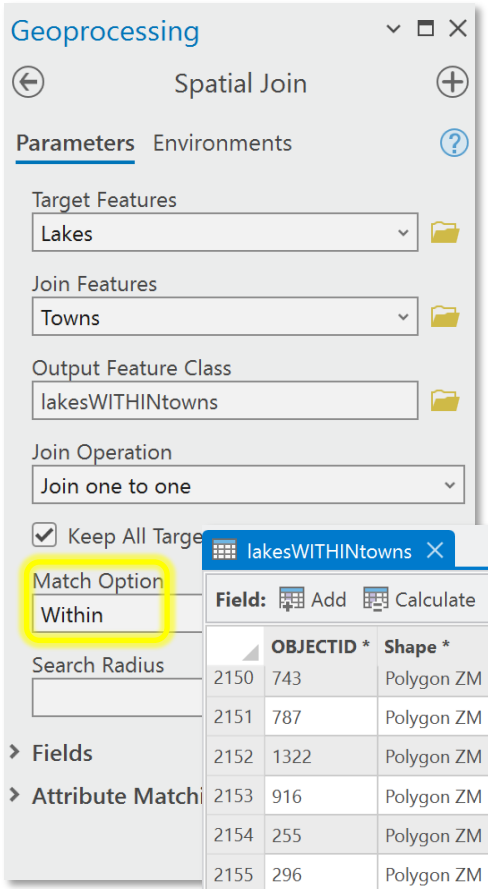
# Data Interpretation: Spatially Joining Features

Tutorial for Week 10

Consider each of the following examples carefully. You may find it helpful to replicate, more closely examine, and perhaps even modify each.

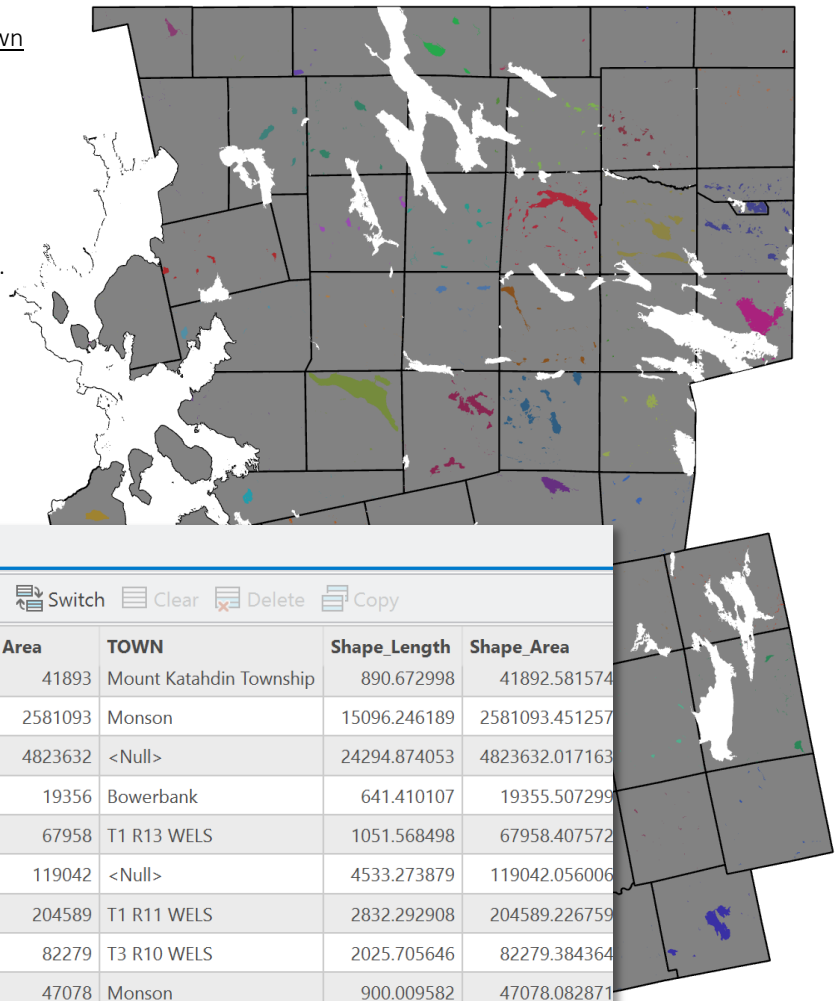
1 *A WITHIN (Container) Join*

In this example, each of a set of "target features" on a **Lakes** layer (shown below as a set of irregular polygons in various colors) inherits the attribute values of whatever "join feature" on a **Towns** layer (shown as rectilinear polygons in grey) wholly contains that lake.




Lakes that lie entirely within each town are colored according to that town, while lakes that span multiple towns and are shown in white.

This is because the latter are not wholly contained within a one town and therefore inherit no town values.



