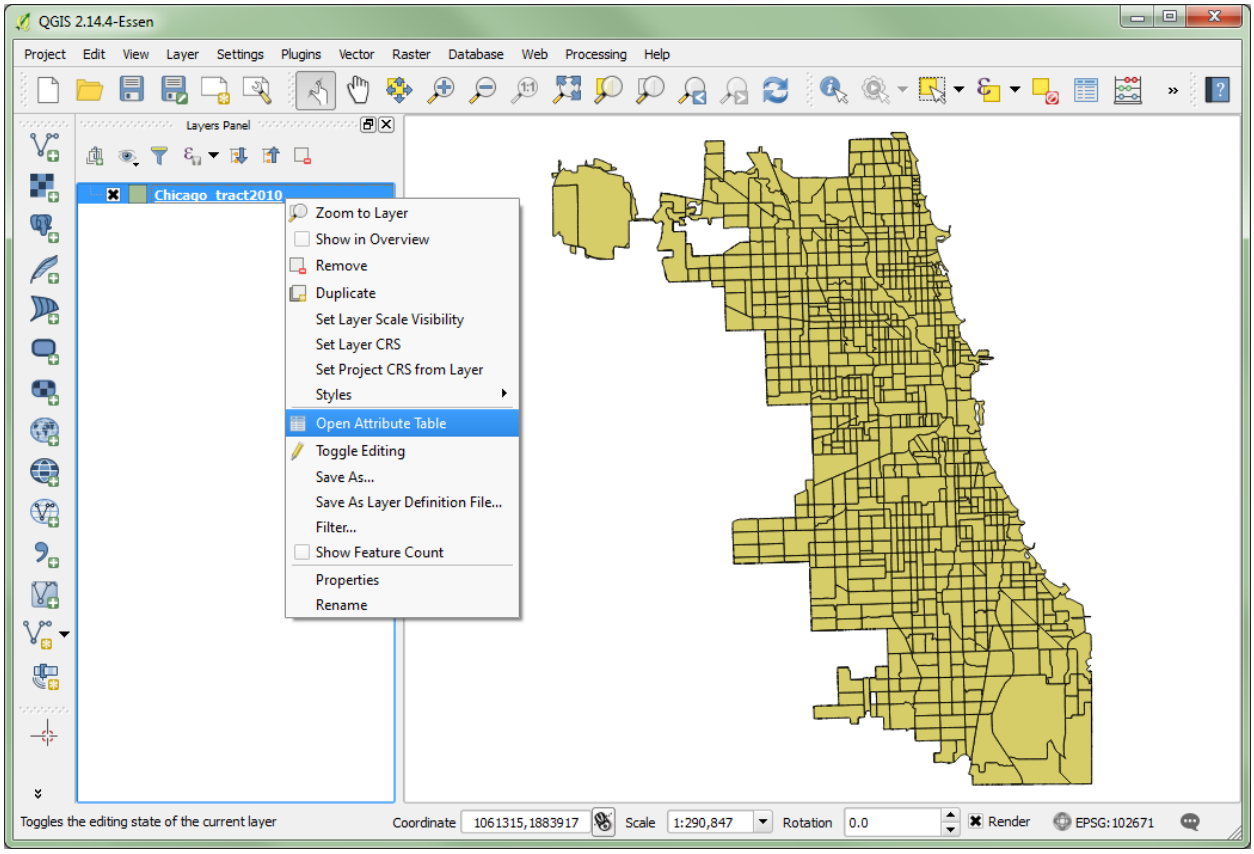
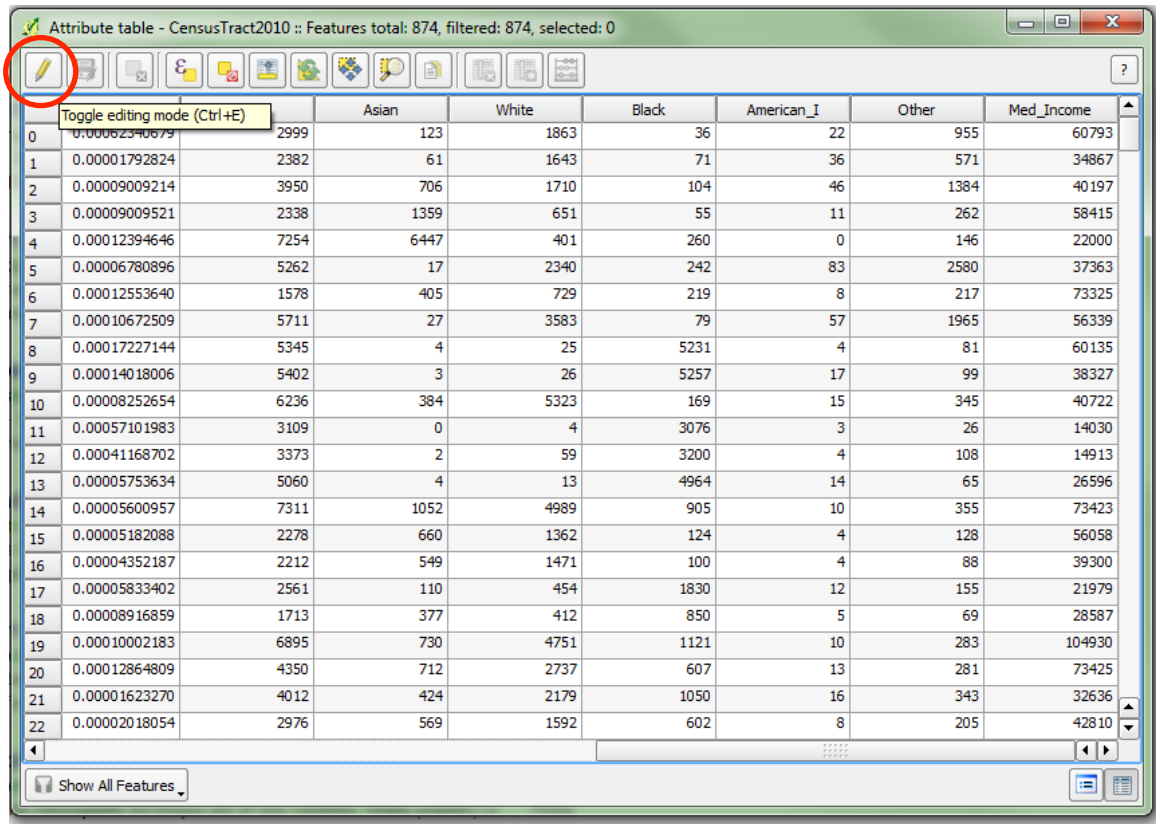
Use QGIS Field Calculator: Calculate Polygon Area

