Bennington County

Census Blocks in Arlington, Vermont Showing Water Withdrawals in 2005

Withdrawls in Million Gallons Per Day

- 0-.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

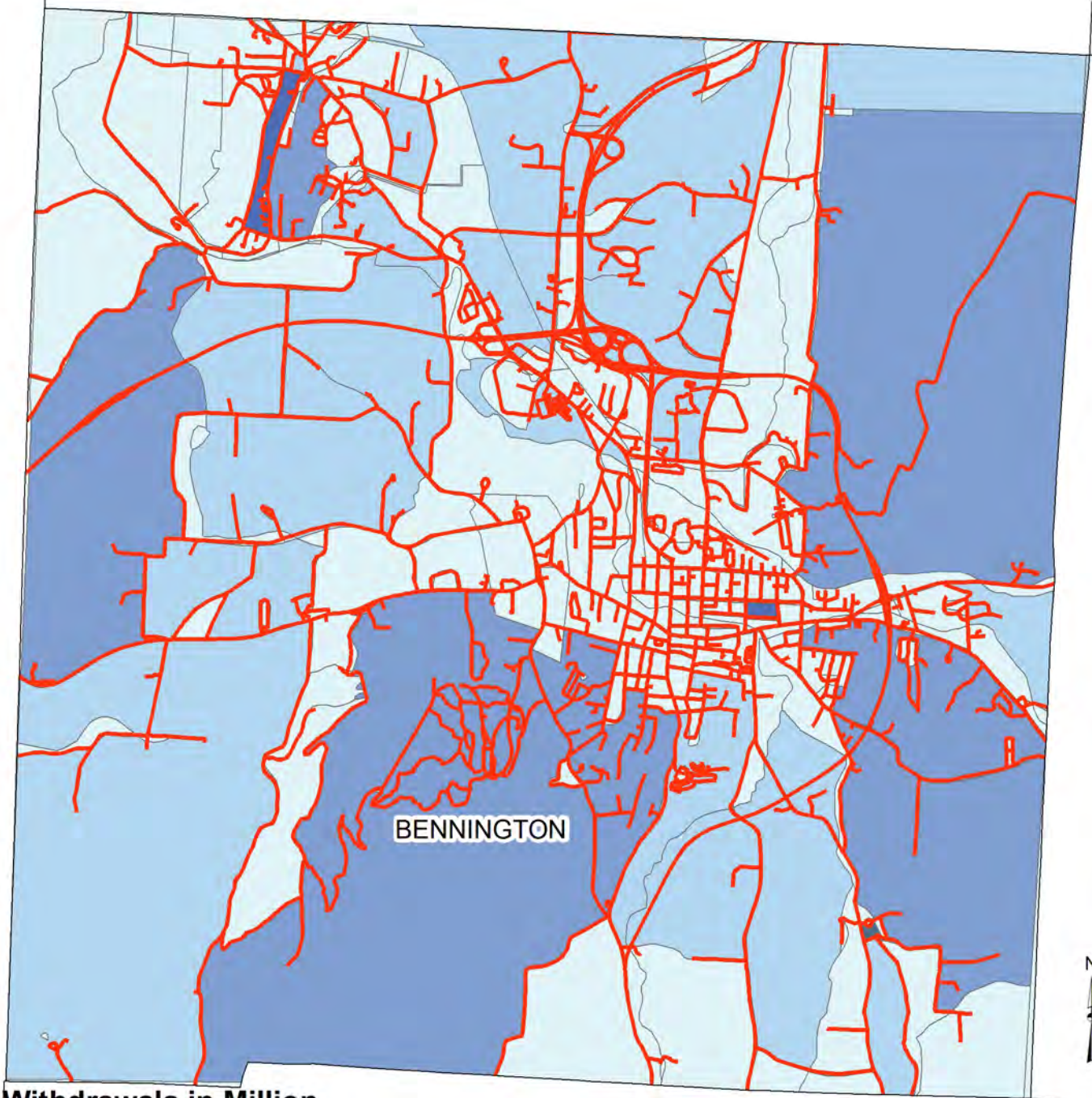
0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Arlington, Vermont Showing Water Withdrawals in 2020

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Bennington, Vermont Showing Water Withdrawals in 2005



Withdrawals in Million Gallons Per Day

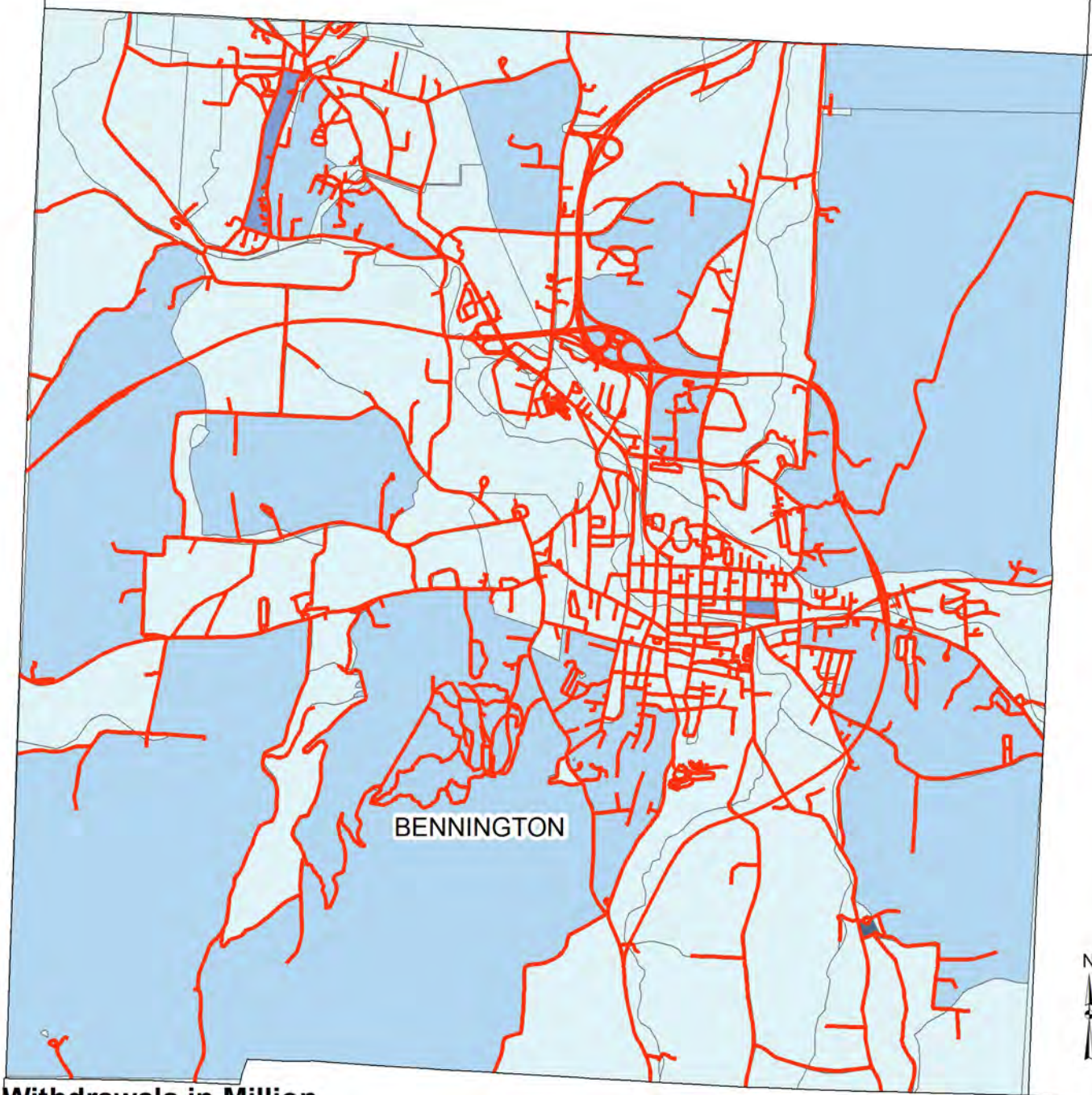
- 0-.002
- >.002-.01
- >.01-.03
- .03-.06
- >.06
- Roads

POWNAL

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Bennington, Vermont Showing Water Withdrawals in 2020