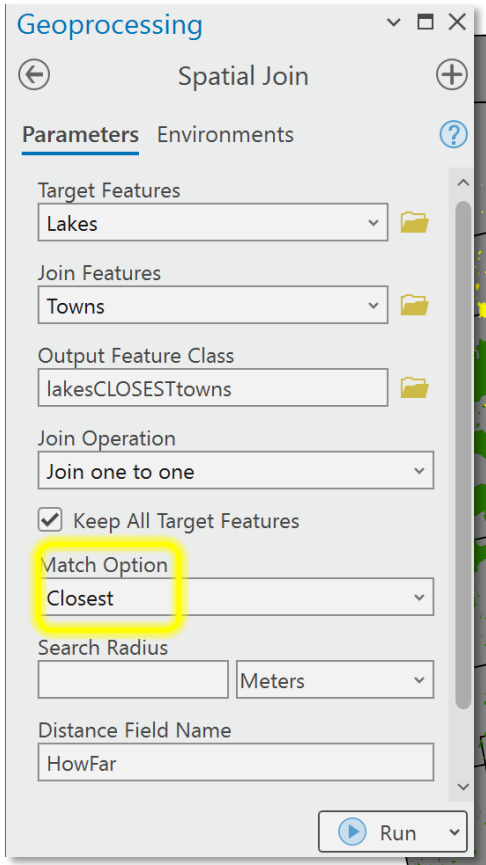
lakesWITHINtowns

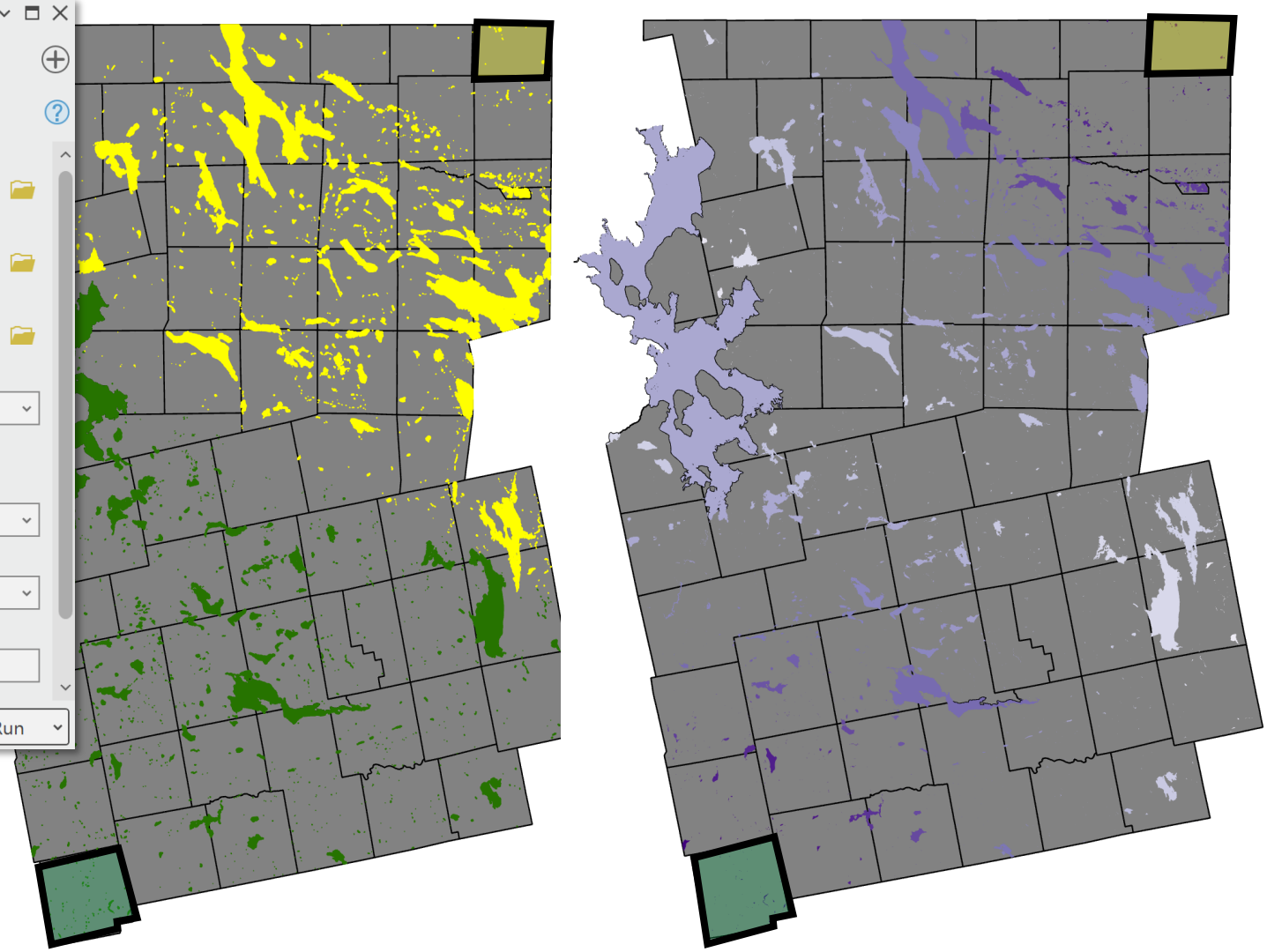
Field: Add Calculate | Selection: Select By Attributes Zoom To Switch Clear Delete Copy

