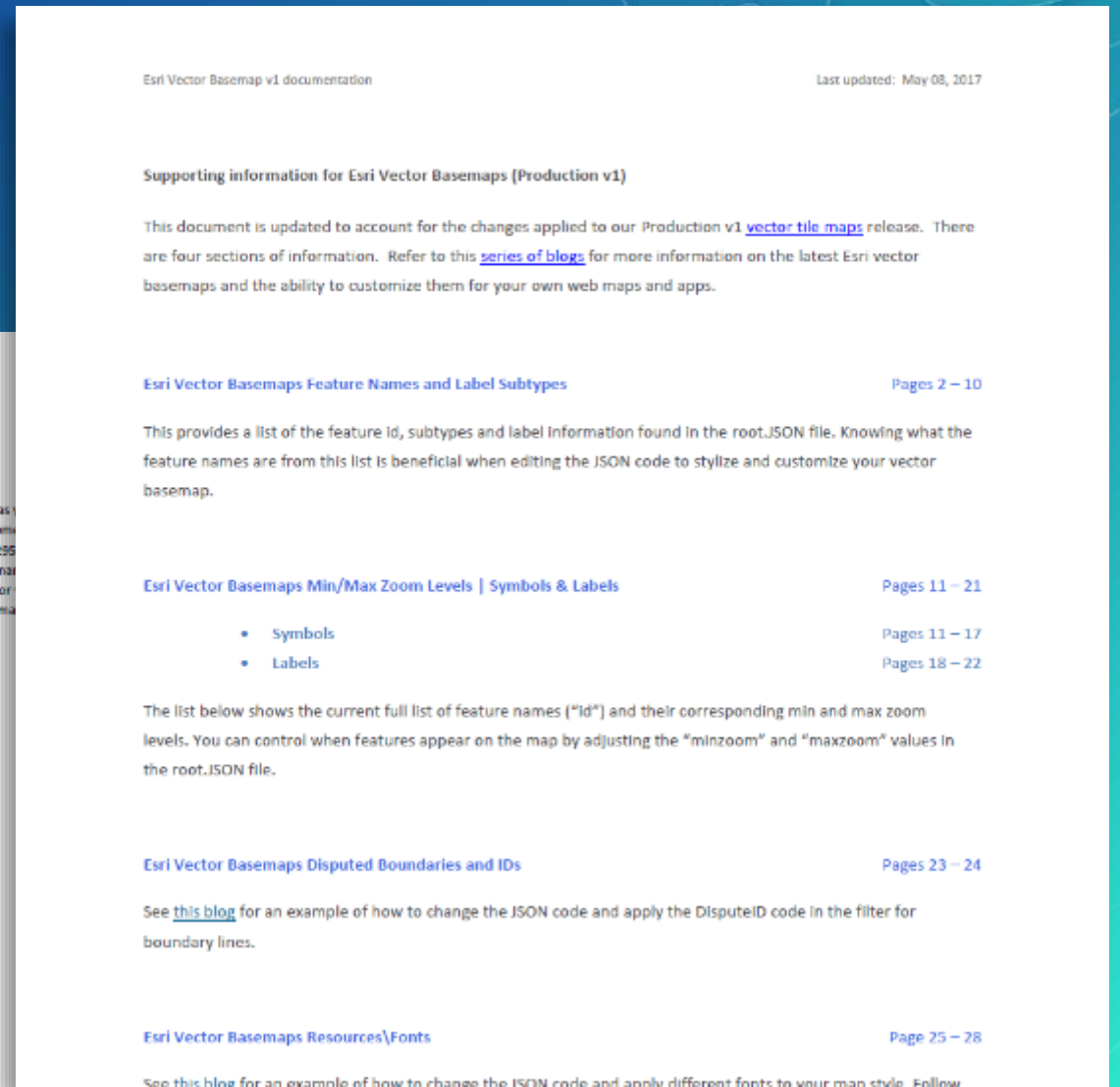
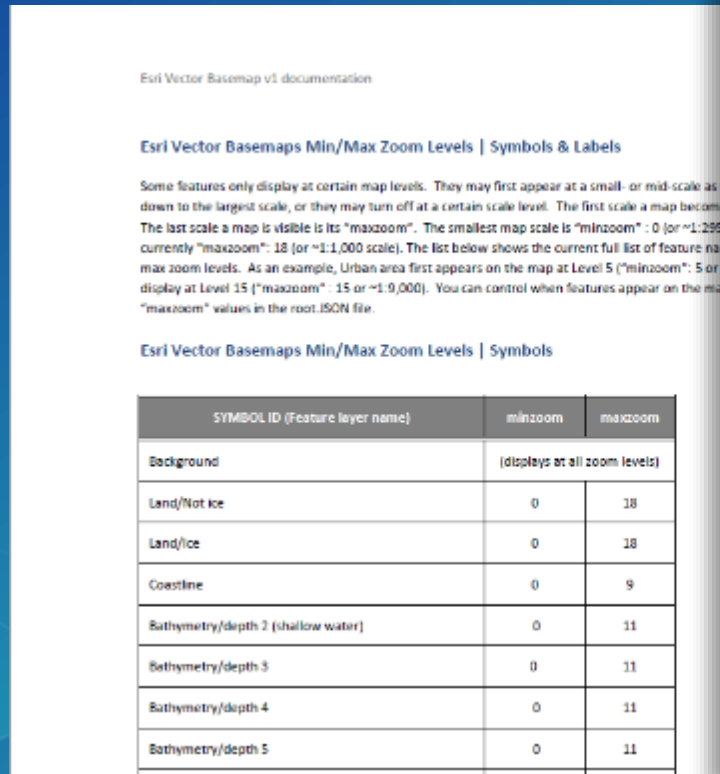
ANDY SKINNER



The Reference Document

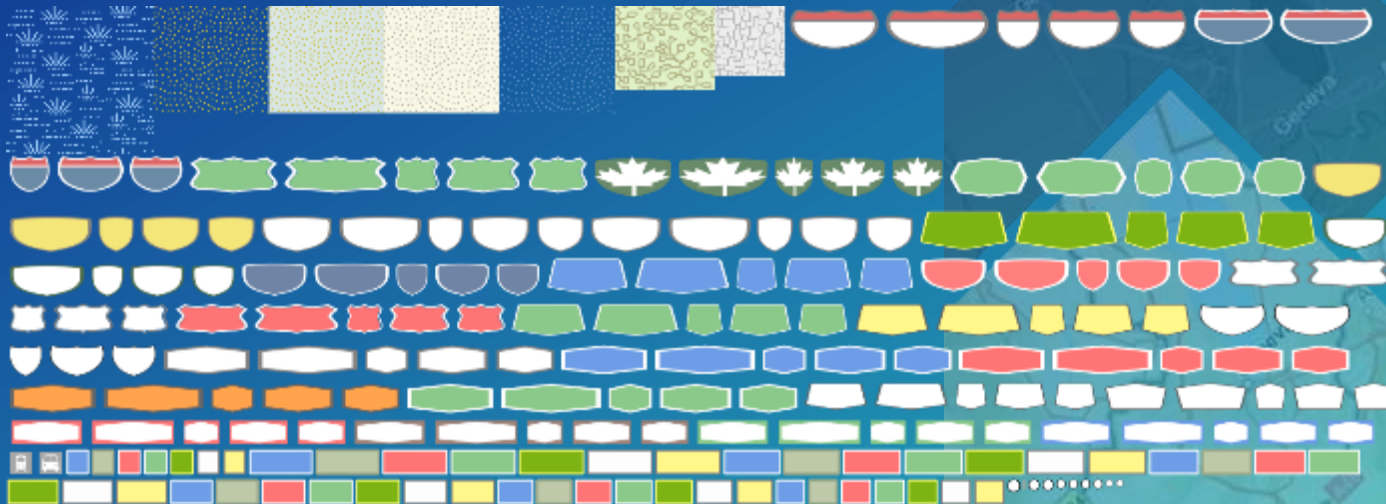
... is available as a pdf via the 'Details' page for your source basemap.

Any of the content listed here can be added to your map.