Withdrawals in Million Gallons Per Day

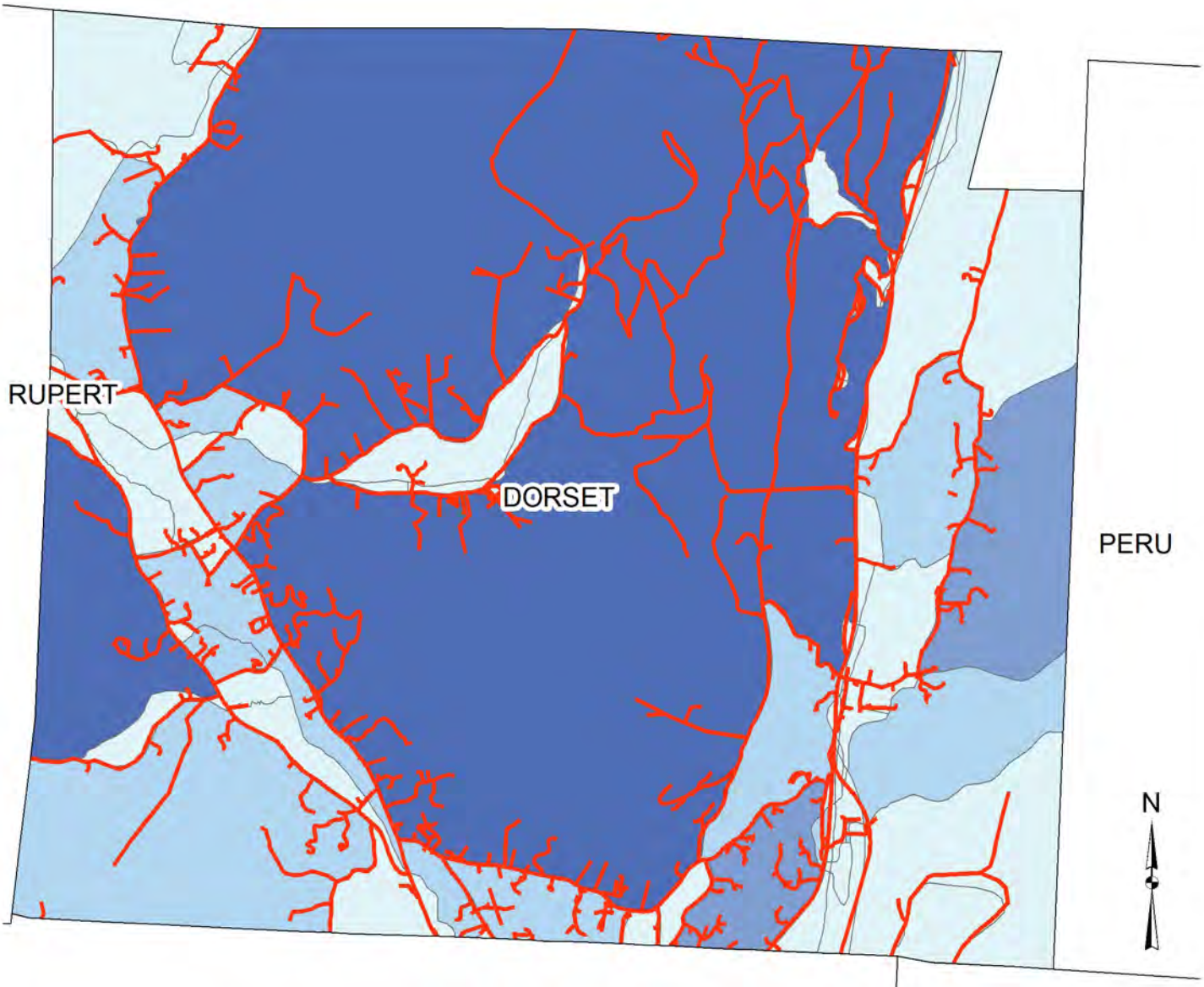
- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

POWNAL

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Dorset, Vermont Showing Water Withdrawals in 2005



Withdrawals in Million Gallons Per Day

- 0-.002
- > .002-.01
- > .01-.03
- >.03-.06
- >.06
- Roads

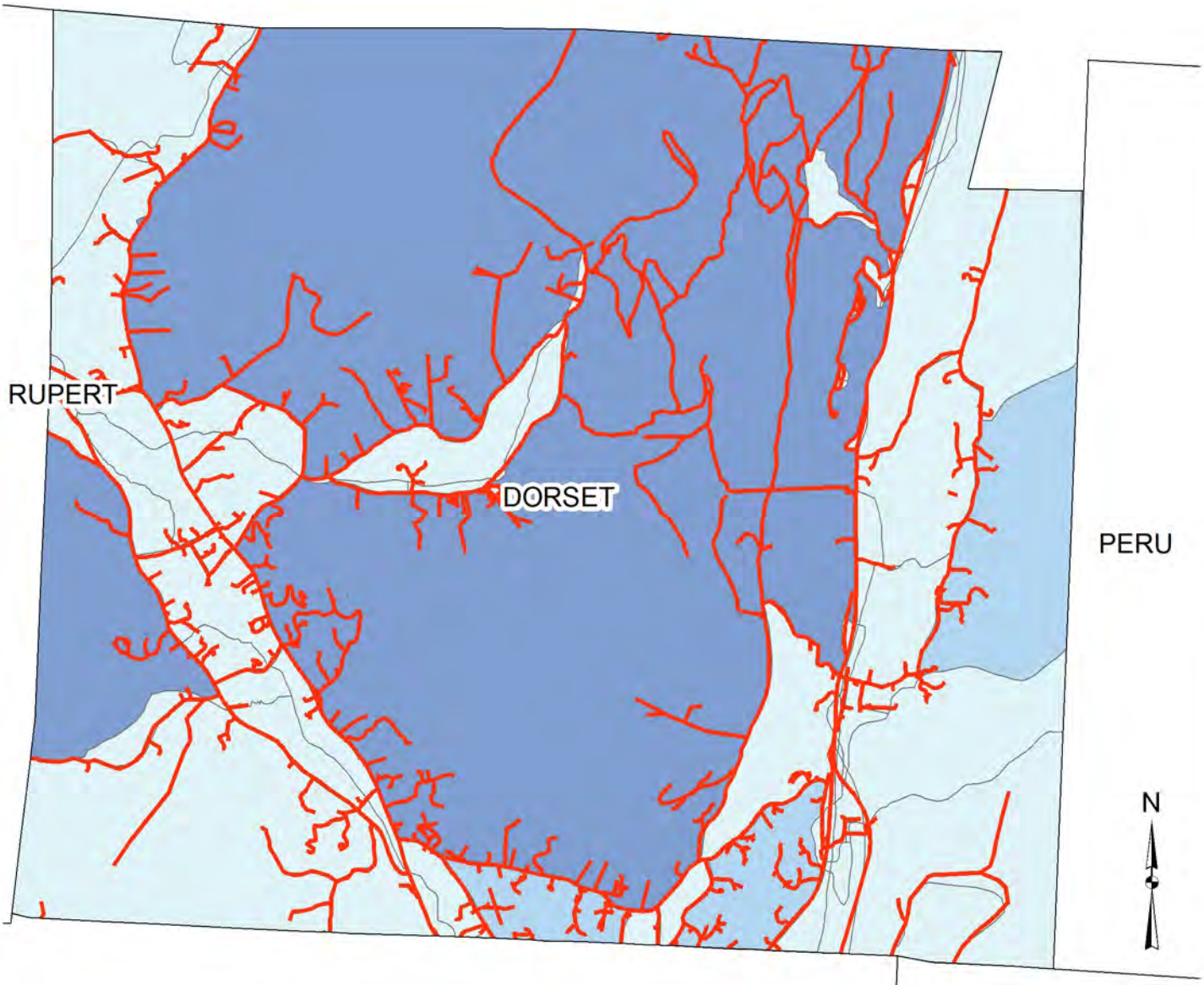
MANCHESTER

WINHALL

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Dorset, Vermont Showing Water Withdrawals in 2020