| | OBJECTID * | Shape * | Join_Count | TARGET_FID | Name | Area | TOWN | Shape_Length | Shape_Area |
|---|---|---|---|---|---|---|---|---|---|
| 2150 | 743 | Polygon ZM | 1 | 742 | Lake Cowles | 41893 | Mount Katahdin Township | 890.672998 | 41892.581574 |
| 2151 | 787 | Polygon ZM | 1 | 786 | Lake Hebron | 2581093 | Monson | 15096.246189 | 2581093.451257 |
| 2152 | 1322 | Polygon ZM | 0 | 1321 | Lake Onawa | 4823632 | <Null> | 24294.874053 | 4823632.017163 |
| 2153 | 916 | Polygon ZM | 1 | 915 | Lamont Ponds | 19356 | Bowerbank | 641.410107 | 19355.507299 |
| 2154 | 255 | Polygon ZM | 1 | 254 | Lazy Tom Pond | 67958 | T1 R13 WELS | 1051.568498 | 67958.407572 |
| 2155 | 296 | Polygon ZM | 0 | 295 | Lazy Tom Stream Reserv... | 119042 | <Null> | 4533.273879 | 119042.056006 |
| 2156 | 2022 | Polygon ZM | 1 | 2021 | Leavitt Pond | 204589 | T1 R11 WELS | 2832.292908 | 204589.226759 |
| 2157 | 475 | Polygon ZM | 1 | 474 | Lily Pad Pond | 82279 | T3 R10 WELS | 2025.705646 | 82279.384364 |
| 2158 | 347 | Polygon ZM | 1 | 346 | Lily Pond | 47078 | Monson | 900.009582 | 47078.082871 |
| 2159 | 2157 | Polygon ZM | 0 | 2156 | Lily Pond | 80909 | <Null> | 1438.625063 | 80909.267601 |
| 2160 | 2030 | Polygon ZM | 1 | 2029 | Little Beaver Pond | 20332 | Rainbow Township | 710.460735 | 20332.178609 |
| 2161 | 2310 | Polygon ZM | 1 | 2309 | Little Beaver Pond | 28140 | T3 R11 WELS | 950.190251 | 28139.789638 |

2 *A CLOSEST (Nearest Neighbor) Join*

In this example, each of a set of "target features" on a **Lakes** layer (shown below as a set of irregular polygons in bright yellow or green) inherits the attribute values of whatever selected "join feature" on a **Towns** layer (shown in darker yellow and green) lies closest to that lake.