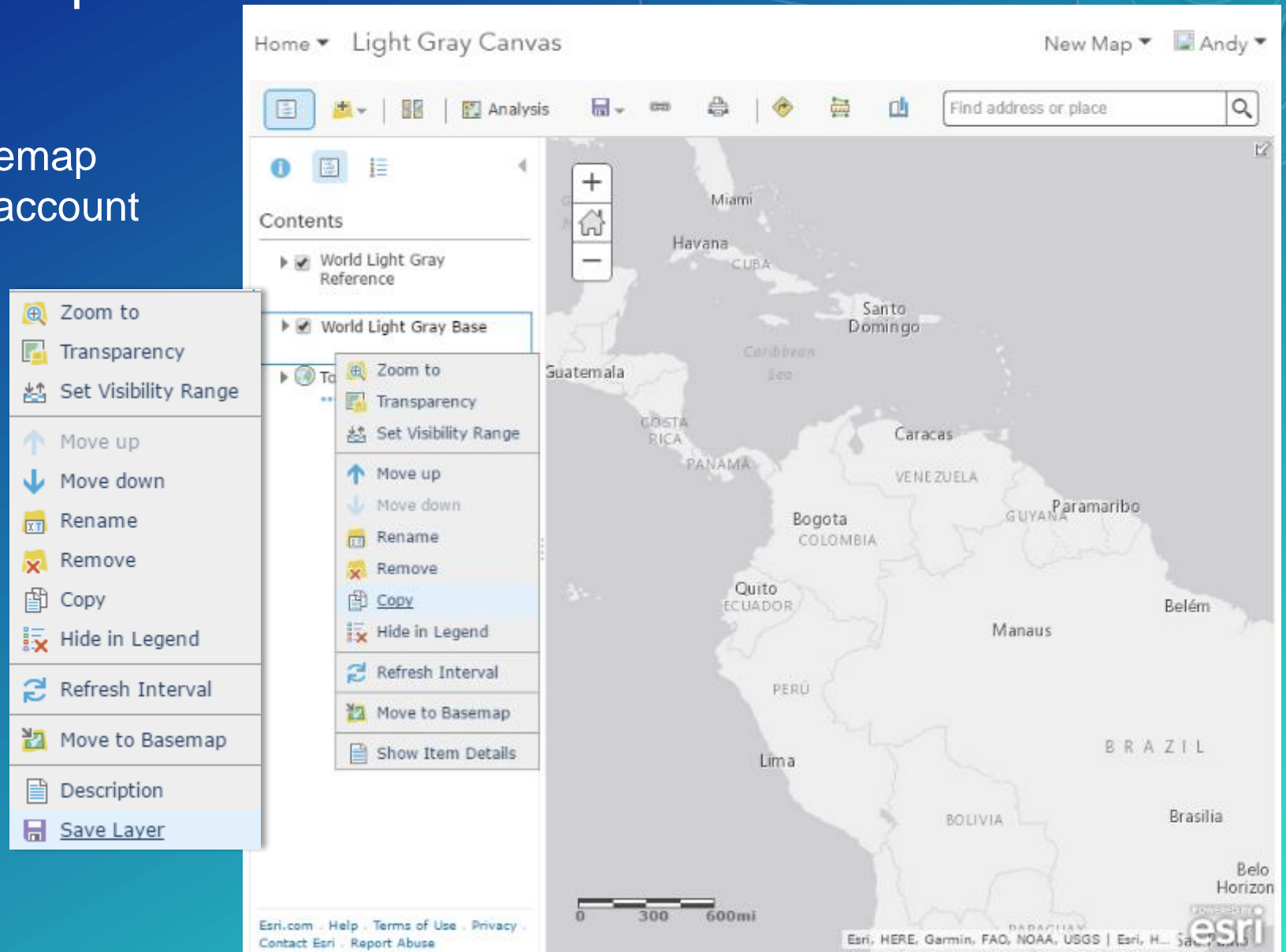
Preparing the basemap

- Choose your basemap
- Is the sprite symbolization going to work with your final result?