Withdrawals in Million Gallons Per Day

- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

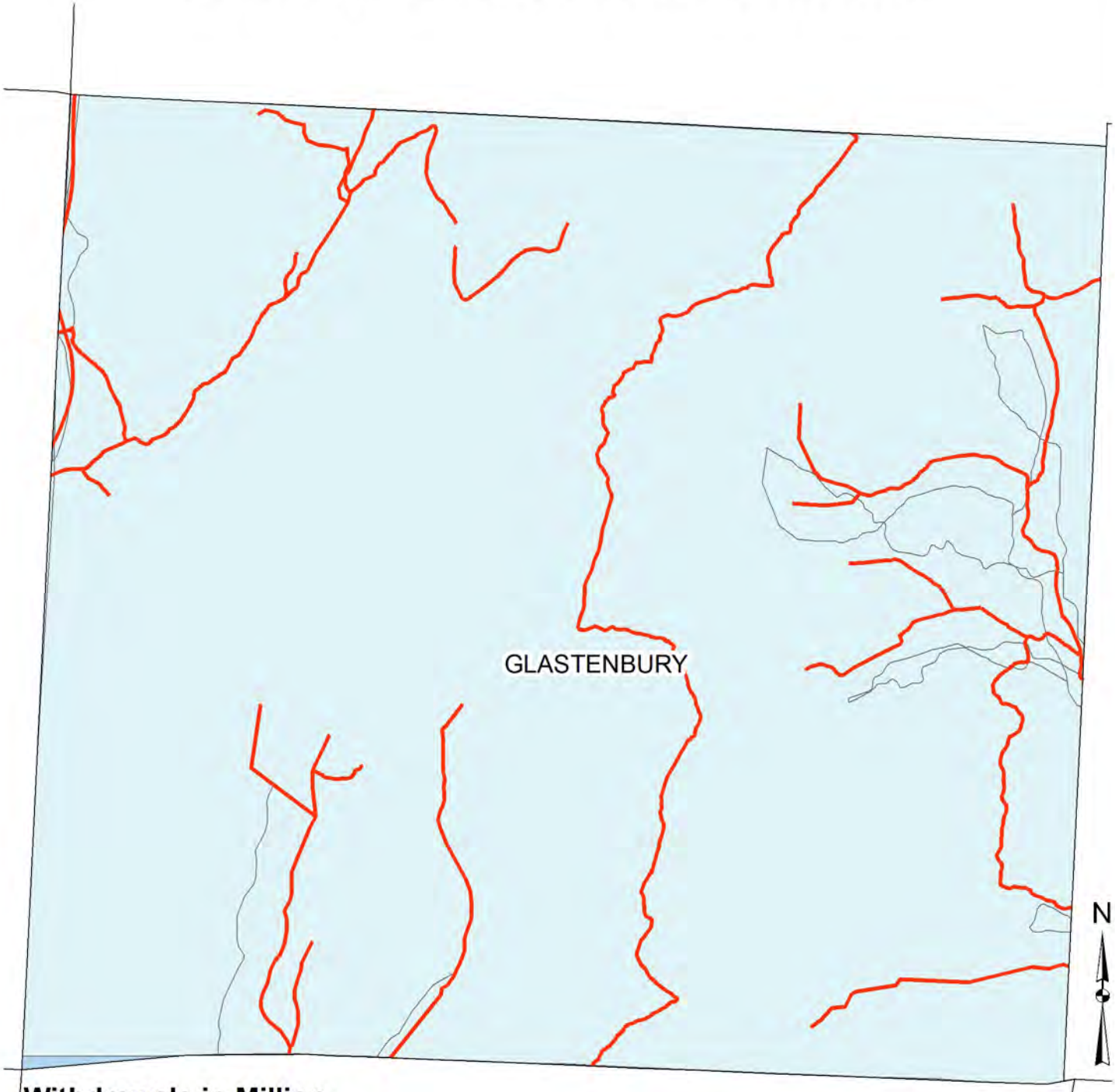
MANCHESTER

WINHALL

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Glastenbury, Vermont Showing Water Withdrawals in 2005



Withdrawals in Million Gallons Per Day

- 0-.002
- > .002-.01
- > .01-.03
- > .03-.06
- > .06
- Roads

WOODFORD

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Glastenbury, Vermont Showing Water Withdrawals in 2020

Withdrawals in Million Gallons Per Day

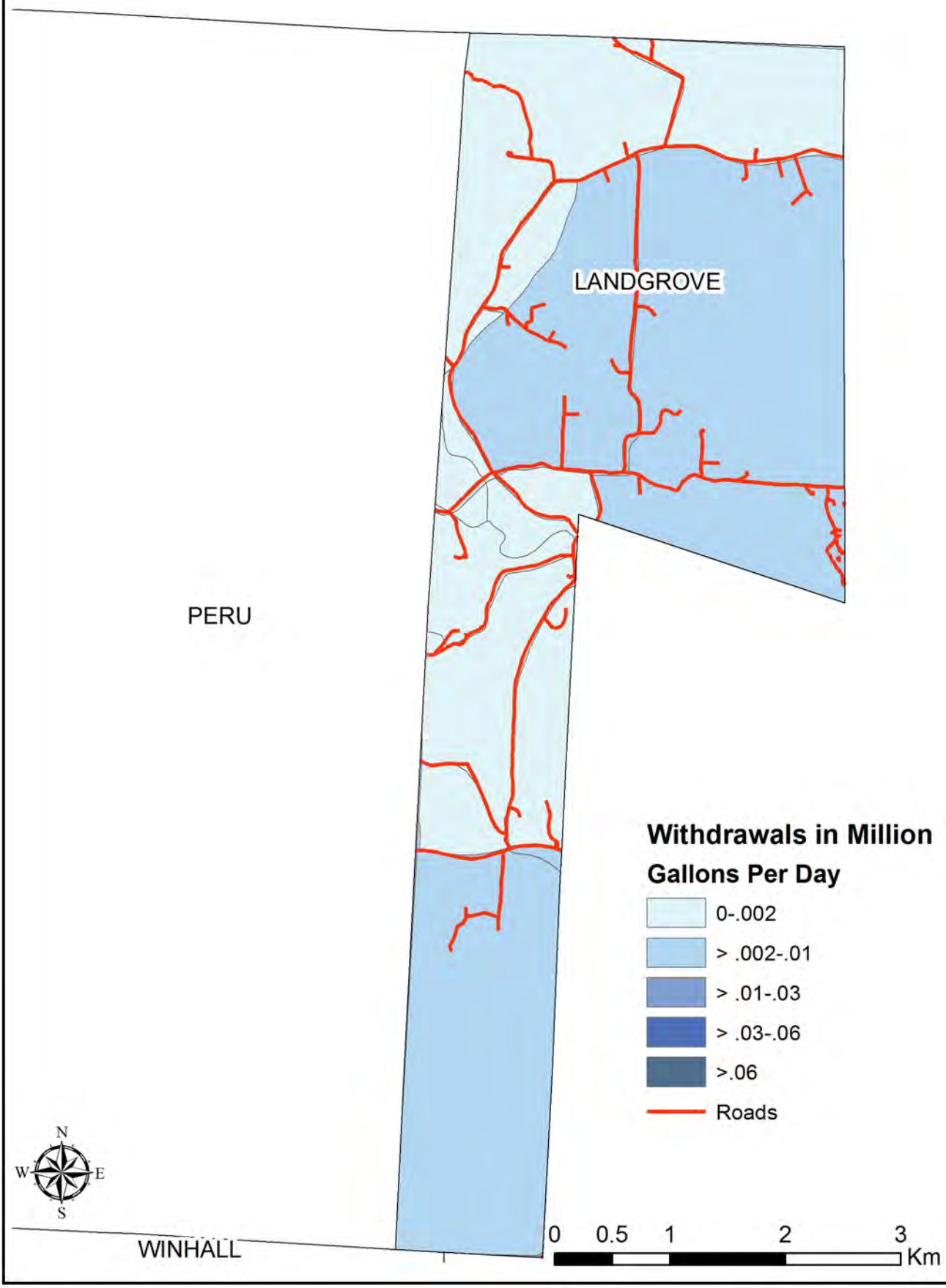
- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