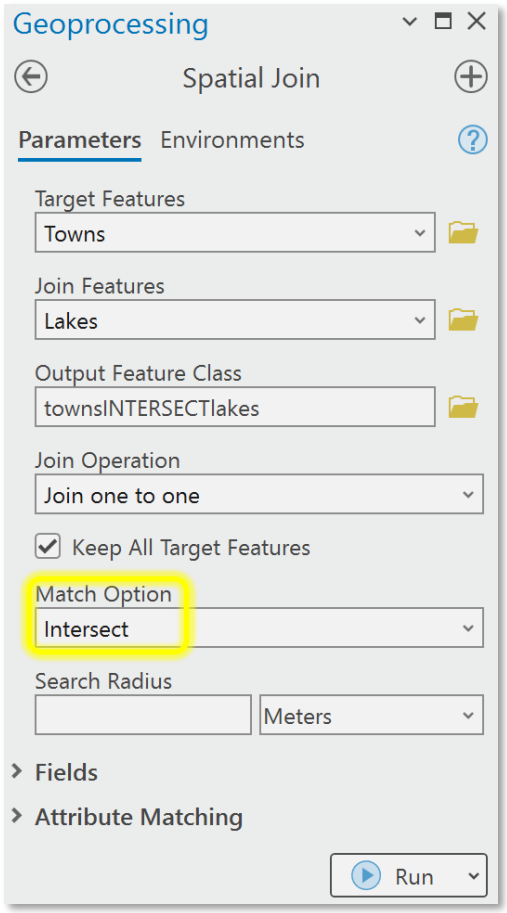


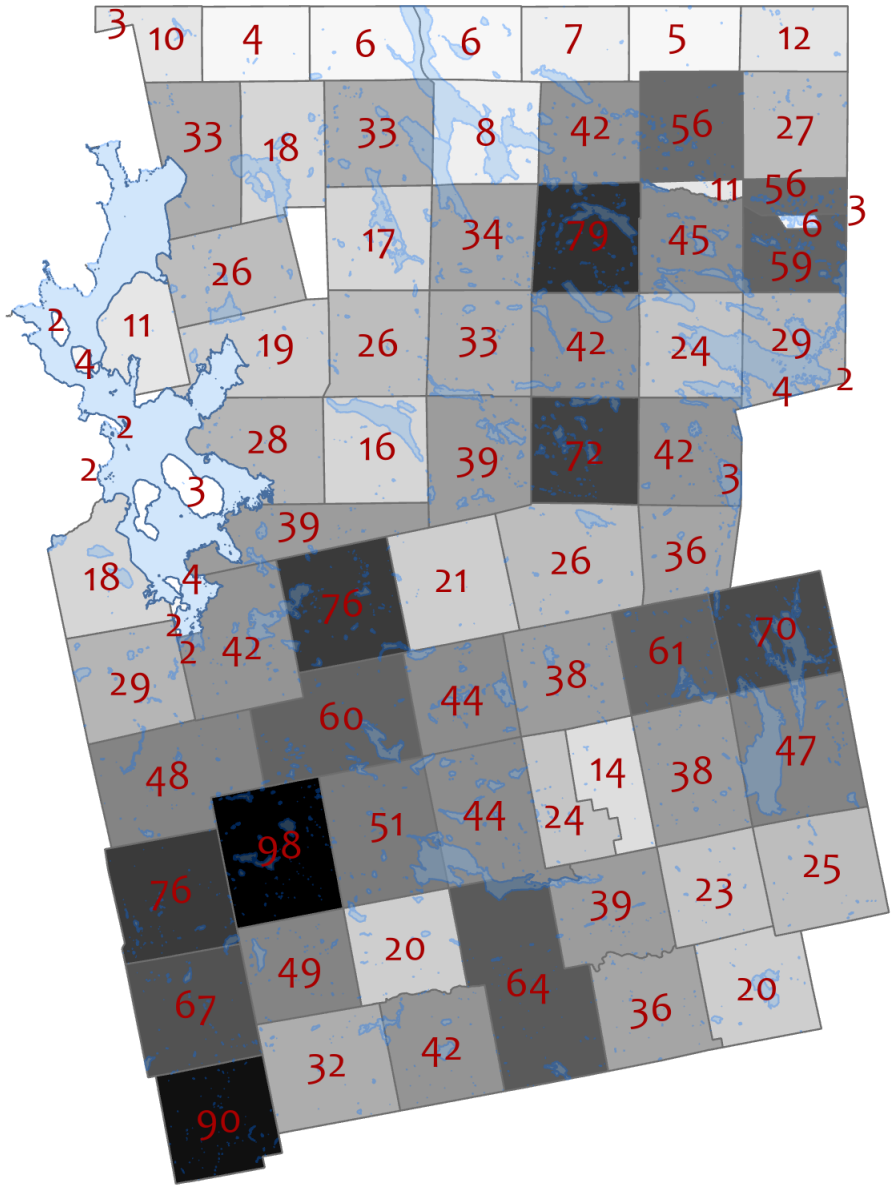



If (and only if) a *Distance Field Name* is specified, that field's values will also indicate each lake's distance to the nearest selected town feature (as shown to the far right in dark-to-light shades of purple).

3 *A Basic INTERSECTS (Contact Summary) Join*

In this example, each of a set of "target features" on the **Towns** layer counts the number of "join features" on the **Lakes** layer that touch that town, even if not wholly contained by it.