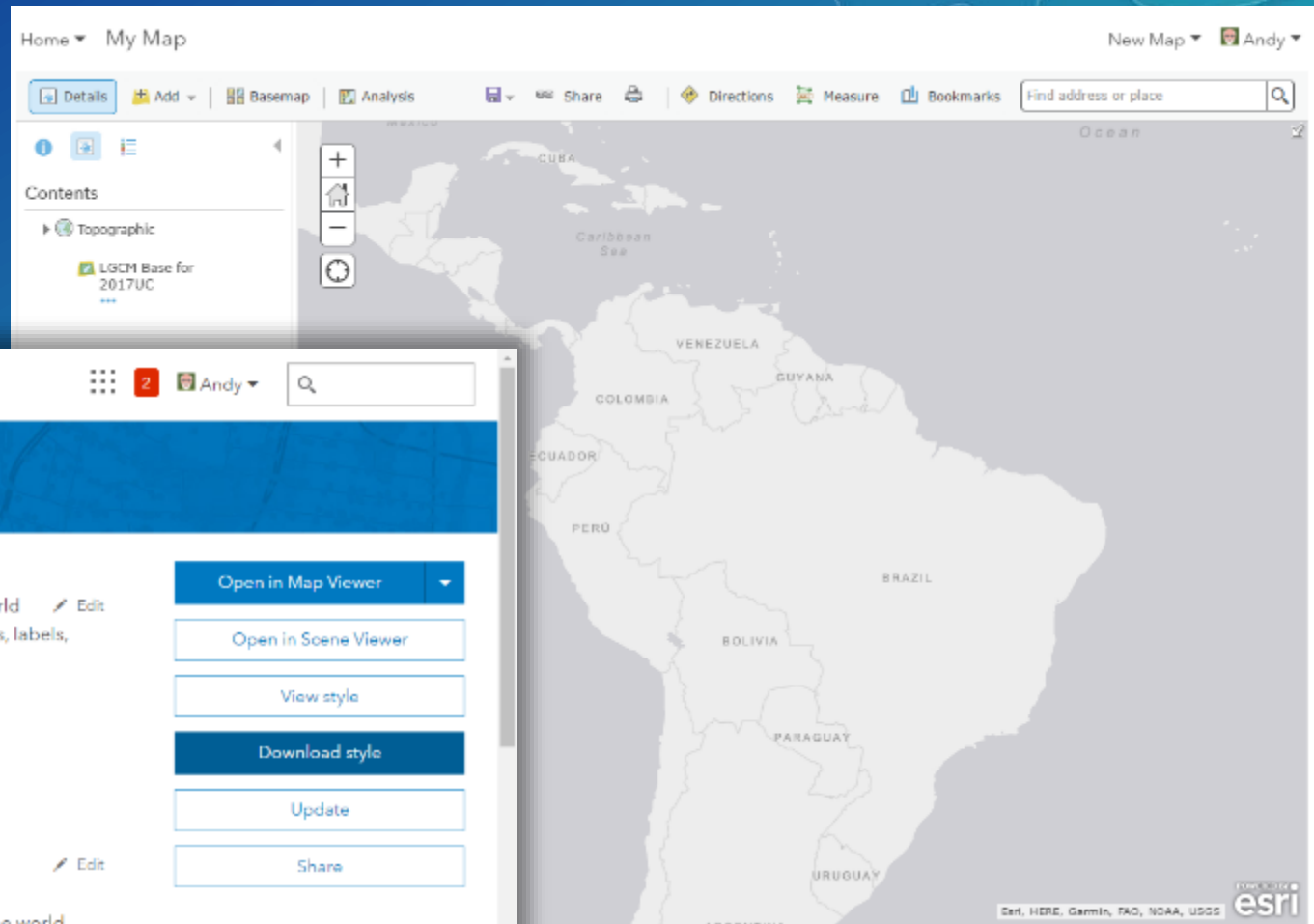
Preparing the basemap

- Make a copy of the basemap layer, and save to your account



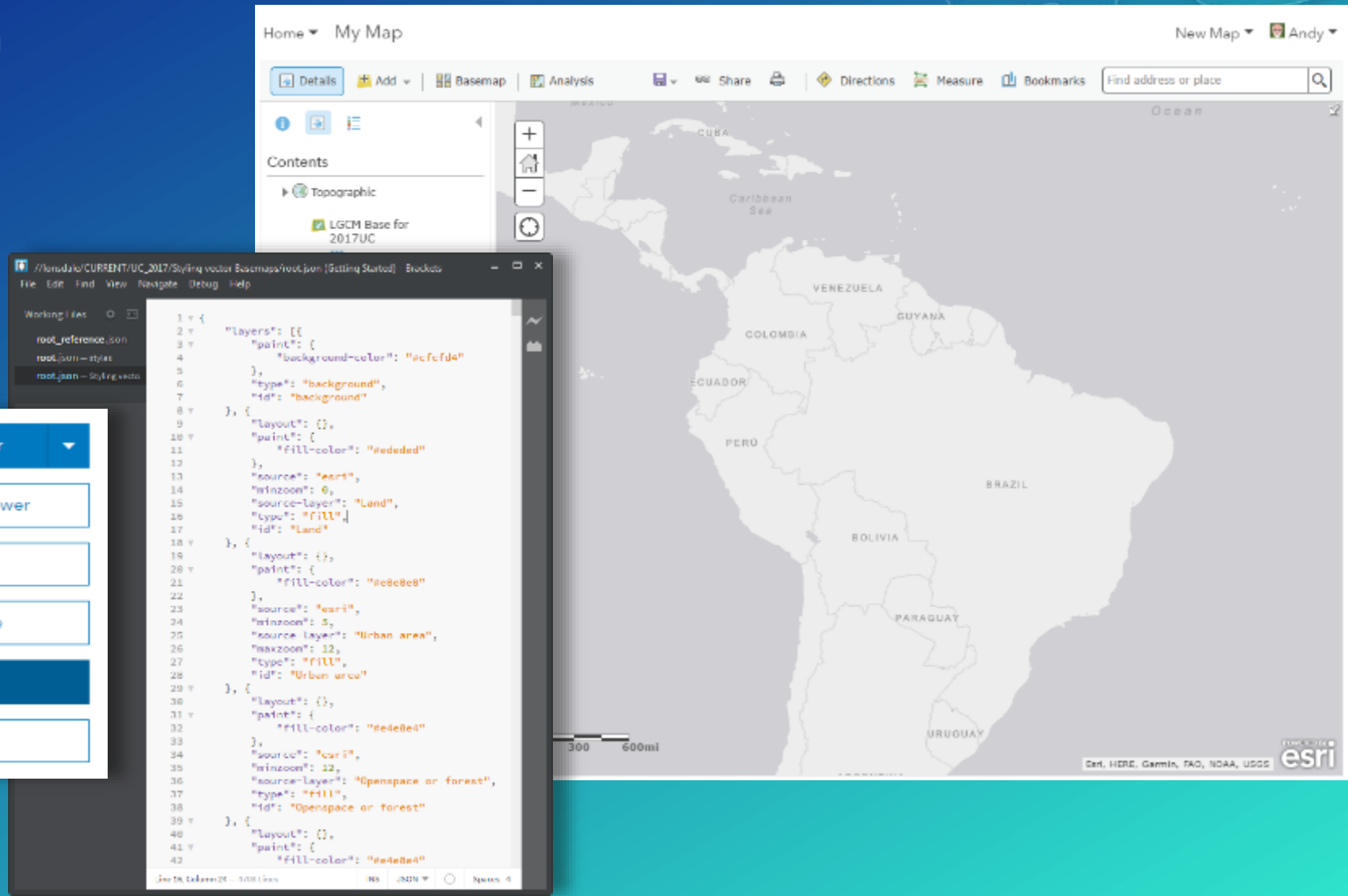
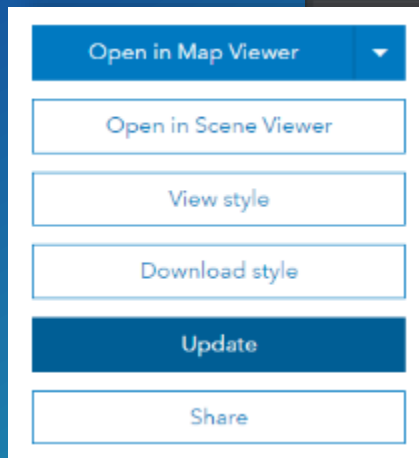
Preparing the basemap

- Make a copy of the basemap layer, and save to your account
- Download the style, and open it in an editor



Preparing the basemap

- Keep the layer open in a webmap
- Edit the json
- Update it on the 'Details' page
- Refresh the map



Editing Apps

<http://esri.github.io/arcgis-vectortile-style-editor/#>

The screenshot displays the ArcGIS VectorTile Style Editor interface. At the top, a green header bar contains buttons for "Sign Out", "Apply Style", "Undo", "Reset", "Save", and a help icon (?). A "Style Reference" link is visible on the right. The main area is split into two panels. The left panel shows a JSON configuration for map layers, with line numbers 1 through 35 on the left margin. The JSON defines three layers: a background layer with a light blue fill, a land layer with a light gray fill, and an urban area layer with a light red fill. The right panel shows a preview map titled "LGCM Base for 2012UC" with a search bar and zoom controls. The map displays a stylized view of Europe and Africa, with land areas in light gray and urban areas in light red. The Esri logo is in the bottom right corner.

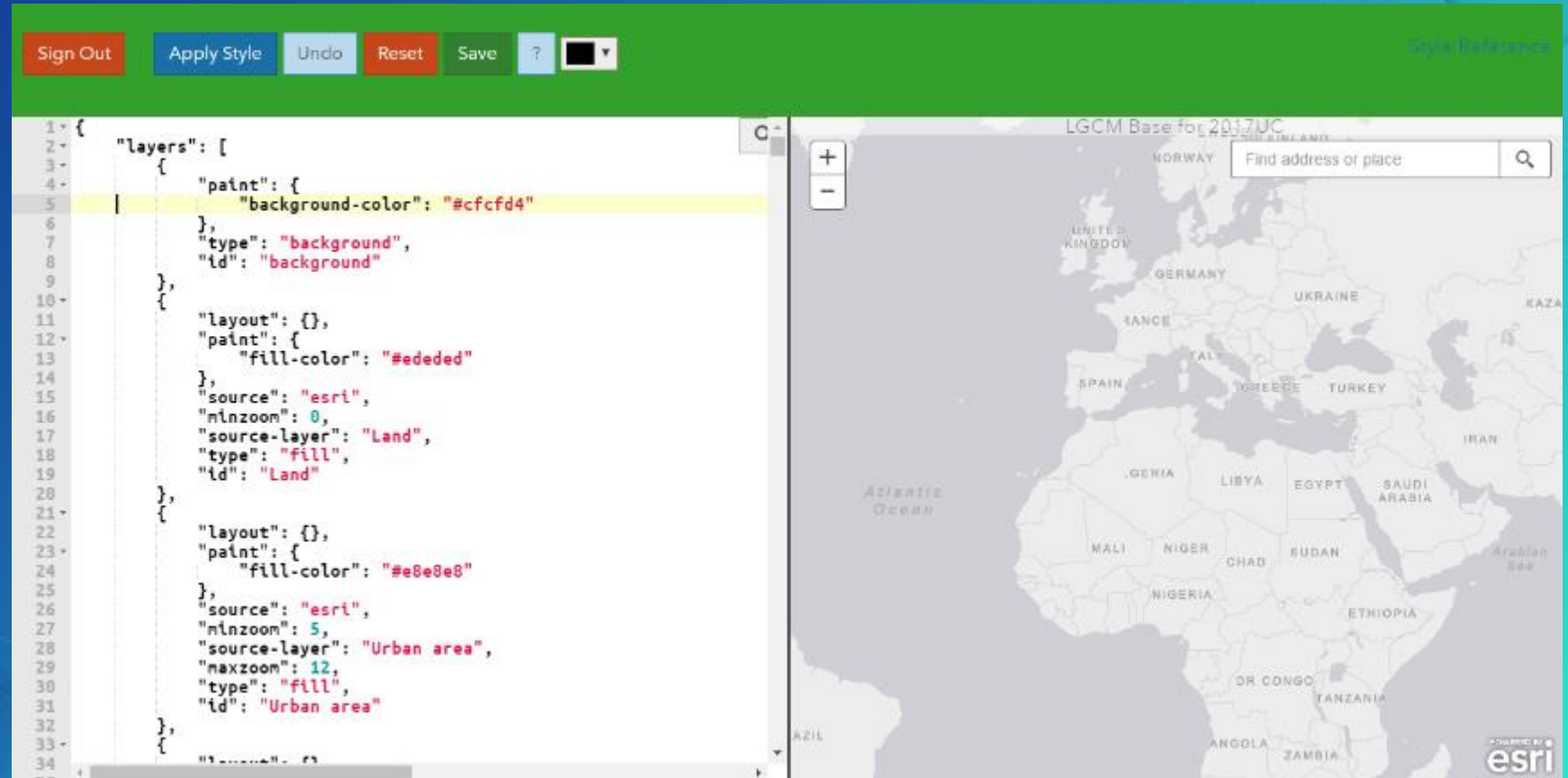
```
1- {
2-   "layers": [
3-     {
4-       "paint": {
5-         "background-color": "#cfcfd4"
6-       },
7-       "type": "background",
8-       "id": "background"
9-     },
10-    {
11-      "layout": {},
12-      "paint": {
13-        "fill-color": "#ededed"
14-      },
15-      "source": "esri",
16-      "minzoom": 0,
17-      "source-layer": "Land",
18-      "type": "fill",
19-      "id": "Land"
20-    },
21-    {
22-      "layout": {},
23-      "paint": {
24-        "fill-color": "#e8e8e8"
25-      },
26-      "source": "esri",
27-      "minzoom": 5,
28-      "source-layer": "Urban area",
29-      "maxzoom": 12,
30-      "type": "fill",
31-      "id": "Urban area"
32-    },
33-  ],
34-}
```

Simple json editor

Editing Apps

<http://esri.github.io/arcgis-vectortile-style-editor/#>

Make changes to the relevant code, apply them, and if they look OK, save them



GUI-based editor

Editing Apps

<https://maps.esri.com/jg/VectorBasemapStyleEditor/index.html>

Style controls can be accessed through the list on the right

The screenshot displays the 'Vector Basemap Style Editor' interface. On the left, a world map is shown with a search bar and zoom controls. On the right, a table lists various style controls for different map features. The table has columns for 'source-layer', 'id', 'zoom', 'type', 'fill', 'line color', 'icon', 'text', and 'circle'. The 'source-layer' column lists features like 'Admin0 forest or park', 'Admin0 point', 'Admin1 arealabel', and 'Admin1 forest or park'. The 'id' column shows specific IDs for each feature. The 'zoom' column has a slider to adjust the zoom level. The 'type' column indicates the feature type (fill, symbol, or text). The 'fill' column shows a color swatch. The 'line color' column shows a color swatch. The 'icon' column shows a small icon. The 'text' column shows a text label. The 'circle' column shows a small circle.

