

## EXERCISE 3:

## EXPLORING LQ POINT MAPS AND SUMMARY TOOLS FOR INDUSTRY CLUSTERS

In this exercise you will develop skills to navigate LQ point maps of counties for Industry clusters and calculate LQs for the custom region and the corridor region by using specific tools.

Location Quotients (LQs) show specialization of industry clusters by counties. The maps of LQs can be shown as polygons (county geography) or as points (county centroids). In both the cases, they are examples of lattice geospatial datasets and can facilitate various types of spatial analysis. This includes visually identifying patterns of cluster specialization across geographies. Please note that a region specializing in an industry cluster can traverse across states and other political boundaries. As you develop cluster-based strategies for your constituents, polygon and point-based maps of the larger region can be helpful for providing regional context and the background.

Please view Tutorial 10 of “Video Tutorials” in RDM prior to completing exercise in Step 1.

([http://prodgis.agriculture.purdue.edu/RDM/Tutorials\\_home.html](http://prodgis.agriculture.purdue.edu/RDM/Tutorials_home.html))

## Step 1: Explore LQ point maps by county

1. In the main Regional Decision Maker<sup>1</sup> website, go to GIS Atlas, National Data and click on Industry Clusters – Location Quotient link. Use “Zoom to State” tool and click on Indiana. Open “Layer List” and “Legend” and expand both the tools. In the “Layer List”, expand the group “Industry Cluster, LQ, Manufacturing based”. You will see that “Advanced Materials, LQ” layer is checked. Scroll down and check “Advanced Materials, LQ, Pct Change, 2008-2010”. It should open the county map for advanced materials, percent change from 2008-2010. You will notice that several counties in Indiana have blue color shade, which means the LQ values decreased between 2008 and 2010. Nevertheless, many counties have point symbols colored yellow, orange and brown, which means despite losses they had significant specialization in 2010. If you zoom in further, county names along with LQ values will appear for that cluster. For Example, “Elkhart: 2.9” means Elkhart County had an LQ of 2.9 for Advanced Materials in 2010. In the “Layer List”, close the “Advanced Materials LQ and Advanced Materials LQ, Pct Change, 2008-2010” layers and open the “Biomedical-Biotechnology, LQ Pct Change, 2008-2010” layers. Now you should see that Elkhart County has an LQ of 0.74 for Biomedical-Biotechnology in 2010. At this zoom level, as you close and open different cluster layers of percent change from the “Layer List”, the labels will show the county name and 2010 LQ for that cluster.
2. Using *Zoom to State* tool, navigate to Indiana and further zoom to the north-east Indiana. Using *Legend* and *Layer List* tool, open appropriate layers, look at the legend colors and labels and answer the following question:

<sup>1</sup> [http://prodgis.agriculture.purdue.edu/RDM/GIS Atlas\\_home.html](http://prodgis.agriculture.purdue.edu/RDM/GIS Atlas_home.html)

Q1. What are the LQ values for following clusters for Kosciusko and Elkhart counties, Indiana? Did LQ values decrease or increase between 2008 and 2010? I have filled-in for Advanced Materials cluster for your reference.

**Kosciusko County**

Cluster	LQ, 2010	Decrease/Increase (2008-2010)
Advanced Materials	7.3	Increase
Biomedical-Biotechnology		
Chemical & Chemical-based		
Defense & Security		

**Elkhart County**

Cluster	LQ, 2010	Decrease/Increase (2008-2010)
Advanced Materials	2.9	Increase
Transportation & Logistics		
Transportation Equipment		
Primary Metal		
Machinery Manufacturing		
Fabricated Metal		

Note: Industry cluster-based strategies are developed for the region. If there are counties, which are well known for specialization in certain clusters within your region then developing a table can be helpful. For example, Kosciusko County is known world-wide for prosthetics and orthopedics related industries. This is indicated by the higher location quotients in Advanced Materials, Biomedical-Biotechnology and Chemical and Chemical-based clusters.

Please view Tutorial 8 of “Video Tutorials” in RDM prior to completing exercise in Step 2. ([http://prodgis.agriculture.purdue.edu/RDM/Tutorials\\_home.html](http://prodgis.agriculture.purdue.edu/RDM/Tutorials_home.html))

Step 2: Explore LQ summary for the region

1. In this exercise, we will calculate regional LQ for a group of counties in the northeastern part of Indiana. In the main Regional Decision Maker<sup>2</sup> website, go to GIS Atlas, National Data and click on Industry Clusters – Location Quotient link. Use “Zoom to State” tool and click on Indiana. Open “Layer List” and “Legend” and expand both the tools. In the “Layer List”, expand the group “Industry Cluster, LQ, Manufacturing based”. You will see that “Advanced Materials, LQ” layer is checked. Similar to previous exercise, if you want, scroll down and check “Advanced Materials, LQ, Pct Change, 2008-2010”. It should open the county map for advanced materials, percent change from 2008-2010. The LQ summary for the region tool would calculate LQs for all the 23 industry clusters regardless of which layer is checked on the “Layer List”. Zoom on to the northeast corner of the state and we will be calculating LQs for the four counties region as shown below.