- Open **QGIS Desktop** and **Add the Vector Layer**
- In the Layers Panel, right-click on the layer and select **Open Attribute Table**.

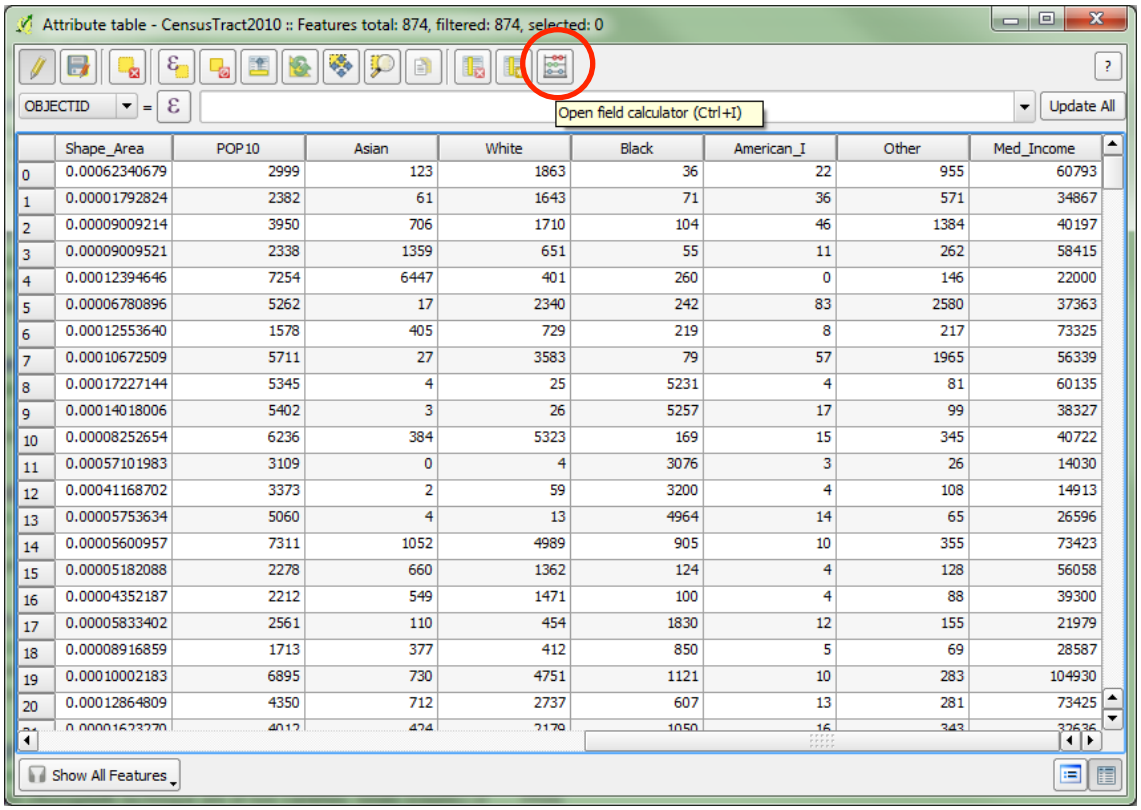


- In the Attribute Table dialog window, click on the **Toggle editing mode** button  (see image below). The editing mode will allow you to make changes to the attribute table, such as *creating a new column* or *deleting an existing column.*