WOODFORD

0 0.5 1 2 3 Km

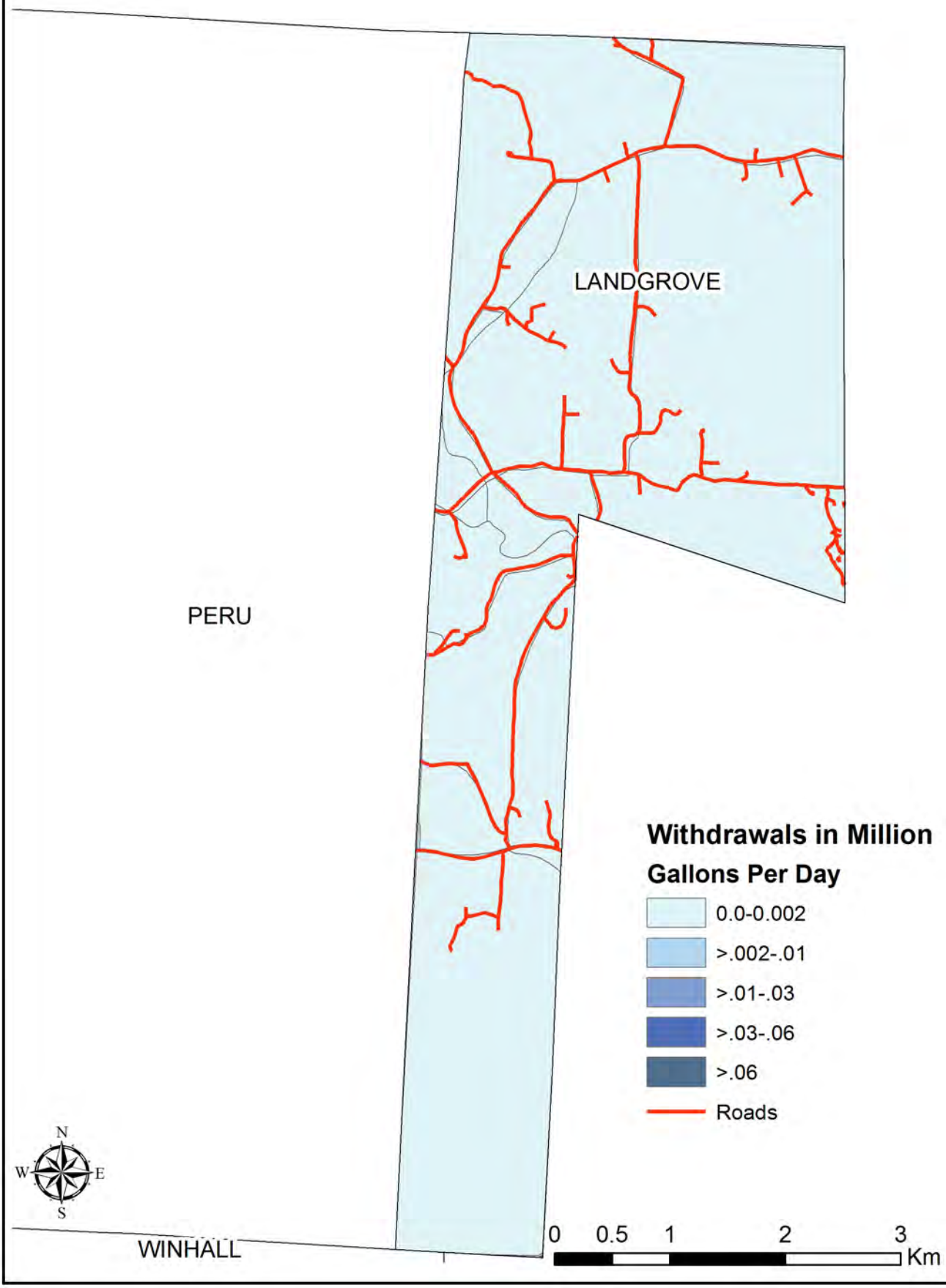
Kyle Walz
Source: USGS
April, 2015

Census Blocks in Landgrove, Vermont Showing Water Withdrawals in 2005



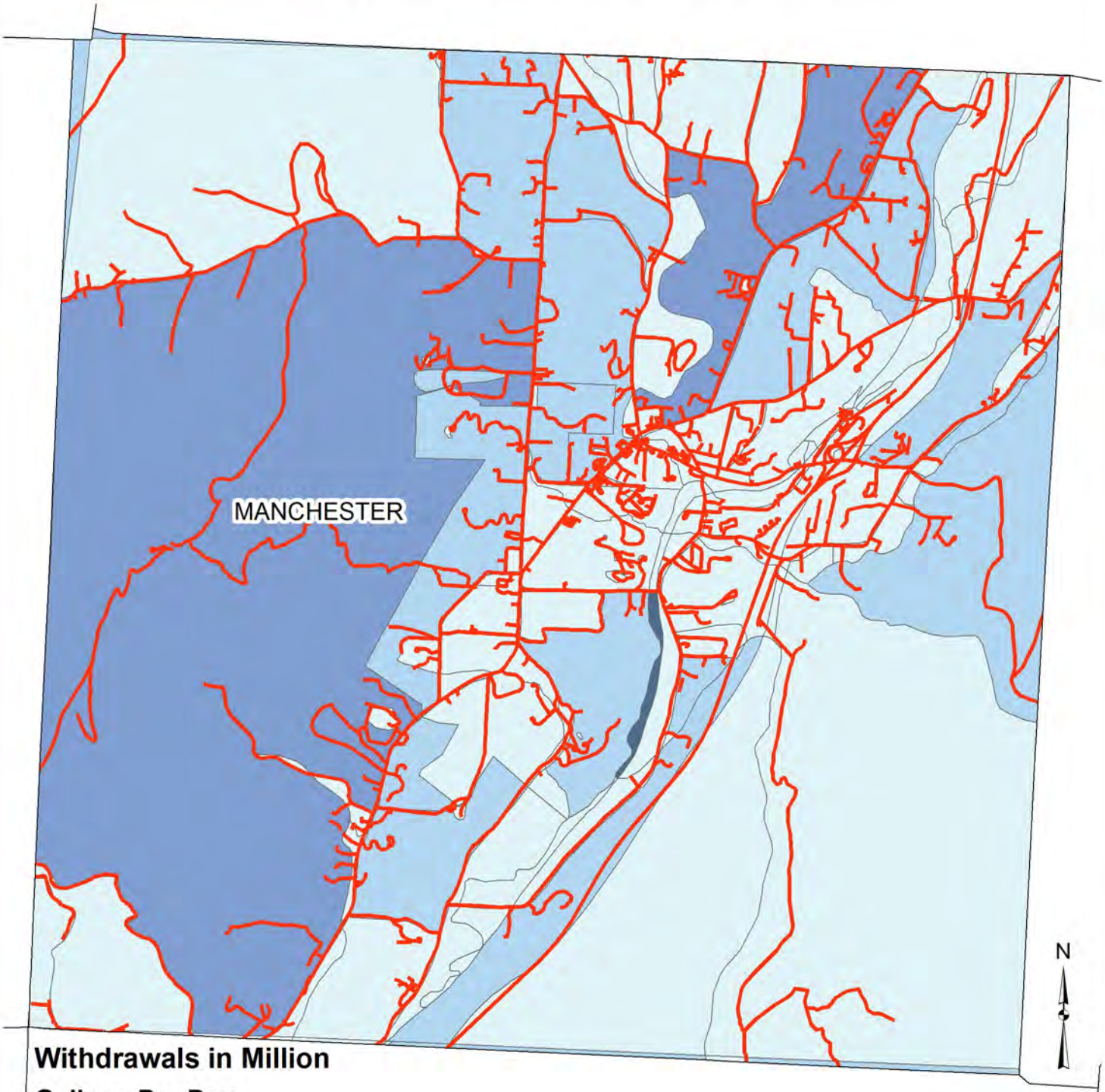
Kyle Walz
Source: USGS
April, 2015

Census Blocks in Landgrove, Vermont Showing Water Withdrawals in 2020



Kyle Walz
Source: USGS
April, 2015

Census Blocks in Manchester, Vermont Showing Water Withdrawals in 2005



Withdrawals in Million Gallons Per Day