source-layer	id	zoom	type	fill	line color	icon	text	circle
Admin0 forest or park	Admin0 forest or park		fill	#E4				
Admin0 forest or park/labelDefault	Admin0 forest or park/labelDefault		symbol				#E6	
Admin0 point	Admin0 point/2x large		symbol				#EF	
Admin0 point	Admin0 point/medium		symbol				#EF	
Admin0 point	Admin0 point/large		symbol				#EF	
Admin0 point	Admin0 point/x large		symbol				#EF	
Admin0 point	Admin0 point/x small		symbol				#EF	
Admin0 point	Admin0 point/x small		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/2x large		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/medium		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/x small		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/small		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/large		symbol				#EF	
Admin1 arealabel	Admin1 arealabel/x large		symbol				#EF	
Admin1 forest or park	Admin1 forest or park		fill	#E4				
Admin1 forest or park/labelDefault	Admin1 forest or park/labelDefault		symbol				#E6	

Changing content

Deleting features:

```
1 {
2   "layers": [{
3     "paint": {
4       "background-color": "#cfcfd4"
5     },
6     "type": "background",
7     "id": "background"
8   }, {
9     "layout": {},
10    "paint": {
11      "fill-color": "#ededed"
12    },
13    "source": "esri",
14    "minzoom": 0,
15    "source-layer": "Land",
16    "type": "fill",
17    "id": "Land"
18  }, {
19    "layout": {},
20    "paint": {
21      "fill-color": "#e8e8e8"
22    },
23    "source": "esri",
24    "minzoom": 5,
25    "source-layer": "Urban area",
26    "maxzoom": 12,
27    "type": "fill",
28    "id": "Urban area"
29  }, {
30    "layout": {},
31    "paint": {
32      "fill-color": "#e4e8e4"
33    },
34    "source": "esri",
35    "minzoom": 12,
36    "source-layer": "Openspace or forest",
37    "type": "fill",
38    "id": "Openspace or forest"
39  }, {
```

```
1 {
2   "layers": [{
3     "paint": {
4       "background-color": "#cfcfd4"
5     },
6     "type": "background",
7     "id": "background"
8   }, {
9     "layout": {},
10    "paint": {
11      "fill-color": "#ededed"
12    },
13    "source": "esri",
14    "minzoom": 0,
15    "source-layer": "Land",
16    "type": "fill",
17    "id": "Land"
18  }, {
19    "layout": {
20      "visibility": "none"
21    },
22    "paint": {
23      "fill-color": "#e8e8e8"
24    },
25    "source": "esri",
26    "minzoom": 5,
27    "source-layer": "Urban area",
28    "maxzoom": 12,
29    "type": "fill",
30    "id": "Urban area"
31  }, {
```

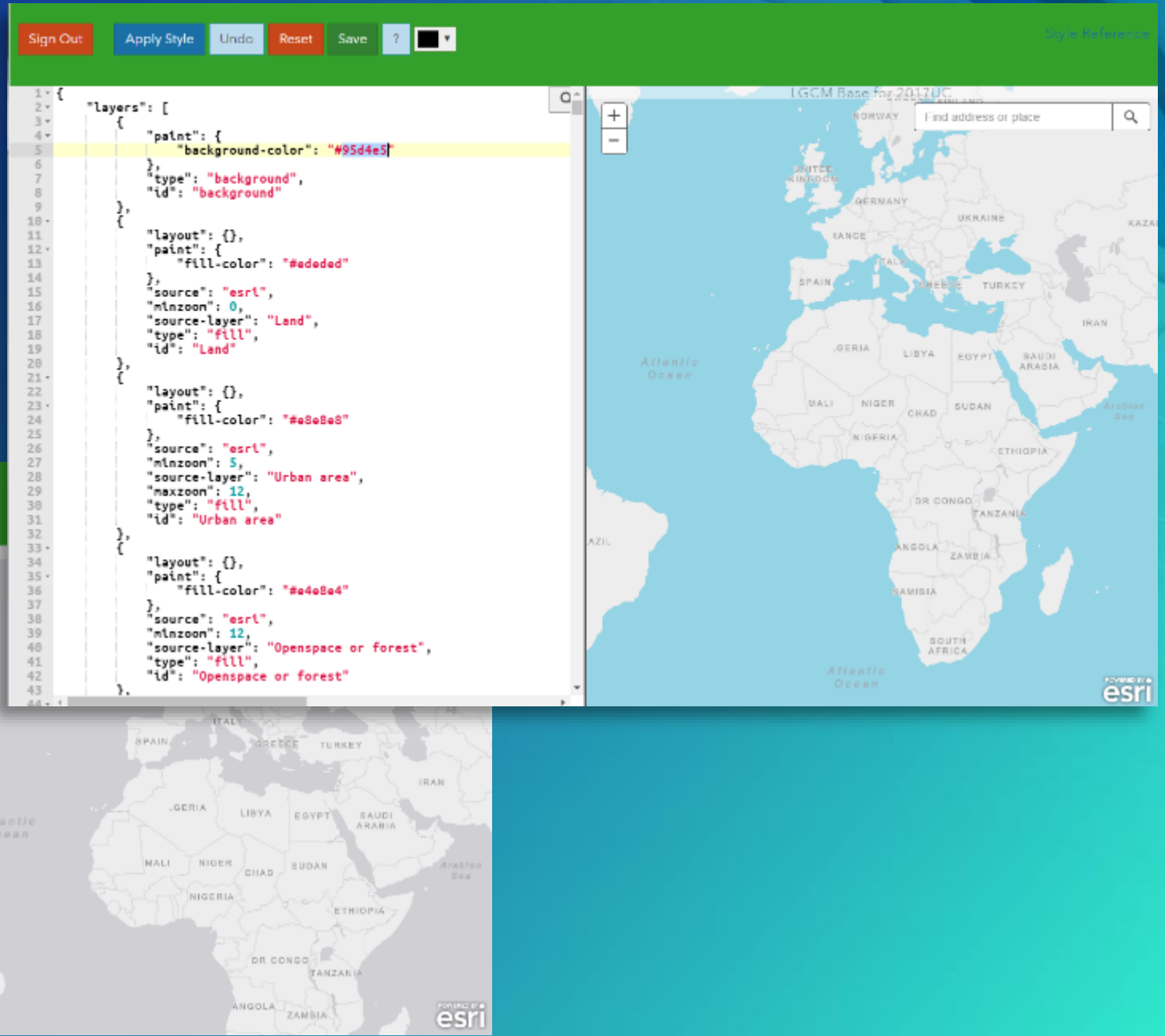
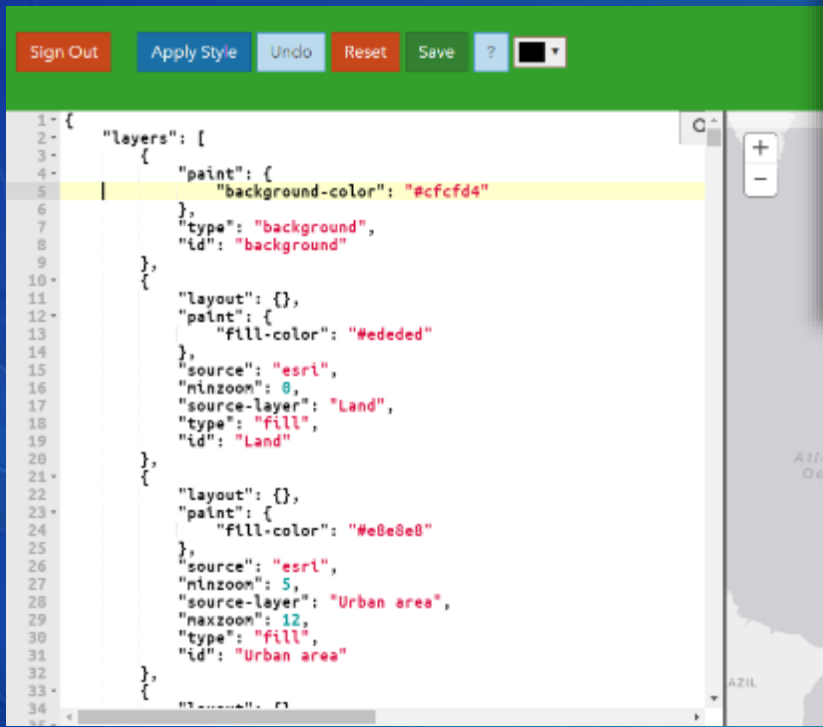
Adding features:

- Copy/paste a block of code into the json from one of our other basemaps ...
- or find the relevant layer in our reference document and construct a new block of code around it