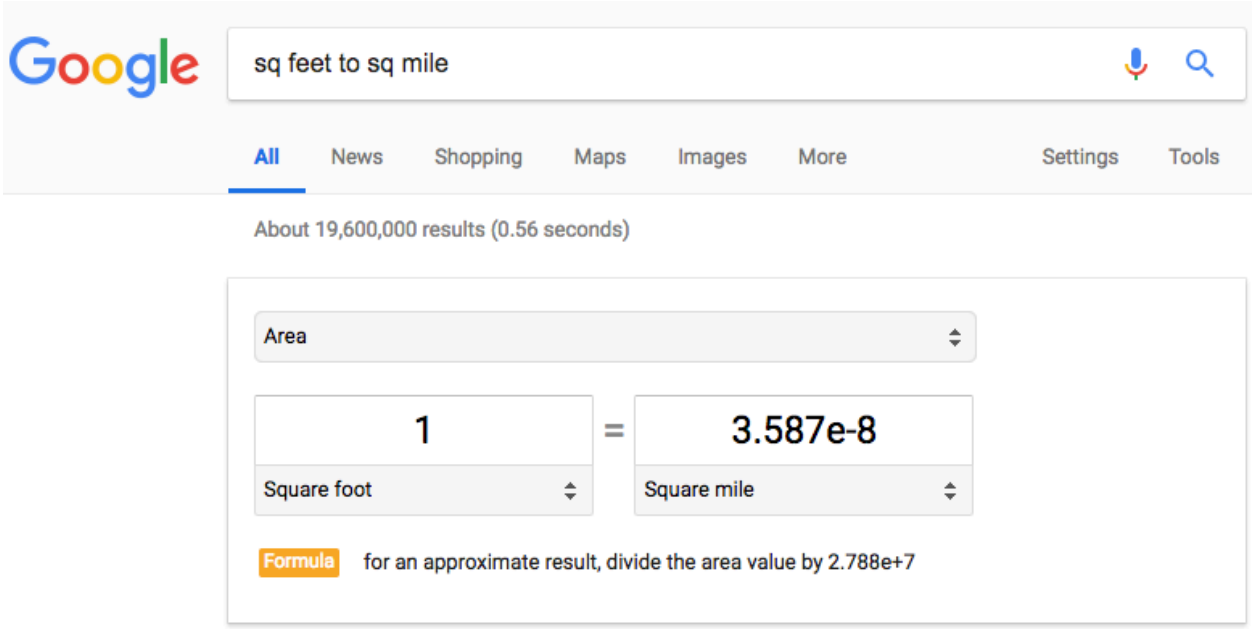


	Shape_Area	POP10	Asian	White	Black	American_I	Other	Med_Income
0	0.00062340679	2999	123	1863	36	22	955	60793
1	0.00001792824	2382	61	1643	71	36	571	34867
2	0.00009009214	3950	706	1710	104	46	1384	40197
3	0.00009009521	2338	1359	651	55	11	262	58415
4	0.00012394646	7254	6447	401	260	0	146	22000
5	0.00006780896	5262	17	2340	242	83	2580	37363
6	0.00012553640	1578	405	729	219	8	217	73325
7	0.00010672509	5711	27	3583	79	57	1965	56339
8	0.00017227144	5345	4	25	5231	4	81	60135
9	0.00014018006	5402	3	26	5257	17	99	38327
10	0.00008252654	6236	384	5323	169	15	345	40722
11	0.00057101983	3109	0	4	3076	3	26	14030