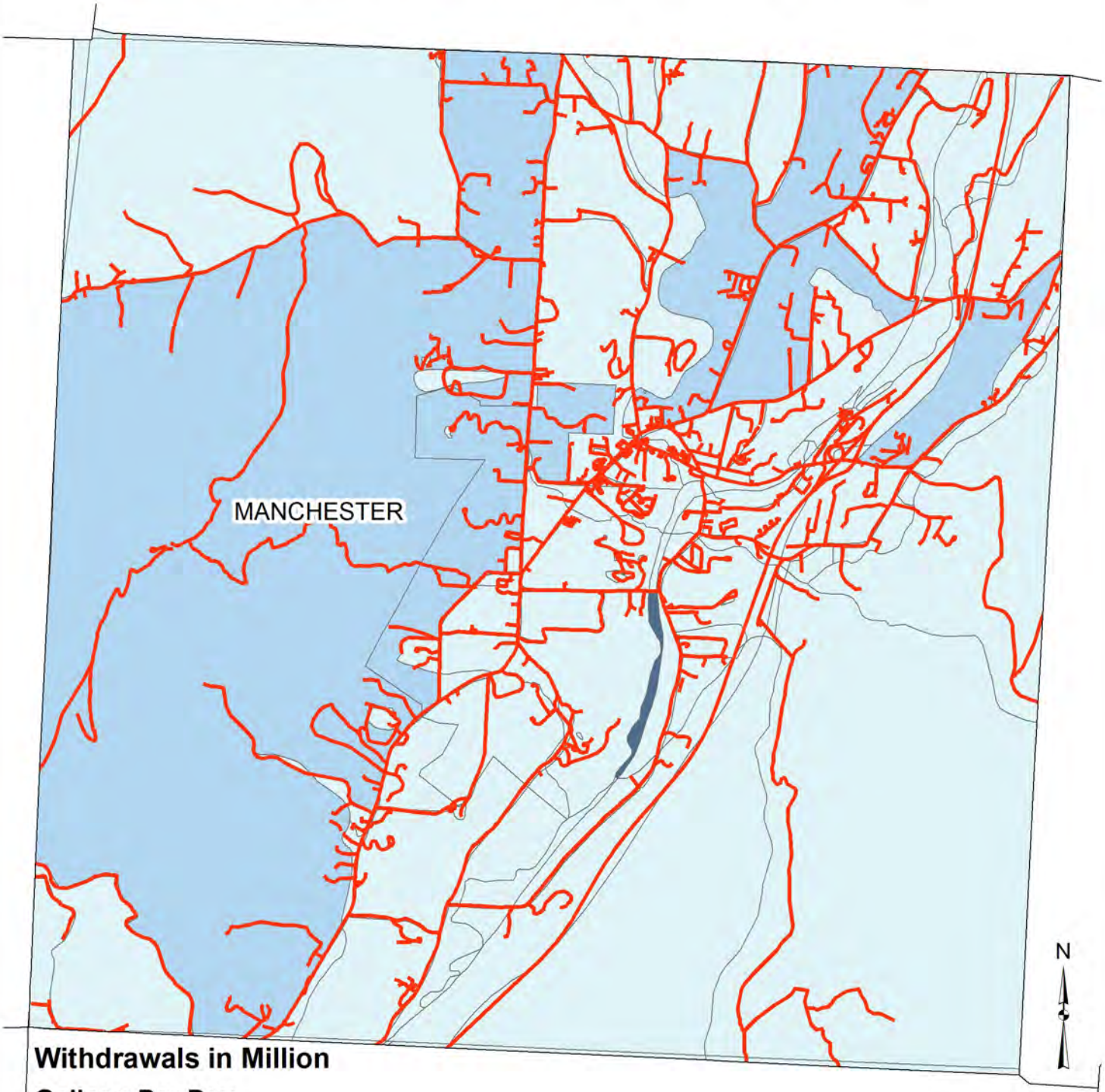
- 0-.002
- > .002-.01
- > .01-.03
- > .03-.06
- >.06
- Roads

SUNDERLAND

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Manchester, Vermont Showing Water Withdrawals in 2020



Withdrawals in Million Gallons Per Day

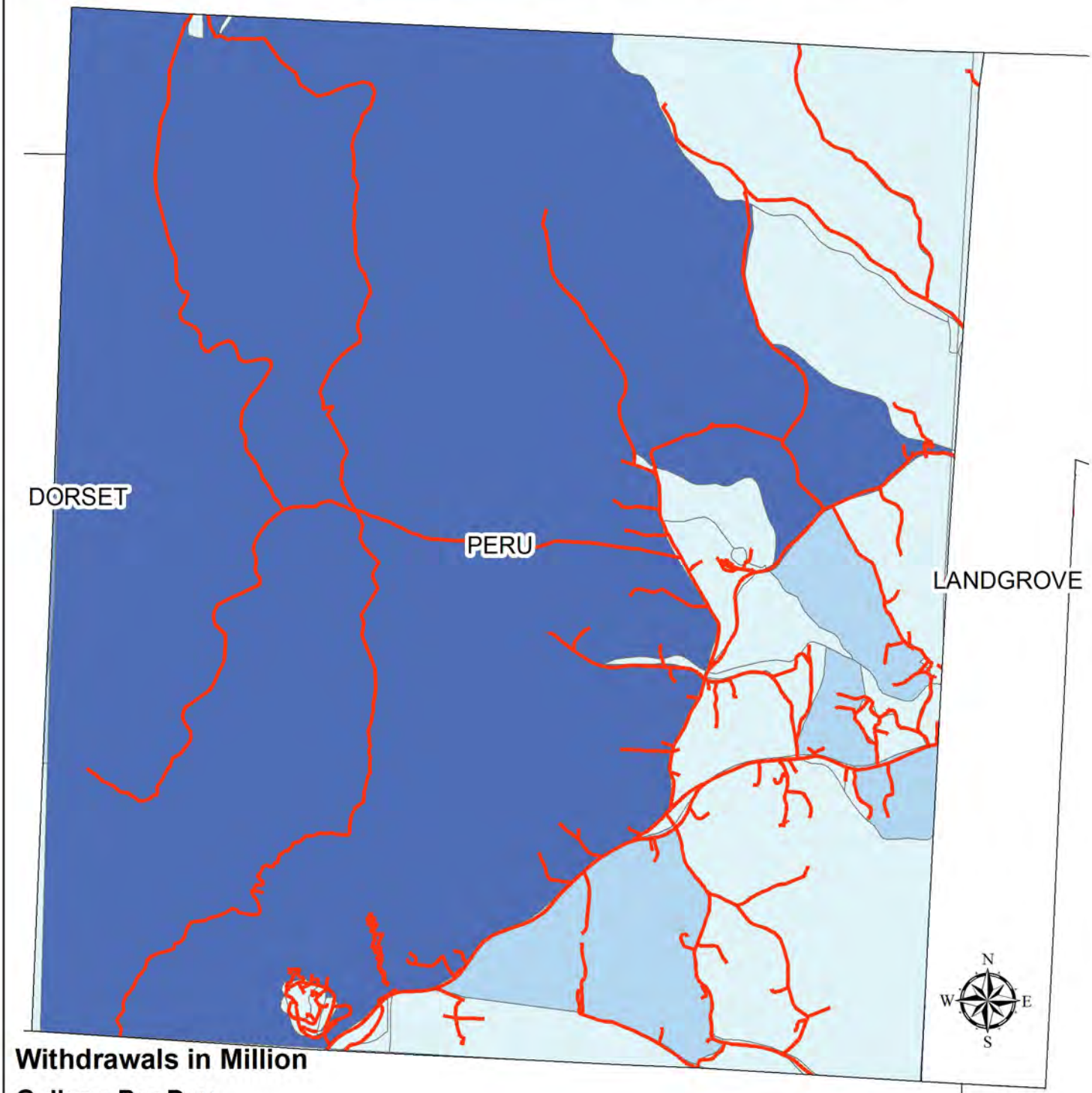
- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

SUNDERLAND

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Peru, Vermont Showing Water Withdrawals in 2005