Changing color

Code-based app

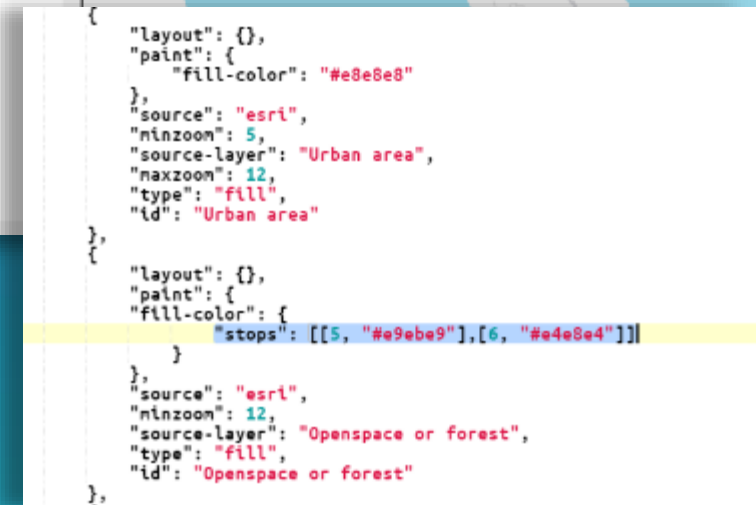
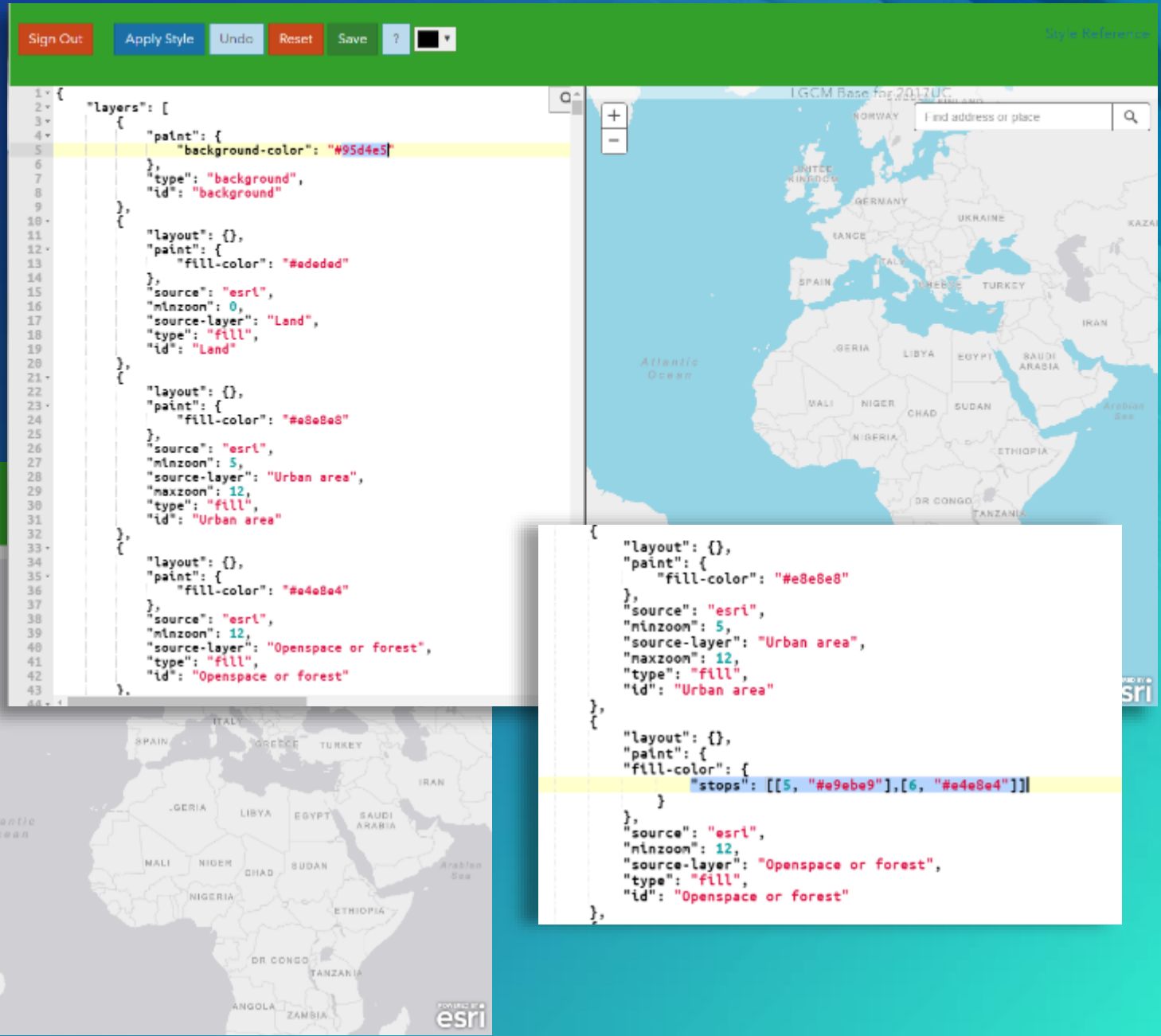
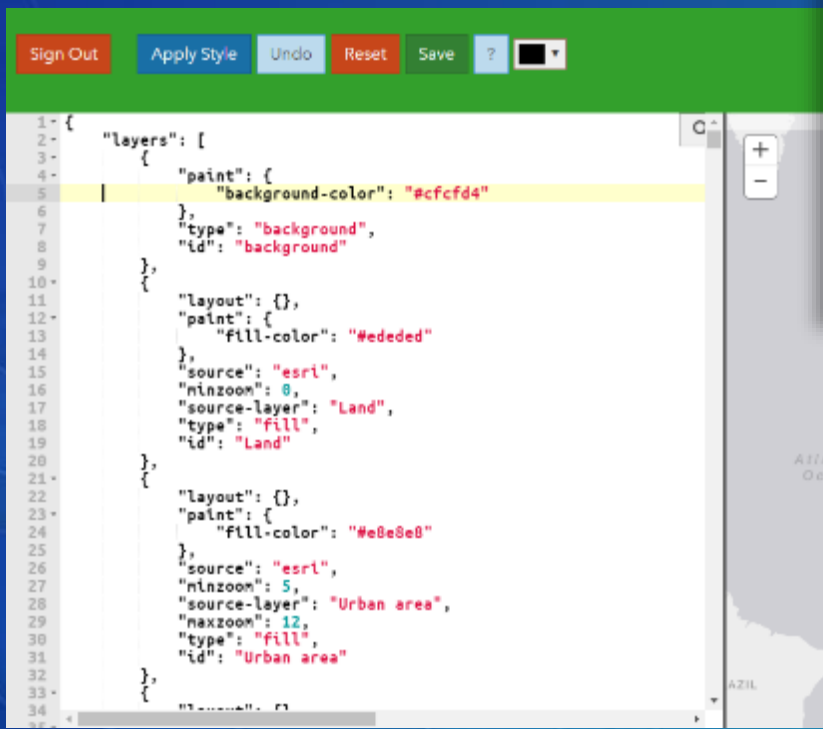
- Find the “paint” section in the relevant code
- Adjust the ‘hex’ value, and save