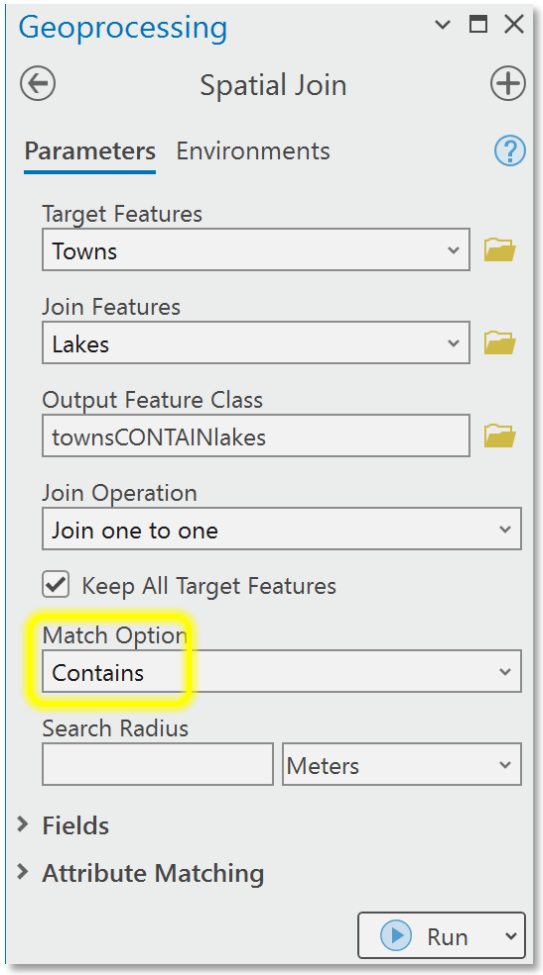


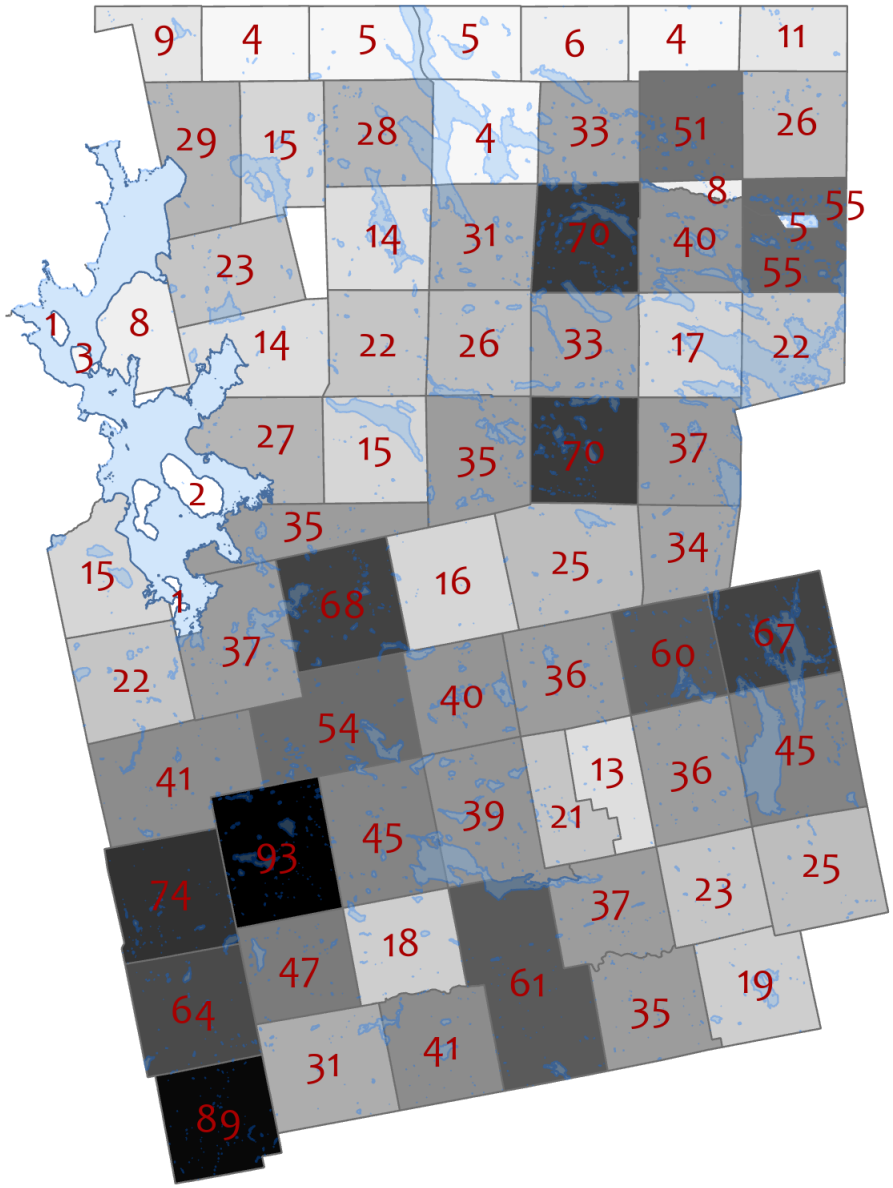




This number is again indicated by the red label over each town (which you should now compare to those on the previous page).

4 *A Basic CONTAINS (Content Summary) Join*

In this example, each of a set of "target features" on that **Towns** layer counts the number of "join features" on the **Lakes** layer that are wholly contained by that town.