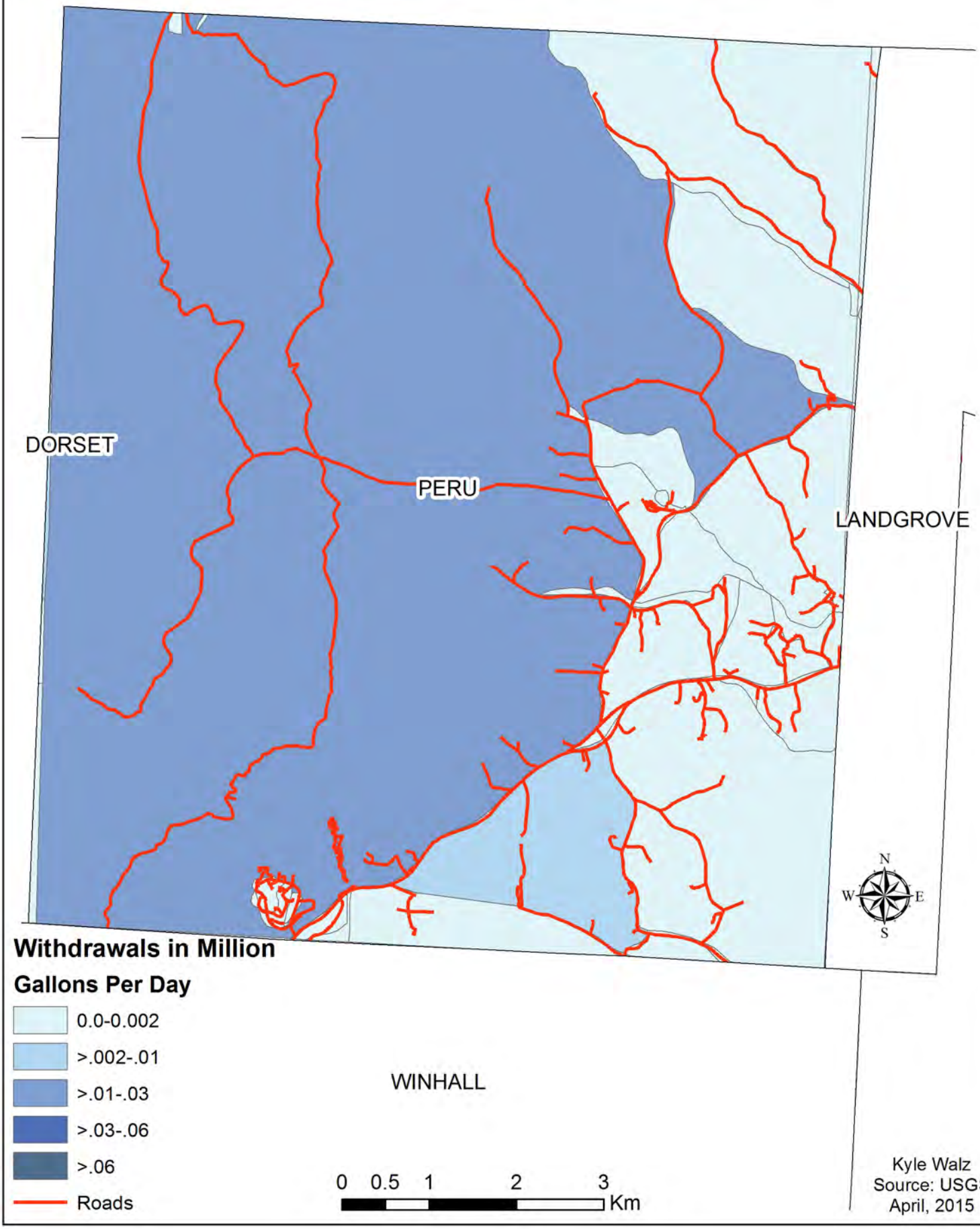
Withdrawals in Million Gallons Per Day

- 0-.002
- > .002-.01
- > .01-.03
- > .03-.06
- >.06
- Roads

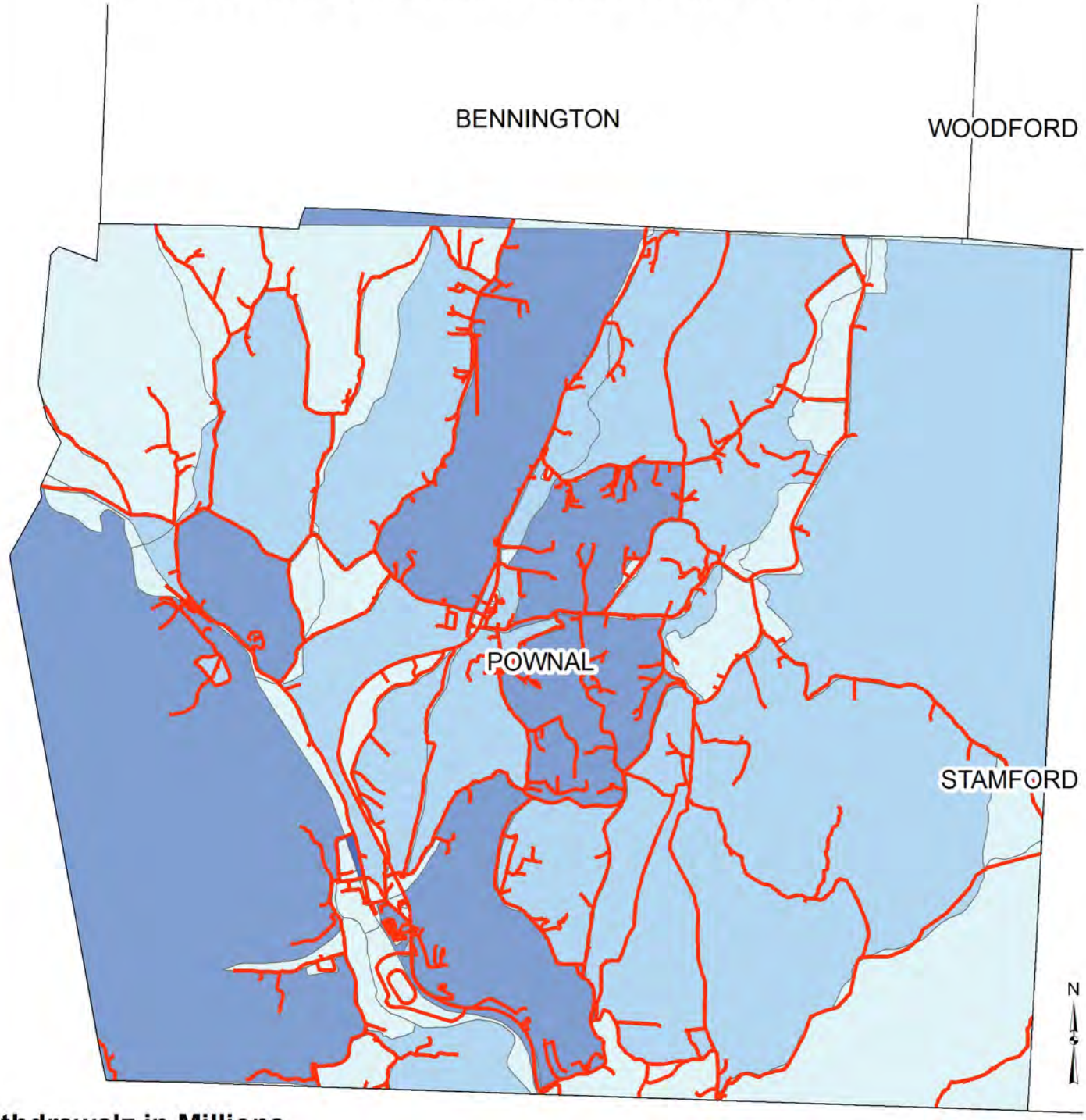
0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Peru, Vermont
Showing Water Withdrawals in 2020



Census Blocks in Pownal, Vermont Showing Water Withdrawals in 2005



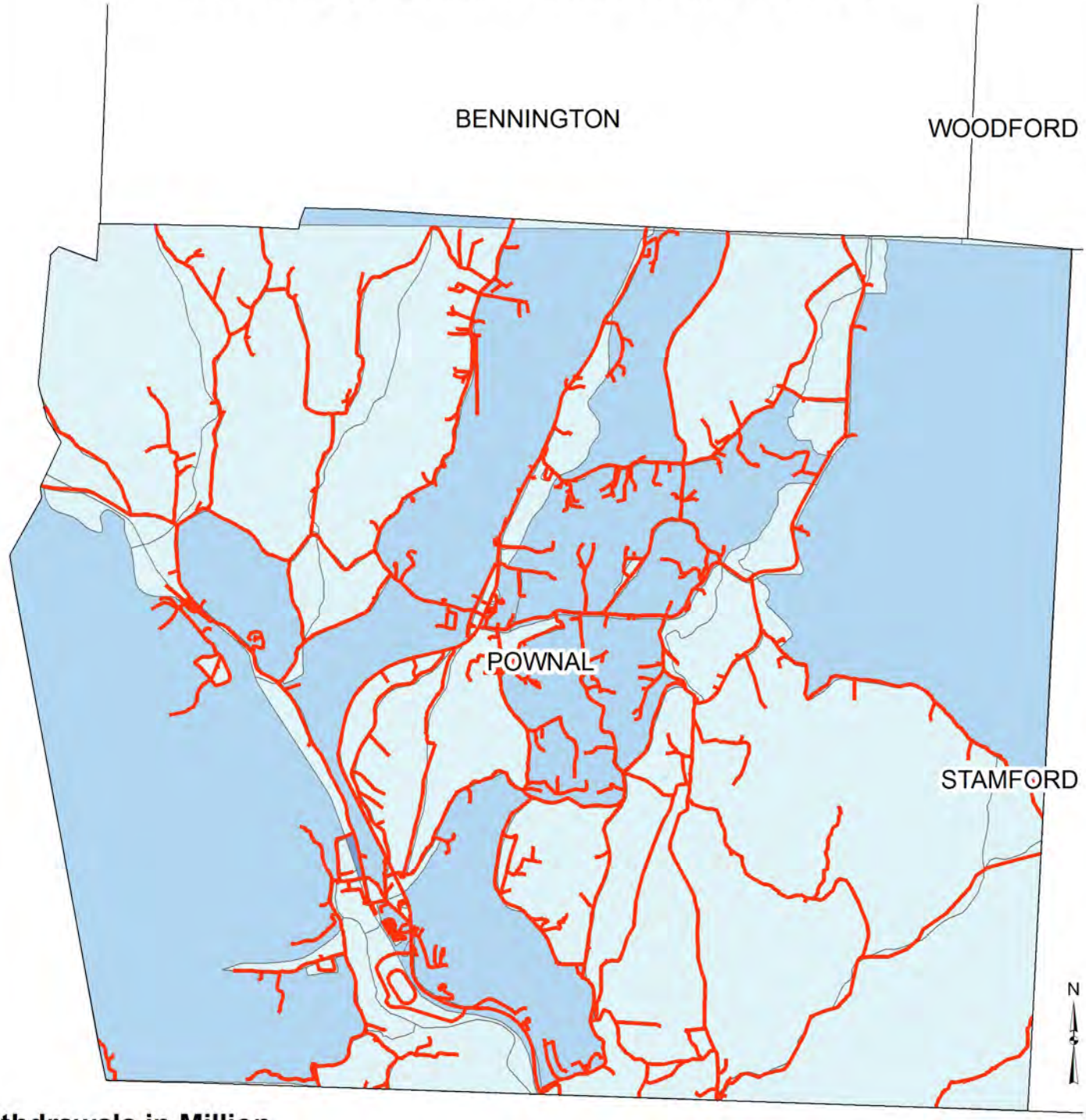
Withdrawalz in Millions Gallons Per Day

- 0-.002
- > .002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Pownal, Vermont Showing Water Withdrawals in 2020