Changing color

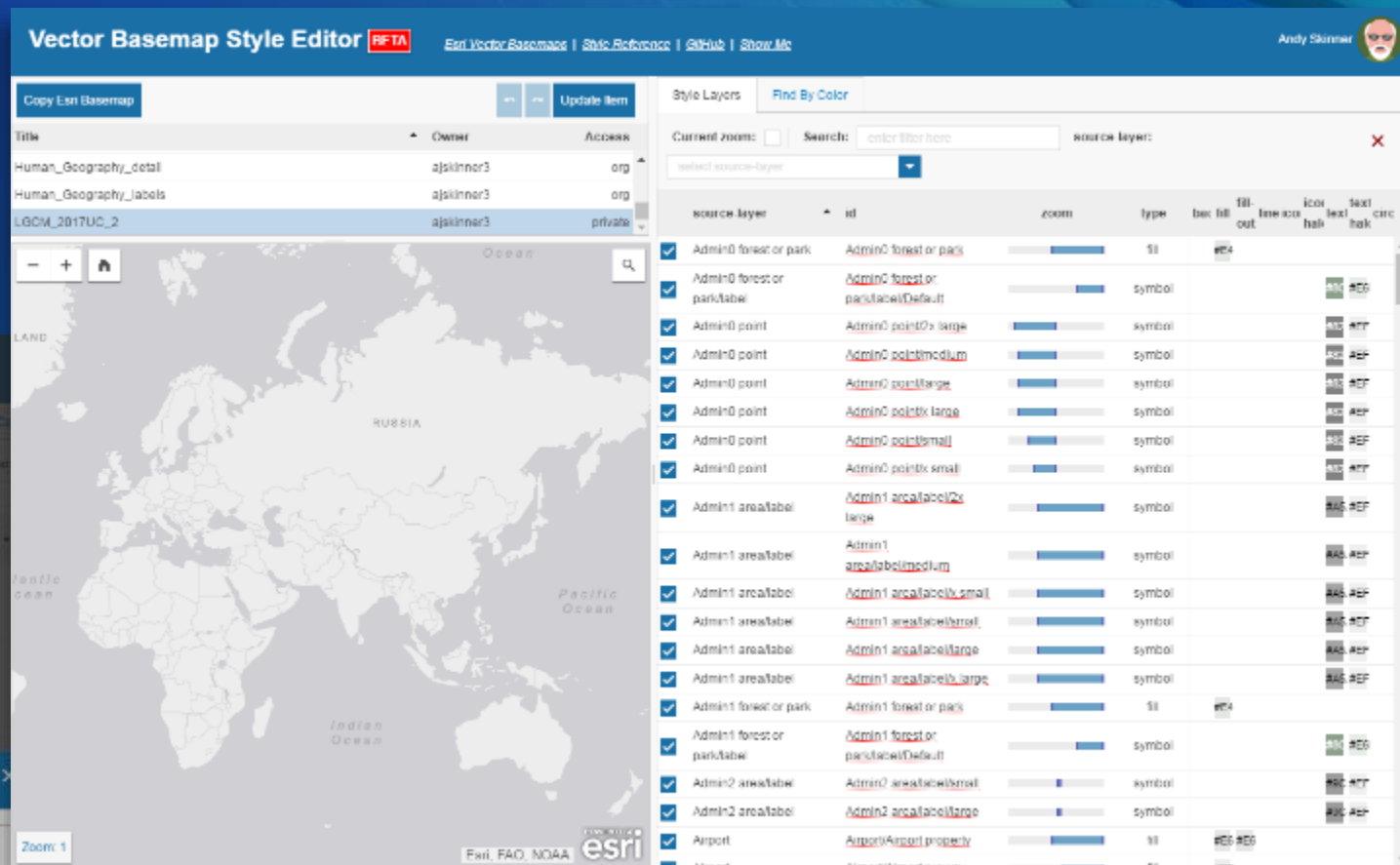
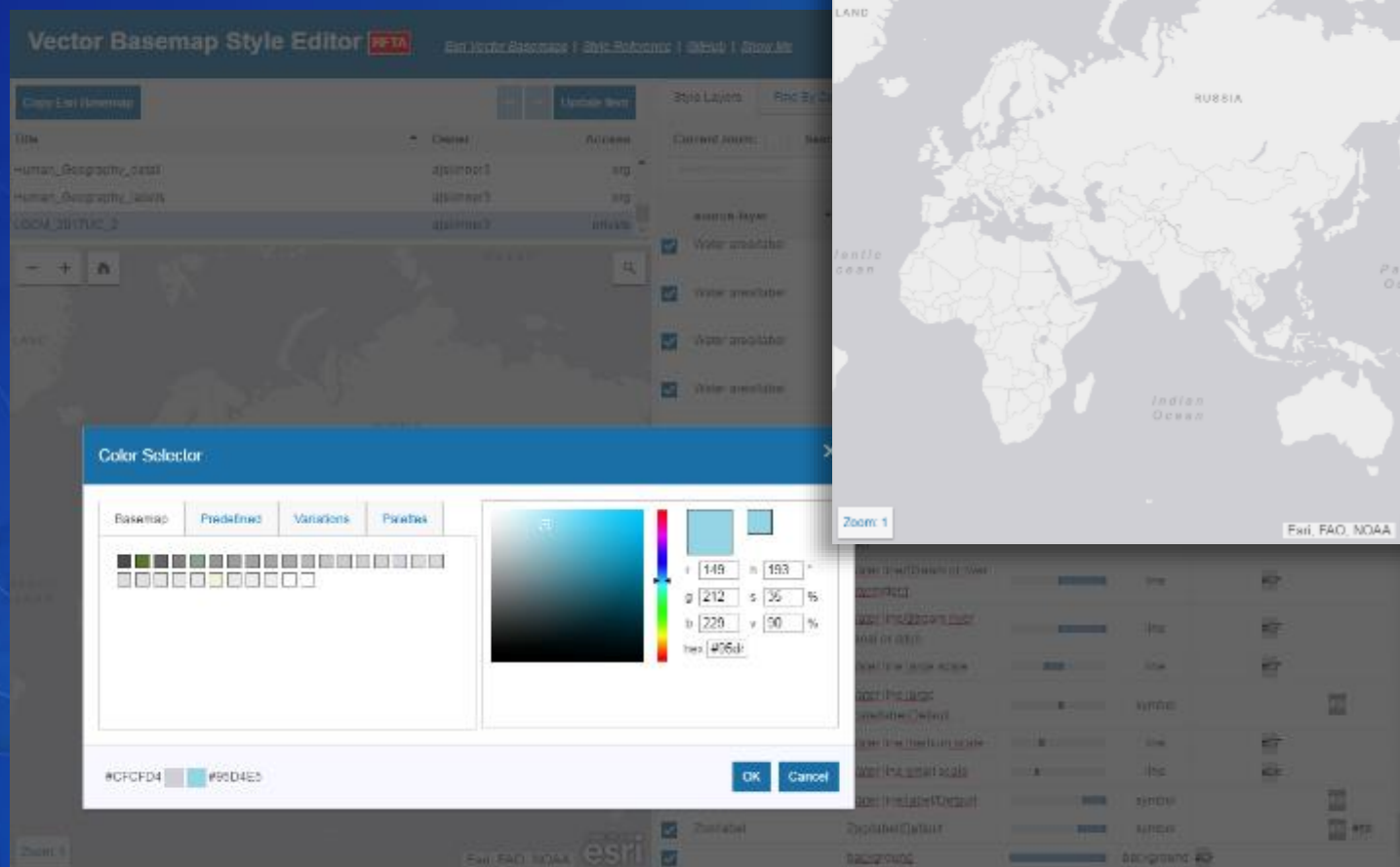
Code-based app

- Find the “paint” section in the relevant code
- Adjust the ‘hex’ value, and save



GUI-based app

- Click on the relevant color swatch



- Input as HEX, RGB or HSV

Changing stroke value

Code-based app

- Find the “line width” section in the relevant code

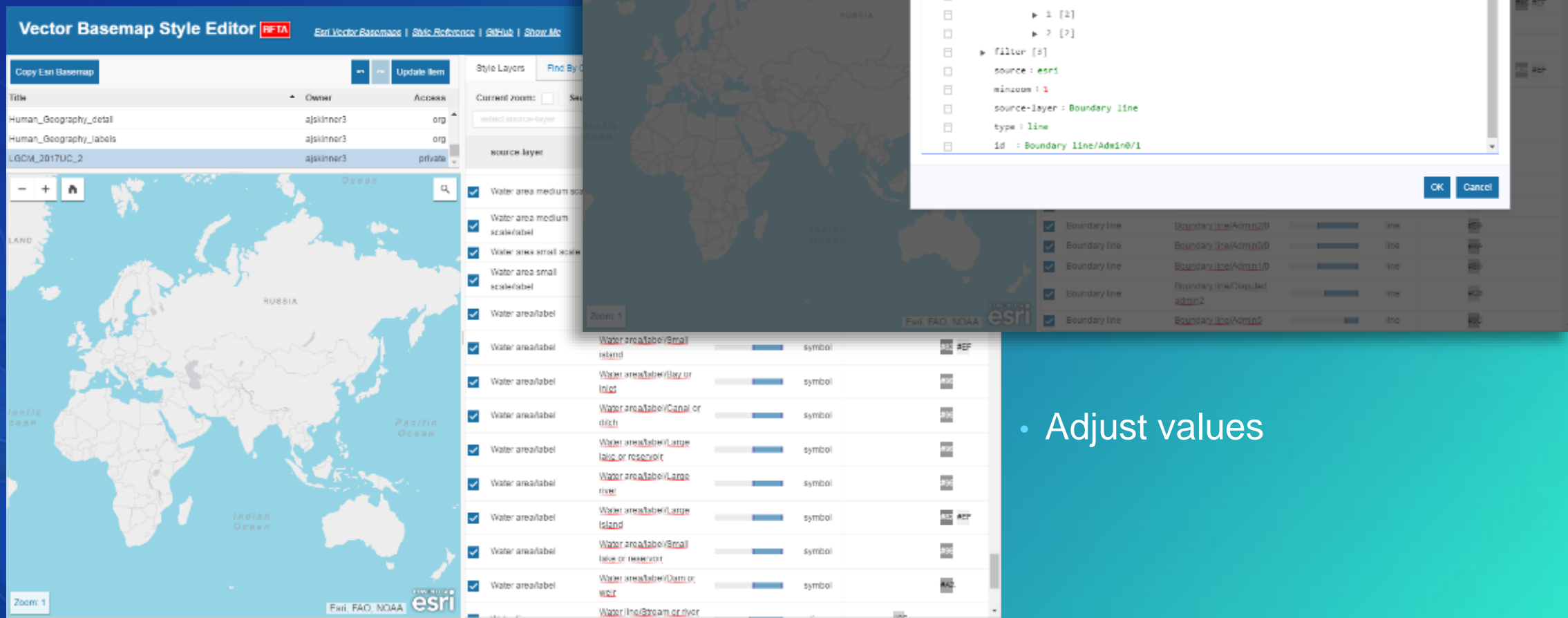
```
896 "line-cap": "round",
897 "line-join": "round"
898 },
899 "paint": {
900 "line-color": "#d4d4d4",
901 "line-width": {
902 "base": 1.2,
903 "stops": [
904 [
905 1,
906 0.665
907 ],
908 [
909 14,
910 9.33
911 ],
912 [
913 17,
914 9.33
915 ]
916 ]
917 },
918 },
919 "filter": [
920 "==",
921 "_symbol",
922 0
923 ],
924 "source": "esri",
925 "minzoom": 1,
926 "source-layer": "Boundary line",
927 "type": "line",
928 "id": "Boundary line/Admin0/1"
929 },
930 {
931 "layout": {
932 "line-join": "round"
933 },
934 "paint": {
935 "line-color": "#b9b9b9",
936
```

```
896 "line-cap": "round",
897 "line-join": "round"
898 },
899 "paint": {
900 "line-color": "#d4d4d4",
901 "line-width": {
902 "base": 1.2,
903 "stops": [
904 [
905 1,
906 2
907 ],
908 [
909 14,
910 9.33
911 ],
912 [
913 17,
914 9.33
915 ]
916 ]
917 },
918 },
919 "filter": [
920 "==",
921 "_symbol",
922 0
923 ],
924 "source": "esri",
925 "minzoom": 1,
926 "source-layer": "Boundary line",
927 "type": "line",
928 "id": "Boundary line/Admin0/1"
929 },
930 {
931 "layout": {
932 "line-join": "round"
933 },
934 "paint": {
935 "line-color": "#b9b9b9",
936
```