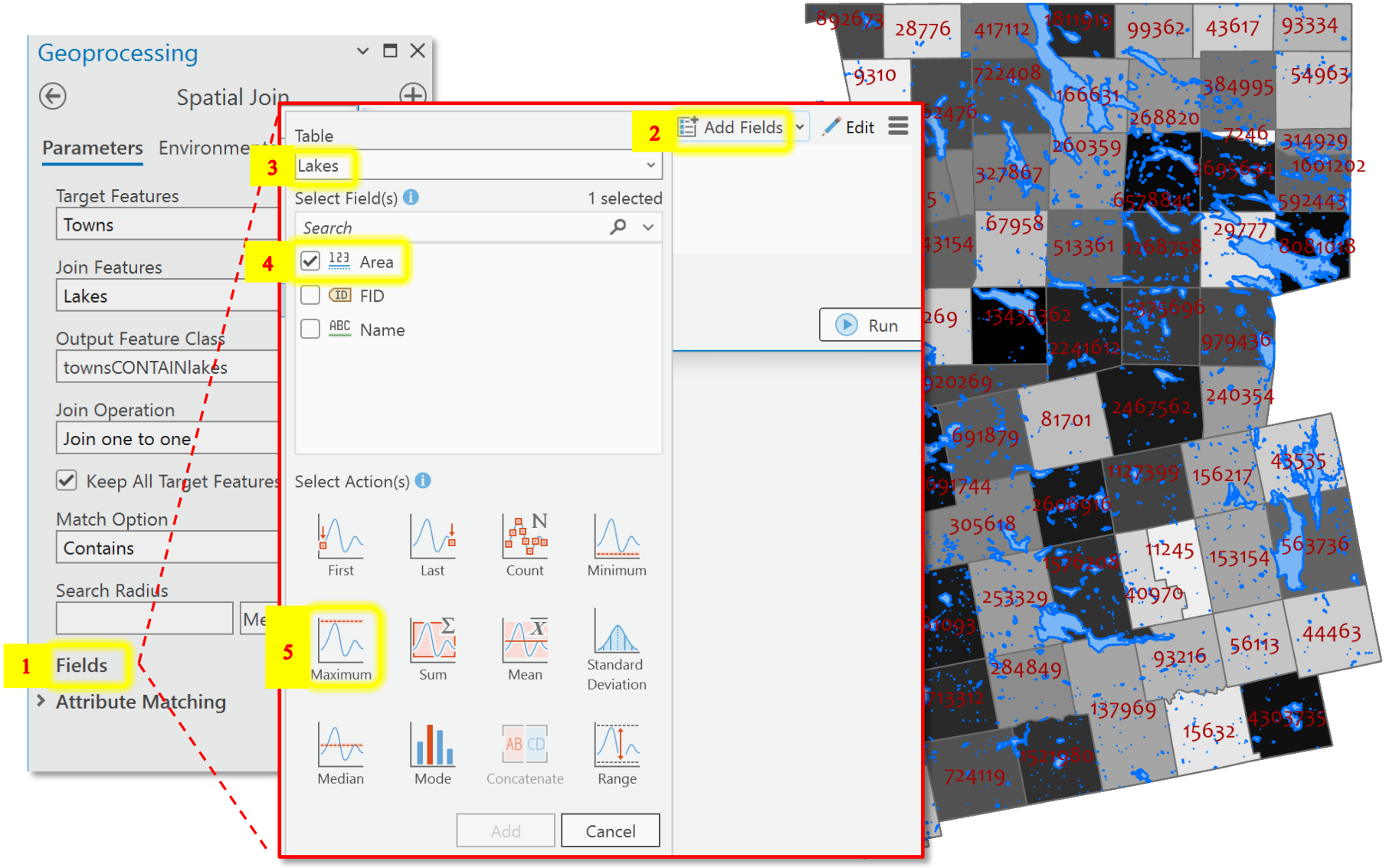



This number is indicated by the red label over each town.

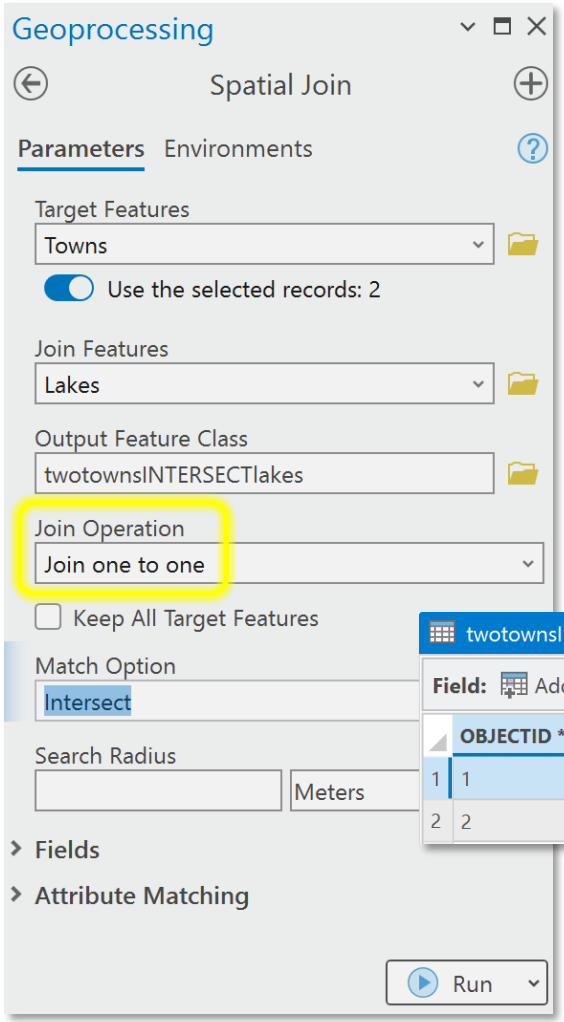
5 *Another CONTAINS (Content Summary) Join*