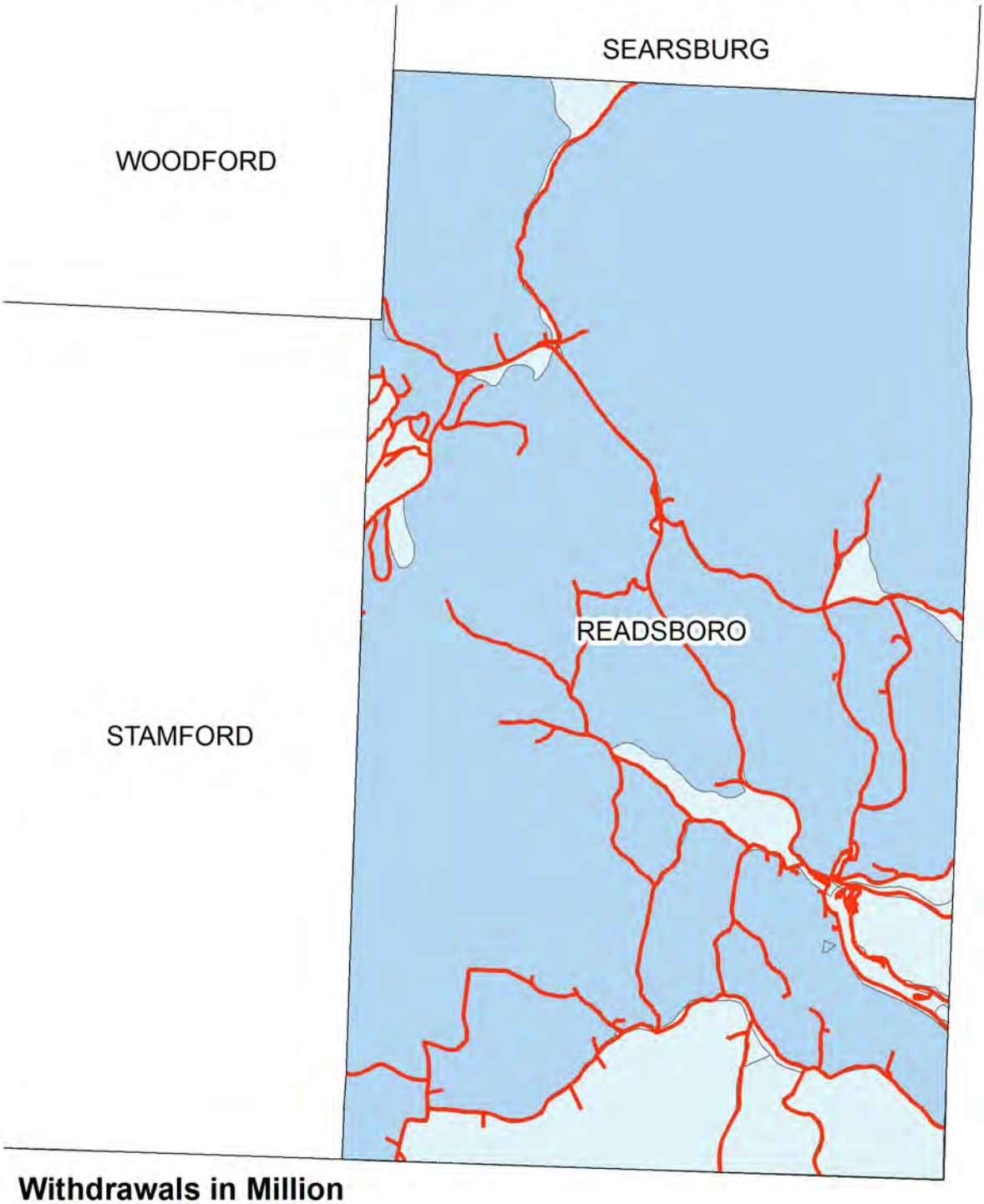
Withdrawals in Million Gallons Per Day

- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Readsboro, Vermont Showing Water Withdrawals in 2005



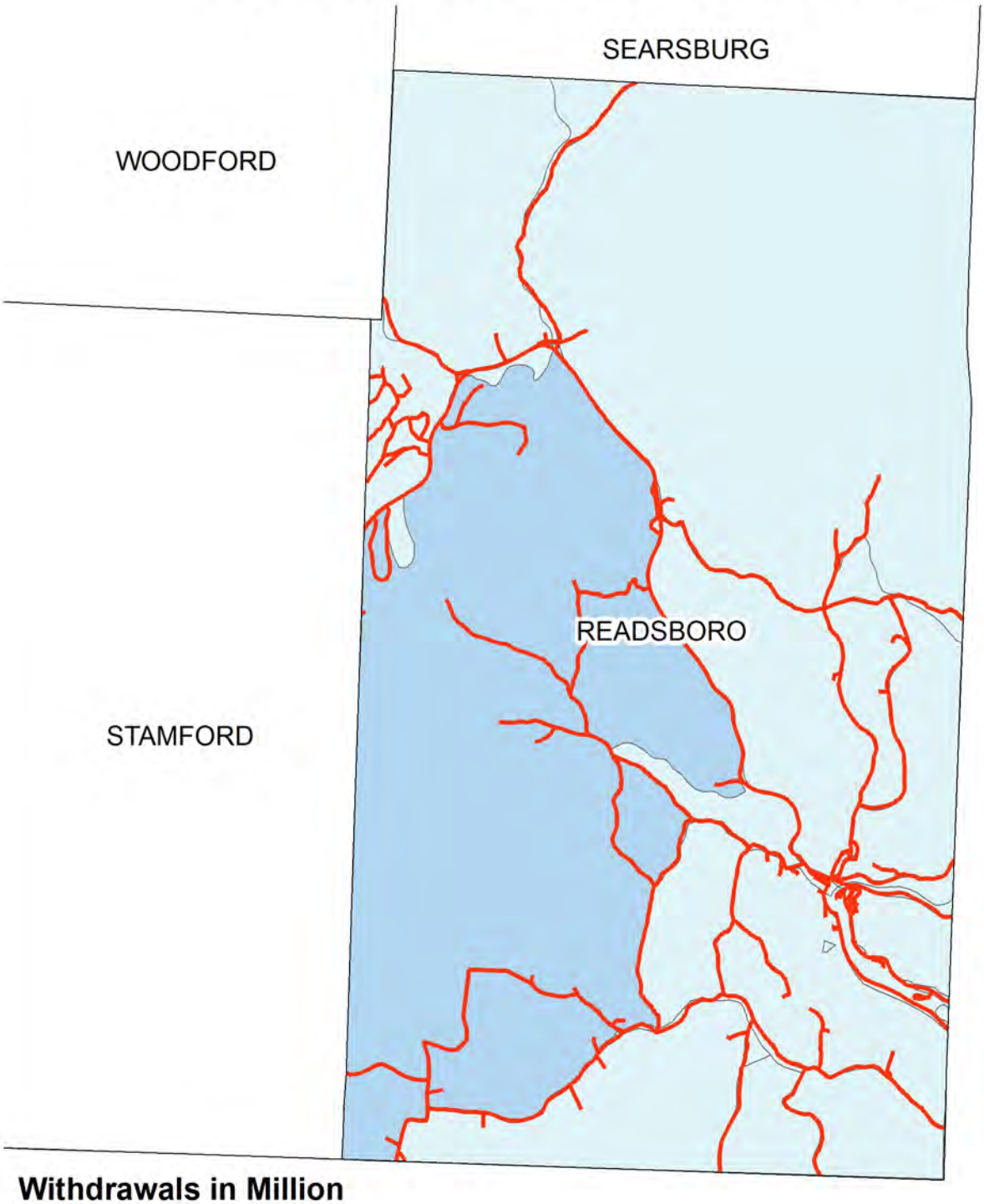
Withdrawals in Million Gallons Per Day

- 0-.002
- > .002-.01
- >.01-.03
- >.03-.06
- > .06
- Roads

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Readsboro, Vermont Showing Water Withdrawals in 2020