- Adjust the relevant stroke value, or values

GUI-based app

- Click on the layer name to reveal the json code



Changing fonts

Both apps

- Find the “line width” section in the relevant code

```
6674 {
6675   "layout": {
6676     "text-letter-spacing": 0.2,
6677     "symbol-avoid-edges": true,
6678     "text-allow-overlap": false,
6679     "text-padding": 1,
6680     "text-font": [
6681       "Redressed Regular"
6682     ],
6683     "text-size": {
6684       "stops": [
6685         [3,15], [5,14], [8,20]
6686       ]
6687     },
6688     "text-field": "{_name}",
6689     "text-transform": "uppercase",
6690     "text-max-width": 8
6691   },
6692   "point": {
6693     "text-color": "#ff0000",
6694     "text-halo-width": 0.93,
6695     "text-halo-color": "#efefef"
6696   },
6697   "filter": [
6698     "=="
6699     "label_class",
6700     2
6701   ],
6702   "source": "esri",
6703   "minzoom": 2,
6704   "source-layer": "Admin0 point",
6705   "maxzoom": 10,
6706   "type": "symbol",
6707   "id": "Admin0 point/large"
6708 },
6709 {
6710 }
```

The screenshot shows the Vector Basemap Style Editor interface. At the top, there's a header with the title 'Vector Basemap Style Editor' and the user's name 'Andy Skinner'. Below the header is a table of style layers with columns for Title, Owner, and Access. The table lists several layers, including 'DGCMBase_forRoadsLessTraveled', 'Dark Gray Canvas - Condensed Code', 'Dark Green Canvas - Imagery Blend', 'Human Geography Basemap Dark Gray', and 'Human Geography Basemap Dark Gray Detail'. A map of Europe is displayed in the center, showing various countries and cities. On the right side, there's a 'Style Layers' panel with a search bar and a list of layers. An 'Edit Style Layer Property' dialog is open for the 'Admin0 point/large' layer, showing a 'text-font' property set to 'Redressed Regular'.

- Adjust the relevant stroke value, or values

Available Fonts for use
with Esri Vector Basemaps

Arial

Avenir Next

Oswald

Just Another Hand

Belleza

Cabin Sketch

Noto Sans
Noto Serif

Ubuntu

Palatino Linotype

Special Elite

Ubuntu Condensed

Ubuntu Mono

SYNCOPE

Redressed

Josefin Slab

Playfair Display

PLAYFAIR DISPLAY SC

Available Fonts for use with Esri Vector Basemaps

Arial

Avenir Next

Oswald

Just Another Hand

Belleza

Cabin Sketch

Ubuntu
Ubuntu Condensed
Ubuntu Mono

Palatino Linotype

syn

Redressed

Josefin Slab

Esri Vector Basemaps Resources\Fonts

For each of the [Esri Vector Basemap Tile Layers](#) updated on May 3, 2017, there is a corresponding set of fonts available to use with the layers. Here is a list of 64 fonts currently in the fonts resources directory.

Open source fonts: http://scripts.sil.org/cms/scripts/page.php?site_id=ori&id=OFL

The root.json style file already applies the fonts for how the map features will display. These are the current fonts possible for display in the Esri Vector Basemaps. The exact name (spaces and all) must be used when changing fonts.

Arial Bold	Josefin Slab Regular	Playfair Display Regular
Arial Bold Italic	Josefin Slab SemiBold	Playfair Display SC Bold
Arial Italic	Josefin Slab SemiBold Italic	Playfair Display SC Regular
Arial Regular	Josefin Slab Thin	Redressed Regular
Arial Unicode MS Bold	Josefin Slab Thin Italic	Special Elite Regular
Arial Unicode MS Regular	Just Another Hand Regular	Syncopate Bold
AvenirNext LT Pro Light Italic	Noto Sans Bold	Syncopate Regular
AvenirNext LT Pro Light Regular	Noto Sans Bold Italic	Ubuntu Bold
AvenirNext LT Pro Medium Bold	Noto Sans Italic	Ubuntu Bold Italic
AvenirNext LT Pro Medium Bold Italic	Noto Sans Regular	Ubuntu Condensed Regular
AvenirNext LT Pro Regular Bold	Noto Serif Bold	Ubuntu Italic
AvenirNext LT Pro Regular Bold Italic	Noto Serif Bold Italic	Ubuntu Light Bold
AvenirNext LT Pro Regular Italic	Noto Serif Italic	Ubuntu Light Bold Italic
AvenirNext LT Pro Regular Regular	Noto Serif Regular	Ubuntu Light Italic
Belleza Regular	Oswald Bold	Ubuntu Light Regular
Cabin Sketch Regular	Oswald Light	Ubuntu Mono Bold
CabinSketch Bold	Oswald Regular	Ubuntu Mono Bold Italic
Josefin Slab Bold	Palatino Linotype Regular	Ubuntu Mono Italic
Josefin Slab Bold Italic	Playfair Display Black Regular	Ubuntu Mono Regular
Josefin Slab Italic	Playfair Display Bold	Ubuntu Regular
Josefin Slab Light	Playfair Display Bold Italic	
Josefin Slab Light Italic	Playfair Display Italic	



Styling in Pro

Vector Tile Packages

Vector Tile Package Customizations

- Vector Tile Package
 - Fonts
 - Sprites
 - Your own data
 - Pro / json
- Children's Map example
 - <http://www.arcgis.com/home/webmap/viewer.html?webmap=802841aae4dd45778801cd1d375795b9>
- Demo
 - Stylize
 - Examine Resources
 - Push to Online