12	0.00041168702	3373	2	59	3200	4	108	14913
13	0.00005753634	5060	4	13	4964	14	65	26596
14	0.00005600957	7311	1052	4989	905	10	355	73423
15	0.00005182088	2278	660	1362	124	4	128	56058
16	0.00004352187	2212	549	1471	100	4	88	39300
17	0.00005833402	2561	110	454	1830	12	155	21979
18	0.00008916859	1713	377	412	850	5	69	28587
19	0.00010002183	6895	730	4751	1121	10	283	104930
20	0.00012864809	4350	712	2737	607	13	281	73425
21	0.00001623270	4012	424	2179	1050	16	343	32636
22	0.00002018054	2976	569	1592	602	8	205	42810

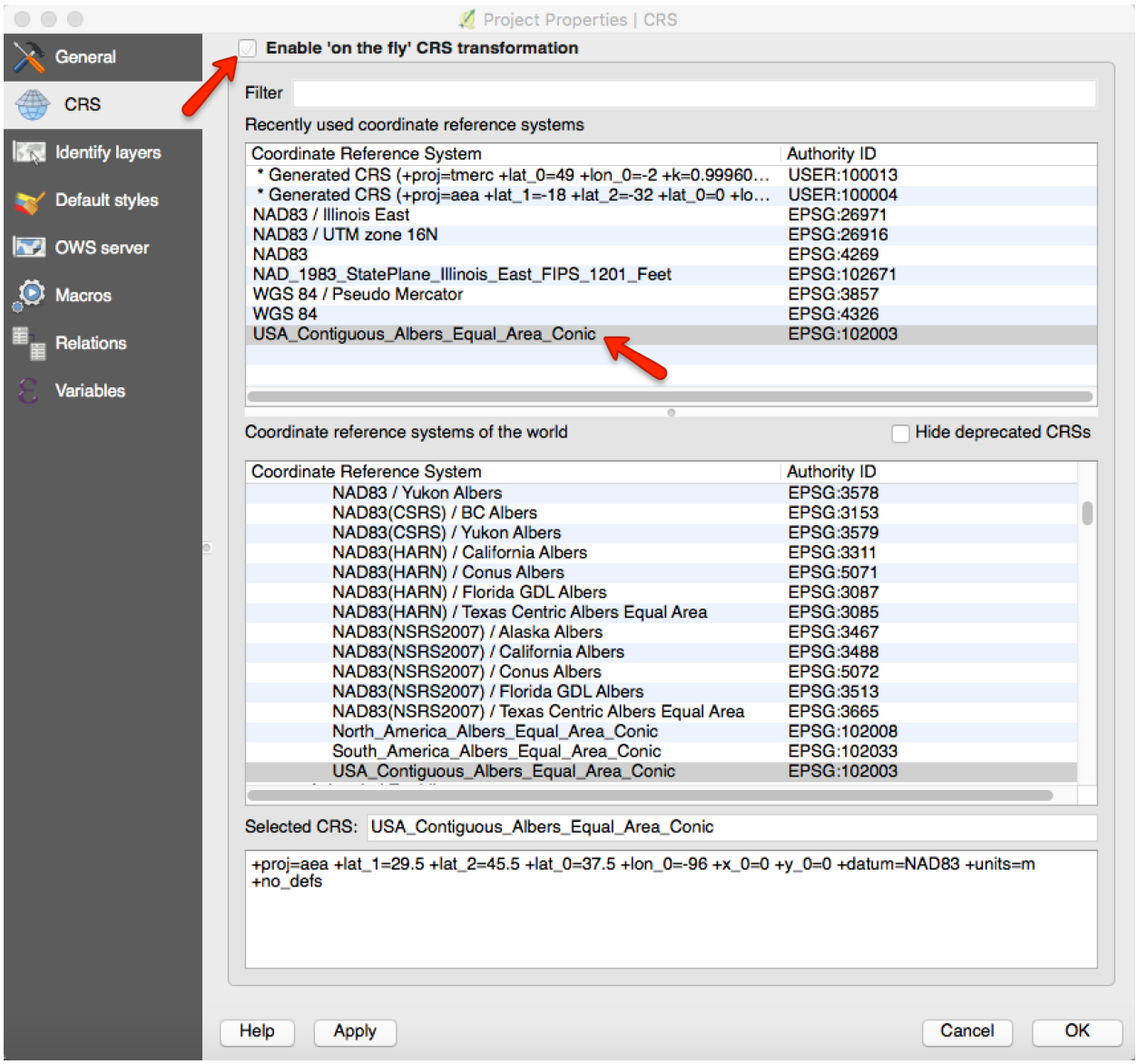
- Then click on the **Open field calculator** button  .