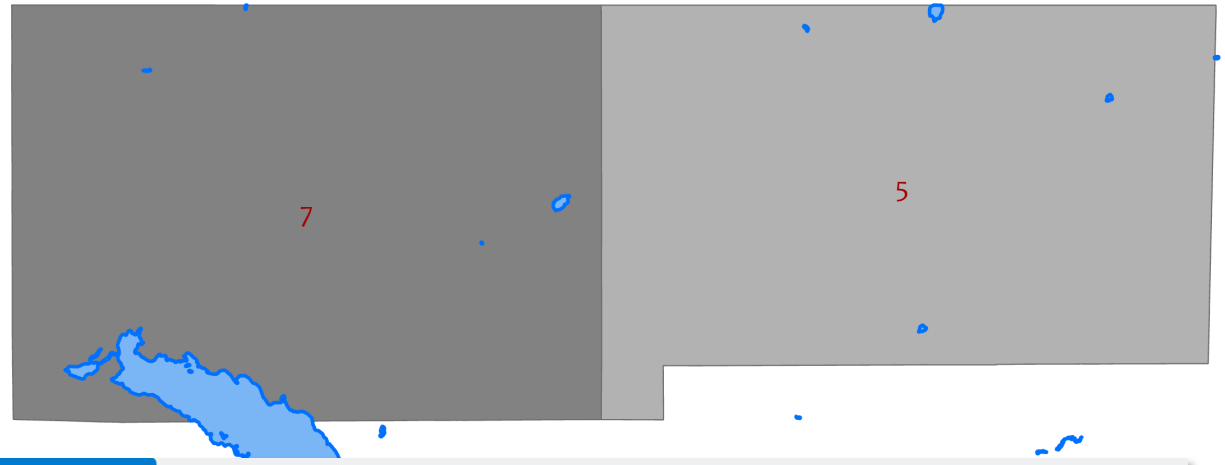
In this example, each "target feature" on the **Towns** layer summarizes a specified attribute of whatever "join features" on the **Lakes** layer are wholly contained by that town. The **Lakes** attribute being summarized is *Area*, the summary statistic employed is the *Maximum* value, and new field recording that summary statistic will be called *Area_Max*.



6 *A Simplified One-to-one INTERSECT (Contact Summary) Join*

In this example, each of two pre-selected "target features" on a **Towns** layer records the number of "join features" on a **LAKES** layer that are touched by that town.