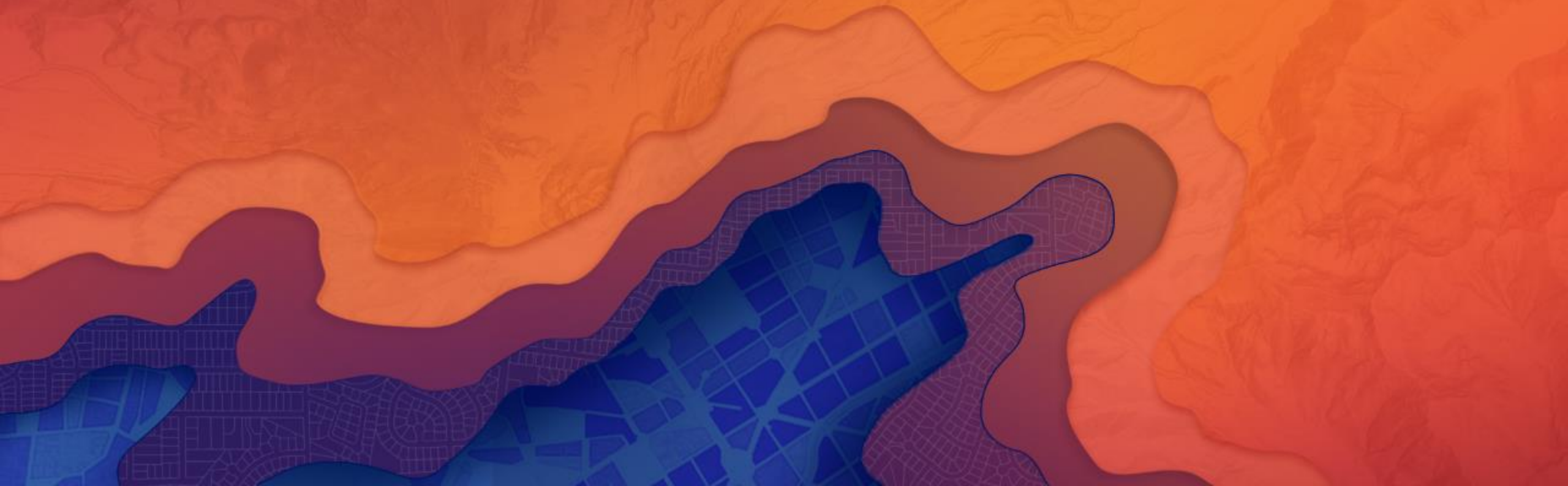
Extras

Things we didn't cover but are still really interesting

- Languages
- Disputed Boundaries
- Rotation
- Projections
- Raster components

Summing Up

ANDY SKINNER

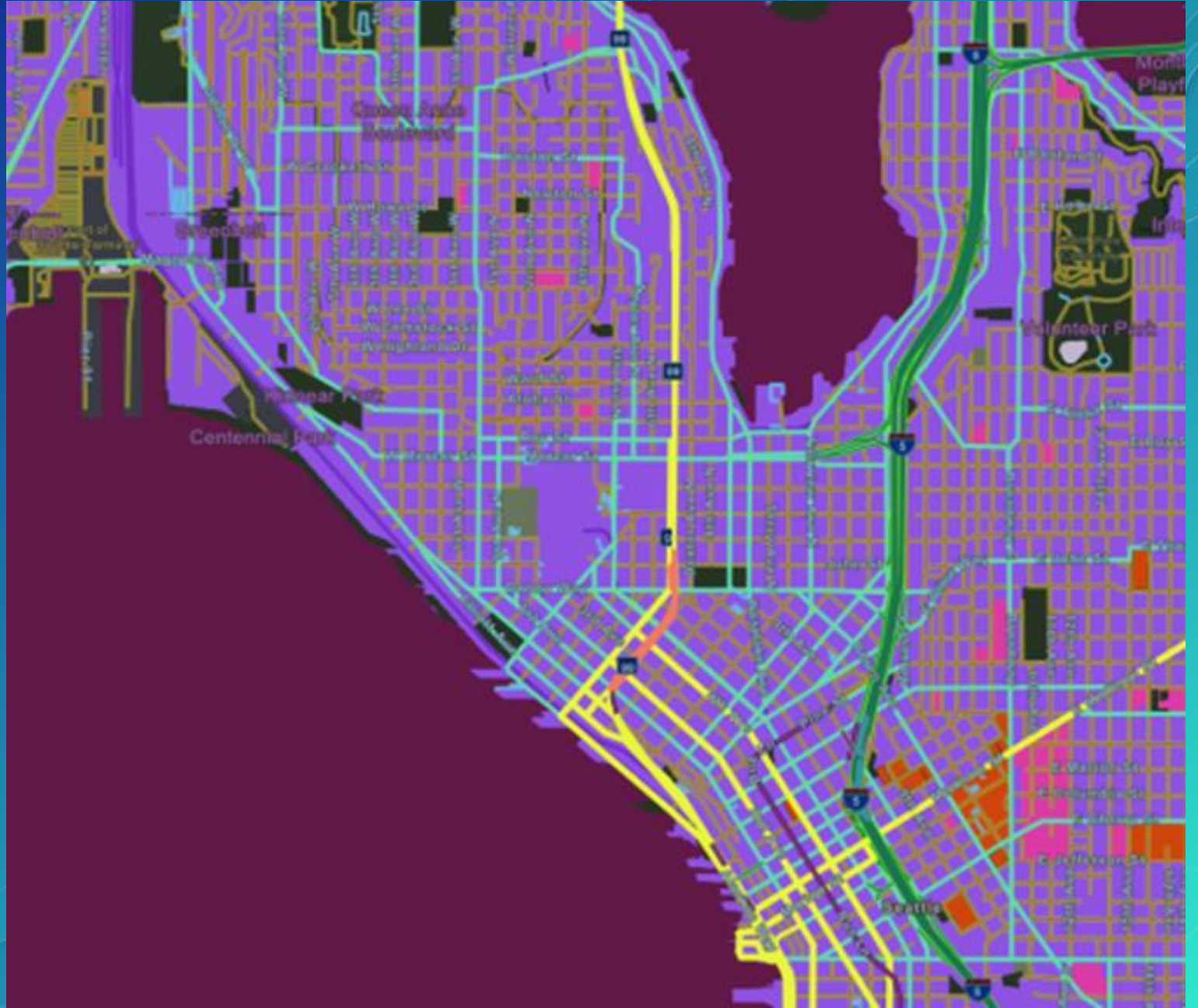


Power!

Use it Wisely ...

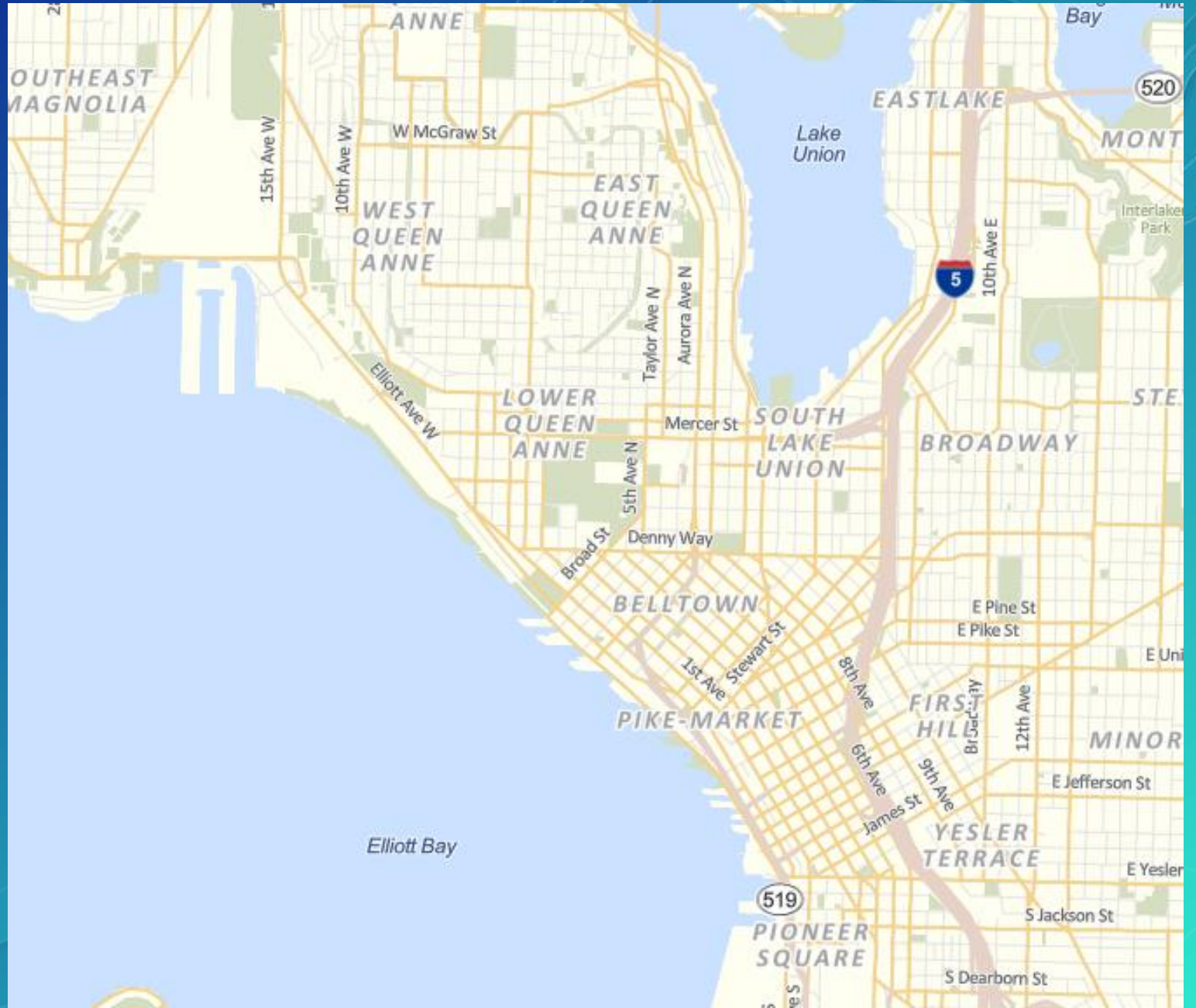
Power!

Use it Wisely ...



Power!

Use it Wisely ...



Links

[ArcGIS.com 'Vector Basemaps'](#)

All of our core set of Vector Tile Basemaps

[ArcGIS.com 'Sample Vector Tile Layers'](#)

Our experiments with using some of the techniques discussed here

[JSON Map Editor](#)

The simple vector tile editor with JSON code alongside a preview map

['GUI'-style Map Editor](#)

The vector tile editor that itemizes by layer

[JSON Lint](#)

A useful (and free) online tool for reformatting JSON files and validating the final result



esri

THE
SCIENCE
OF
WHERE