- Now, we are about to create a new field to calculate polygon areas in **square miles**.
  - Before doing this in QGIS, we need to figure out the formula to be used.
  - First, check the map unit is in feet under **Project Properties > General**
  - The Chicago layer is in feet, which means the default area calculation will give us area measured in square feet.
  - To get square miles instead, I looked up the formula on Google:



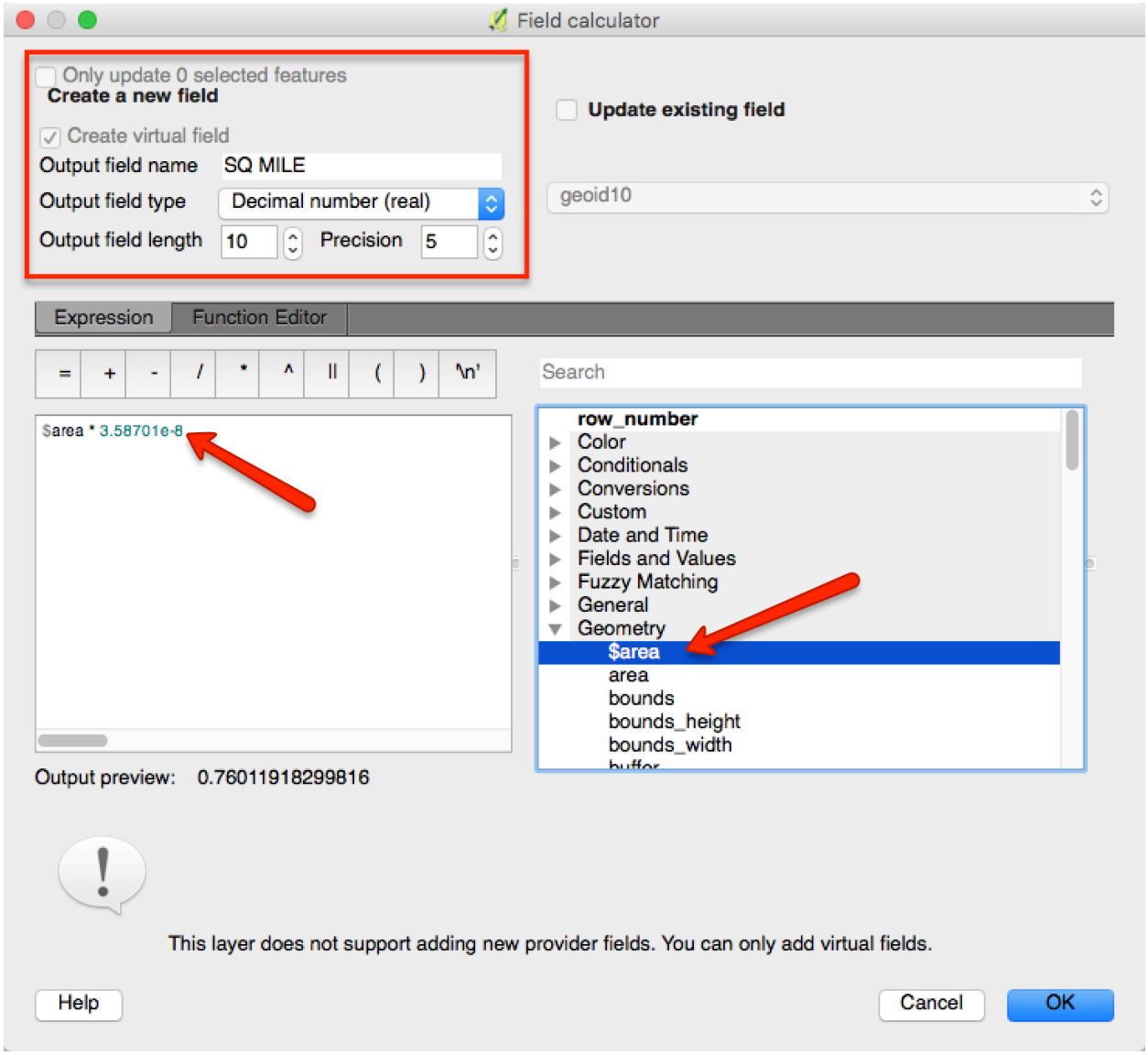
  - This basically tells us that we could calculate square mile by **multiplying the square feet values by 3.58701e-8**
- **A bit tricky for the U.S. layer**, which is **not projected (only has geographic coordinate system)** and has **degrees as the map unit**. In this case, we could change the map project/unit in **Project Properties > CRS.**
  - Select **Enable 'on the fly' CRS (coordinate systems) transformation**
  - I used **USA_Contiguous_Albers_Equal_Area_Conic** projection in this case. The idea is to select a projected coordinate system that will have regular map unit other than degrees
  - You will learn more about projection in other GIS classes, e.*g., GIS Across Disciplines, GIS I and GIS II*