<sup>2</sup> [http://prodgis.agriculture.purdue.edu/RDM/GIS Atlas\\_home.html](http://prodgis.agriculture.purdue.edu/RDM/GIS Atlas_home.html)

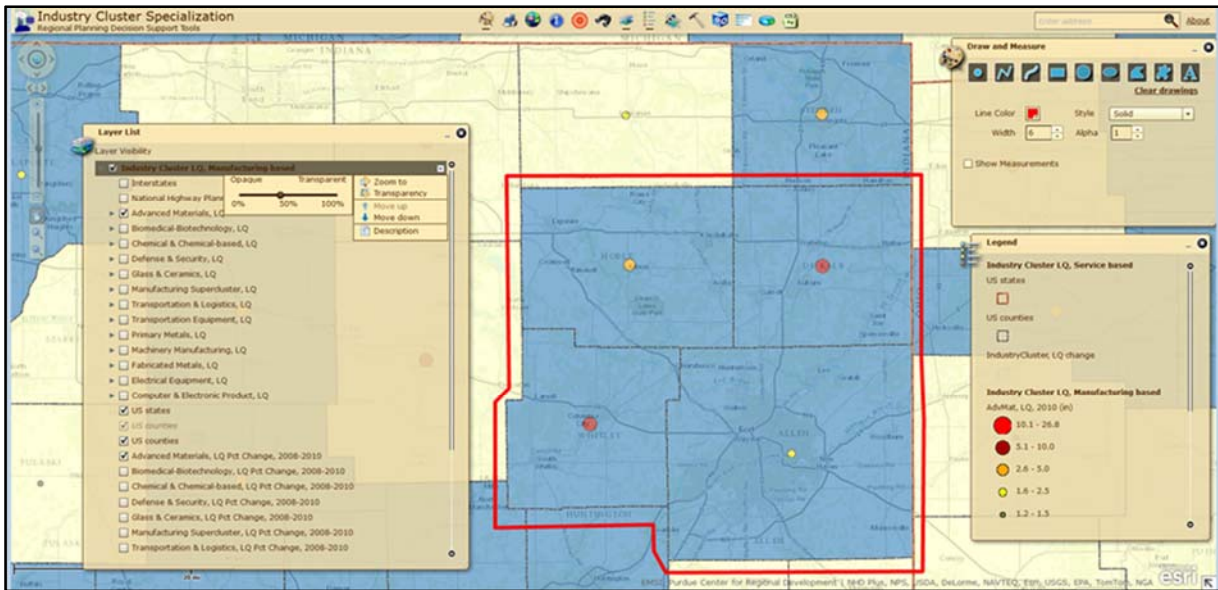


Figure 1: Four Counties Target-region (Noble, DeKalb, Whitley and Allen)

Click on the “AOI LQ Calculator” tool. AOI stands for “Area of Interest”. Use “Draw Polygon” or any other selection tool, such as “Draw Circle” to select the four counties. Please note that your drawing needs to intersect the counties. Your drawing does not need to encompass the county boundaries. Click “Submit” and wait for several seconds for the result table. The tool should calculate the 2010 regional LQs. Look at the result window and answer the following.

Q2. What are the LQ values for following clusters for the four counties region in Indiana? I have filled-in Advanced Materials cluster for your reference.  
**Four Counties Region**

Cluster	LQ, 2010
Advanced Materials	4.69
Chemical & Chemical-based	
Manufacturing Supercluster	
Transportation Equipment	
Primary Metal	
Fabricated Metal	

Q3. From the result window please answer the following. Which industry cluster has the maximum LQ? Which industry cluster has the minimum LQ?

LQ 2010	Maximum	Minimum
Name of Industry Cluster		

Please view Tutorial 9 of “Video Tutorials” in RDM prior to completing exercise in Step 3.