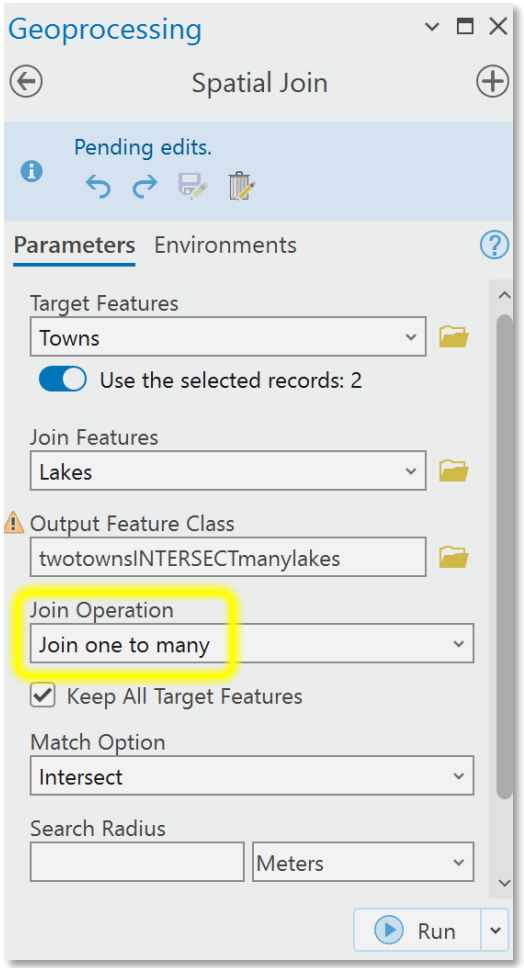

twotownsINTERSECTlakes

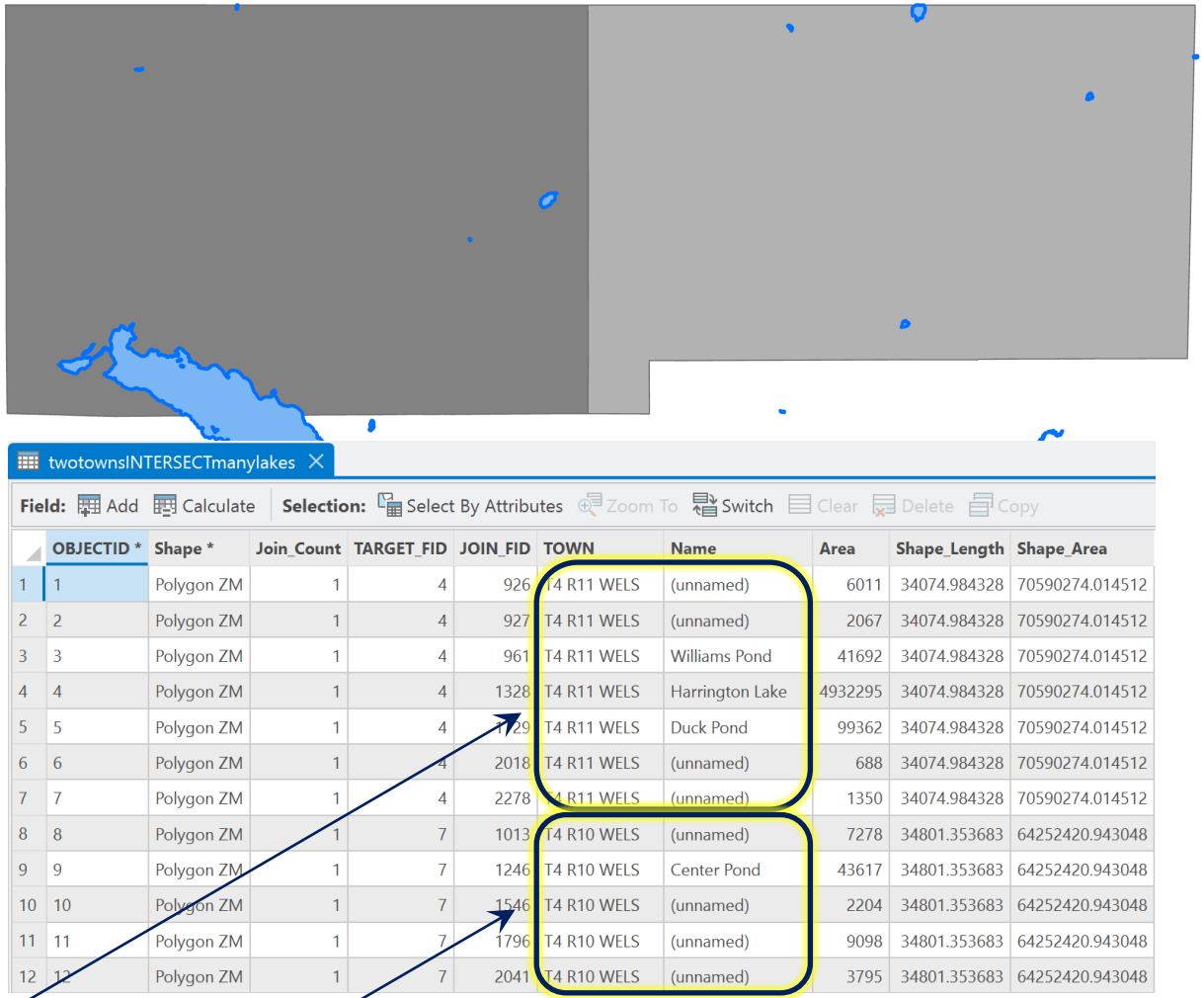
Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

| | OBJECTID * | Shape * | Join_Count | TARGET_FID | TOWN | Name | Area | Shape_Length | Shape_Area |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Polygon ZM | 7 | 4 | T4 R11 WELS | (unnamed) | 6011 | 34074.984328 | 70590274.014512 |
| 2 | 2 | Polygon ZM | 5 | 7 | T4 R10 WELS | (unnamed) | 7278 | 34801.353683 | 64252420.943048 |

7 *A Simplified One-to-many INTERSECT (Contact Summary) Join*

In this example, each of two pre-selected "target features" on a **Towns** layer is actually replicated for each of the "join features" on a **LAKES** layer that touches that town.



twotownsINTERSECTmanylakes

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

| | OBJECTID * | Shape * | Join_Count | TARGET_FID | JOIN_FID | TOWN | Name | Area | Shape_Length | Shape_Area |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Polygon ZM | 1 | 4 | 926 | T4 R11 WELS | (unnamed) | 6011 | 34074.984328 | 70590274.014512 |
| 2 | 2 | Polygon ZM | 1 | 4 | 927 | T4 R11 WELS | (unnamed) | 2067 | 34074.984328 | 70590274.014512 |
| 3 | 3 | Polygon ZM | 1 | 4 | 961 | T4 R11 WELS | Williams Pond | 41692 | 34074.984328 | 70590274.014512 |
| 4 | 4 | Polygon ZM | 1 | 4 | 1328 | T4 R11 WELS | Harrington Lake | 4932295 | 34074.984328 | 70590274.014512 |
| 5 | 5 | Polygon ZM | 1 | 4 | 1729 | T4 R11 WELS | Duck Pond | 99362 | 34074.984328 | 70590274.014512 |
| 6 | 6 | Polygon ZM | 1 | 4 | 2018 | T4 R11 WELS | (unnamed) | 688 | 34074.984328 | 70590274.014512 |
| 7 | 7 | Polygon ZM | 1 | 4 | 2278 | T4 R11 WELS | (unnamed) | 1350 | 34074.984328 | 70590274.014512 |
| 8 | 8 | Polygon ZM | 1 | 7 | 1013 | T4 R10 WELS | (unnamed) | 7278 | 34801.353683 | 64252420.943048 |
| 9 | 9 | Polygon ZM | 1 | 7 | 1246 | T4 R10 WELS | Center Pond | 43617 | 34801.353683 | 64252420.943048 |
| 10 | 10 | Polygon ZM | 1 | 7 | 1546 | T4 R10 WELS | (unnamed) | 2204 | 34801.353683 | 64252420.943048 |
| 11 | 11 | Polygon ZM | 1 | 7 | 1796 | T4 R10 WELS | (unnamed) | 9098 | 34801.353683 | 64252420.943048 |
| 12 | 12 | Polygon ZM | 1 | 7 | 2041 | T4 R10 WELS | (unnamed) | 3795 | 34801.353683 | 64252420.943048 |

In other words, the output feature class will include seven copies of that dark grey town feature – each with data on just one of that town's seven lakes.

And it will include five copies of the light grey town – each with data on just one of that town's five lakes.