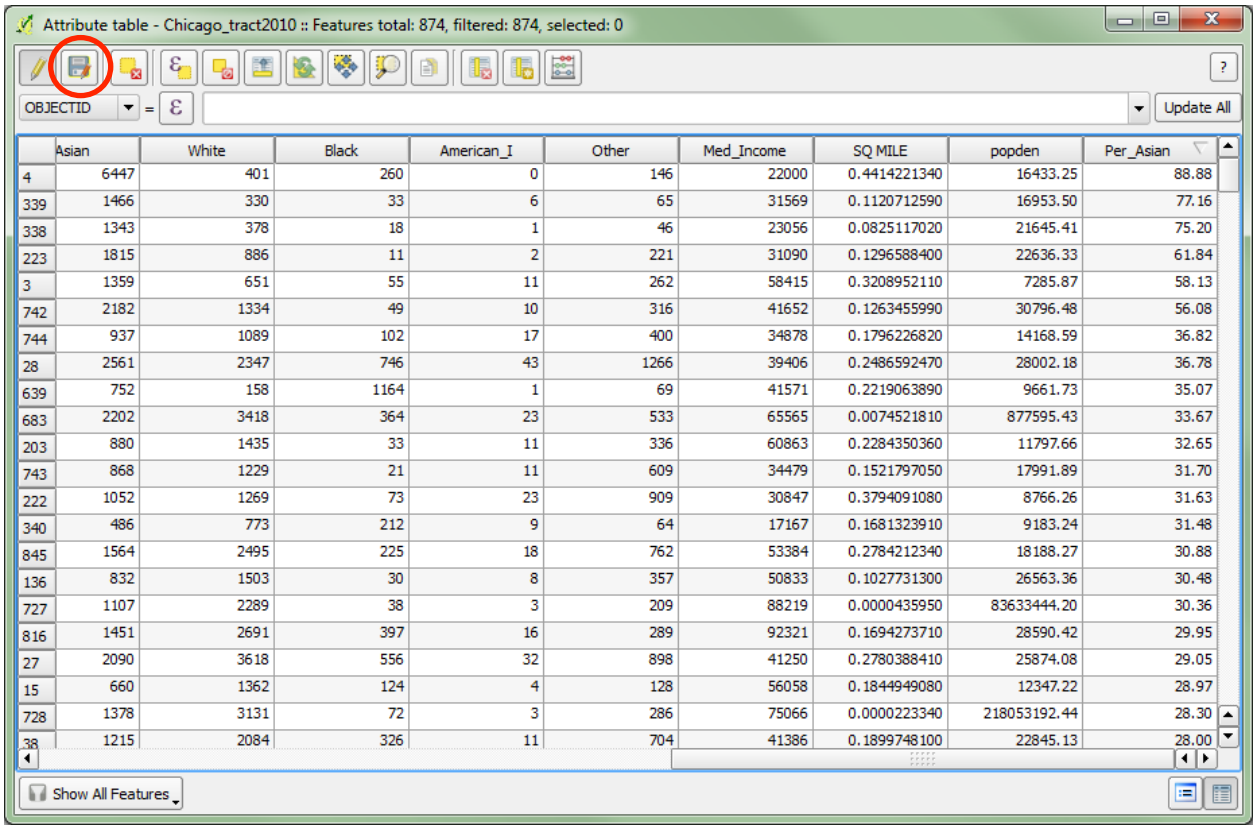
- If you click **Apply** and return to the **General** tab, you will see the map unit is changed to **meters** for the U.S. states layer. Then you may look for the formula on Google for this layer.
- **Note: This change of map unit does NOT apply to the simplify tolerance unit, UNLESS you SAVE the layer AS a new ESRI Shapefile**.