([http://progdgis.agriculture.purdue.edu/RDM/Tutorials\\_home.html](http://progdgis.agriculture.purdue.edu/RDM/Tutorials_home.html))

### Step 3: Explore LQ summary for the corridor

- In this exercise, we will calculate regional LQ for a group of counties located along the Interstate 70 corridor in the central Indiana. In the main Regional Decision Maker<sup>3</sup> website, go to GIS Atlas, National Data and click on Industry Clusters – Location Quotient link. Use “Zoom to State” tool and click on Indiana. Open “Layer List” and “Legend” and expand both the tools. In the “Layer List”, expand the group “Industry Cluster, LQ, Manufacturing based”. You will see that “Advanced Materials, LQ” layer is checked. Similar to previous exercise, if you want, scroll down and check “Advanced Materials, LQ, Pct Change, 2008-2010”. It should open the county map for advanced materials, percent change from 2008-2010. The LQ summary for the corridor tool would calculate LQs for all the 23 industry clusters regardless of which layer is checked on the “Layer List”. In the “Layer List”, check on “National Highway Planning Network” and “Interstates” layers. Zoom on to the central Indiana along the Interstate 70 corridor going to Ohio, and we will be calculating LQs for the four counties region as shown below.

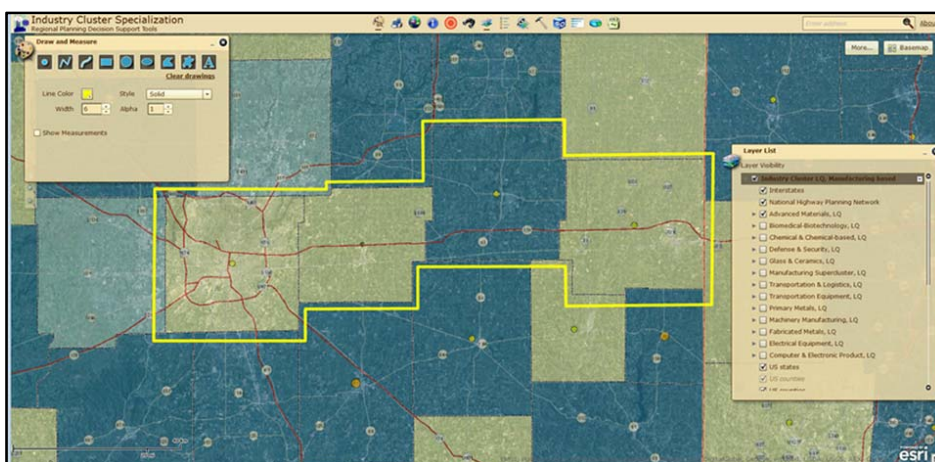


Figure 2: Four Counties Region along the I 70 (Marion, Hancock, Henry and Wayne)

Click on the “Corridor LQ Calculator” tool. Use “Draw Line” or the “Draw Freehand Line” and traverse Interstate 70 and make sure the line should intersect the counties. The tool will show an orange colored line as you draw along the corridor. The default ROW of 150 Meters should be fine for this exercise. Click “Submit” and wait for several seconds for the result table. The tool should calculate the 2010 combined regional LQs for the four counties located along the corridor. Look at the result window and please answer the following.

Q4. What are the LQ values for following clusters for the four counties corridor region located along the I-70 corridor? I have filled-in Advanced Materials cluster for your reference.

<sup>3</sup> [http://progdgis.agriculture.purdue.edu/RDM/GIS Atlas\\_home.html](http://progdgis.agriculture.purdue.edu/RDM/GIS Atlas_home.html)

## Four Counties Region

Cluster	LQ, 2010
Advanced Materials	1.71
Agribusiness & Food Production	
Biomedical & Biotechnology	
Chemical & Chemical-based	
Manufacturing Supercluster	
Transportation & Logistics	
Transportation Equipment	
Primary Metal	
Machinery Manufacturing	
Fabricated Metal	

**Note:** You will notice that this group of counties located along the I-70 corridor is highly specialized in various manufacturing related clusters, such as Primary Metal and Transportation Equipment. You may know that a feasibility study has been conducted to develop dedicated freight (truck) lanes on the I-70 corridor by the Federal Highway Administration (FHWA), Indiana Department of Transportation (INDOT) and other state DOTs. I-70 is an important corridor and carries a variety of goods and commodities especially within the grain belt (Ohio, Indiana, Illinois, Missouri, etc.). The proposed dedicated freight lanes should become an asset for those industry clusters requiring bulk goods movement. In particular, manufacturing related industry clusters should benefit from the proposed dedicated truck lanes. The four counties corridor region along the I-70 can link and leverage such assets. This is an example of how RDM industry cluster tools can be used for regional analysis.

Please fill-in all the tables in this document, save with your initials and submit to Indraneel Kumar, [ikumar@purdue.edu](mailto:ikumar@purdue.edu)

THANK YOU!