- In the Field calculator window (Chicago layer), make the following changes:
  - Check the box next to **Create a new field** (we will create a new field to hold the area values)
  - Set the Output field name as **SQ MILE** (this is the name of the new field)
  - Set the Output field type as **Decimal number (real)** (the data type of the new field)
  - Set Output field width as **10 (total number of digits)**, **Precision** as **2** (**number of decimal places**)

- Enter the Expression to calculate **"$area * 3.58701e-8".** You may double-click the $area function from the **Geometry** section to add it. And you may complete the rest of the expression using your keyboard.
- Click **OK** to calculate the polygon area in square miles.



- Be sure to save your changes by clicking on the **Save Edits** button  .



	Asian	White	Black	American_I	Other	Med_Income	SQ MILE	popden	Per_Asian
4	6447	401	260	0	146	22000	0.4414221340	16433.25	88.88
339	1466	330	33	6	65	31569	0.1120712590	16953.50	77.16
338	1343	378	18	1	46	23056	0.0825117020	21645.41	75.20
223	1815	886	11	2	221	31090	0.1296588400	22636.33	61.84
3	1359	651	55	11	262	58415	0.3208952110	7285.87	58.13
742	2182	1334	49	10	316	41652	0.1263455990	30796.48	56.08
744	937	1089	102	17	400	34878	0.1796226820	14168.59	36.82
28	2561	2347	746	43	1266	39406	0.2486592470	28002.18	36.78
639	752	158	1164	1	69	41571	0.2219063890	9661.73	35.07
683	2202	3418	364	23	533	65565	0.0074521810	877595.43	33.67
203	880	1435	33	11	336	60863	0.2284350360	11797.66	32.65
743	868	1229	21	11	609	34479	0.1521797050	17991.89	31.70
222	1052	1269	73	23	909	30847	0.3794091080	8766.26	31.63
340	486	773	212	9	64	17167	0.1681323910	9183.24	31.48
845	1564	2495	225	18	762	53384	0.2784212340	18188.27	30.88
136	832	1503	30	8	357	50833	0.1027731300	26563.36	30.48
727	1107	2289	38	3	209	88219	0.0000435950	83633444.20	30.36
816	1451	2691	397	16	289	92321	0.1694273710	28590.42	29.95
27	2090	3618	556	32	898	41250	0.2780388410	25874.08	29.05
15	660	1362	124	4	128	56058	0.1844949080	12347.22	28.97
728	1378	3131	72	3	286	75066	0.0000223340	218053192.44	28.30
38	1215	2084	326	11	704	41386	0.1899748100	22845.13	28.00

- Then click on the **Toggle editing mode** button  again to exit the editing mode. Then close the attribute table.