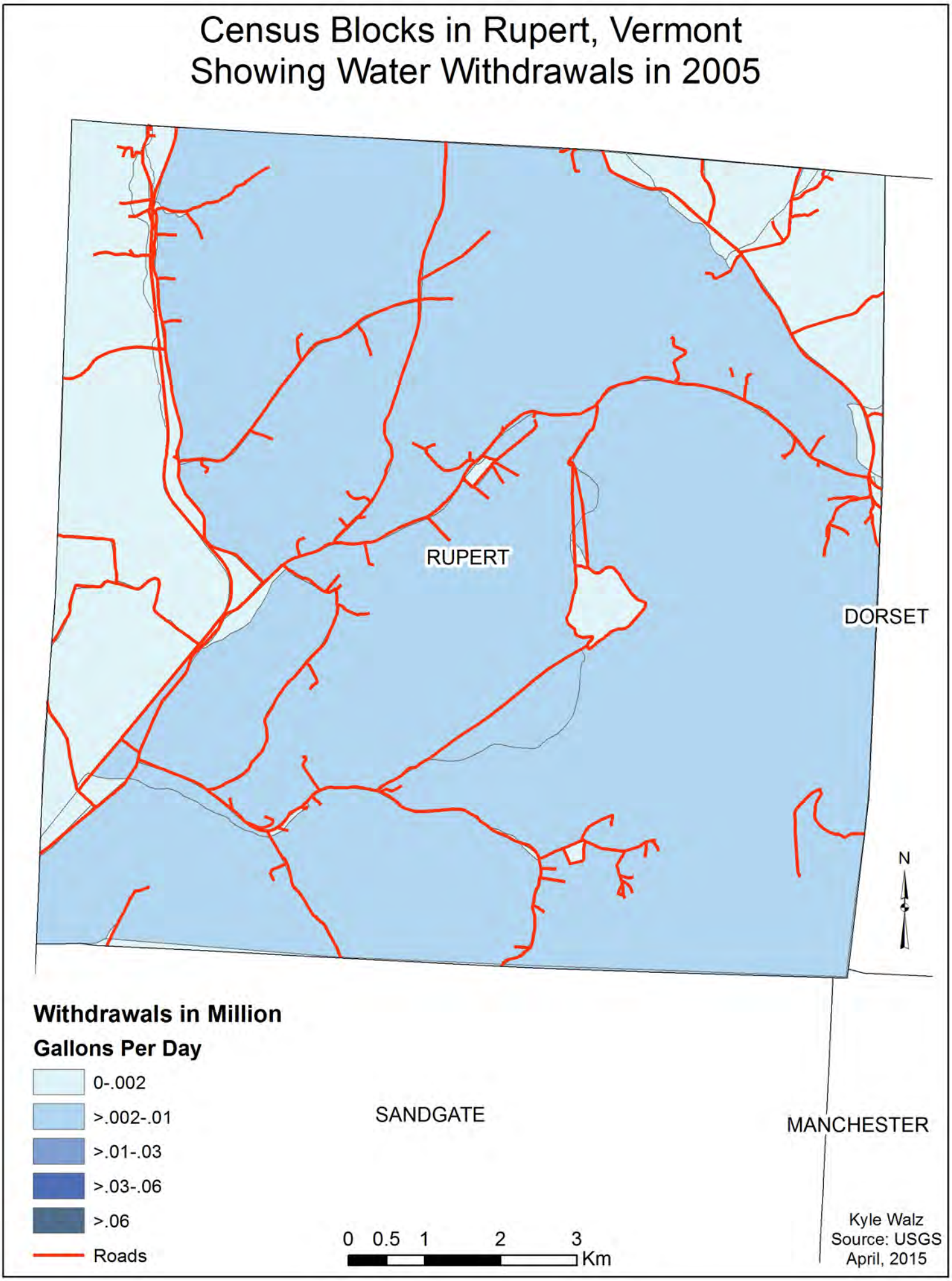
Withdrawals in Million Gallons Per Day

- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

0 0.5 1 2 3 Km

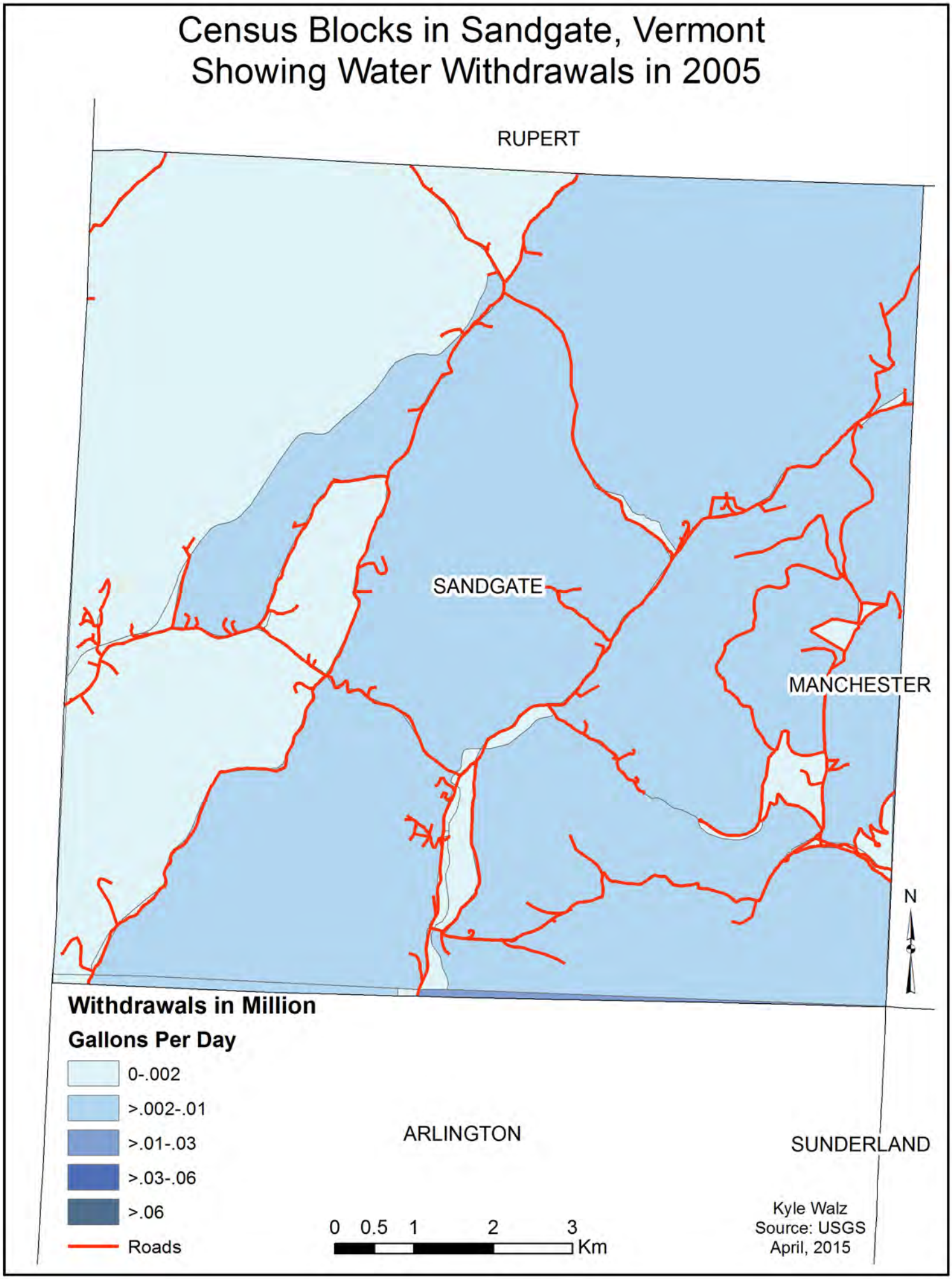
Kyle Walz
Source: USGS
April, 2015

Census Blocks in Rupert, Vermont Showing Water Withdrawals in 2005

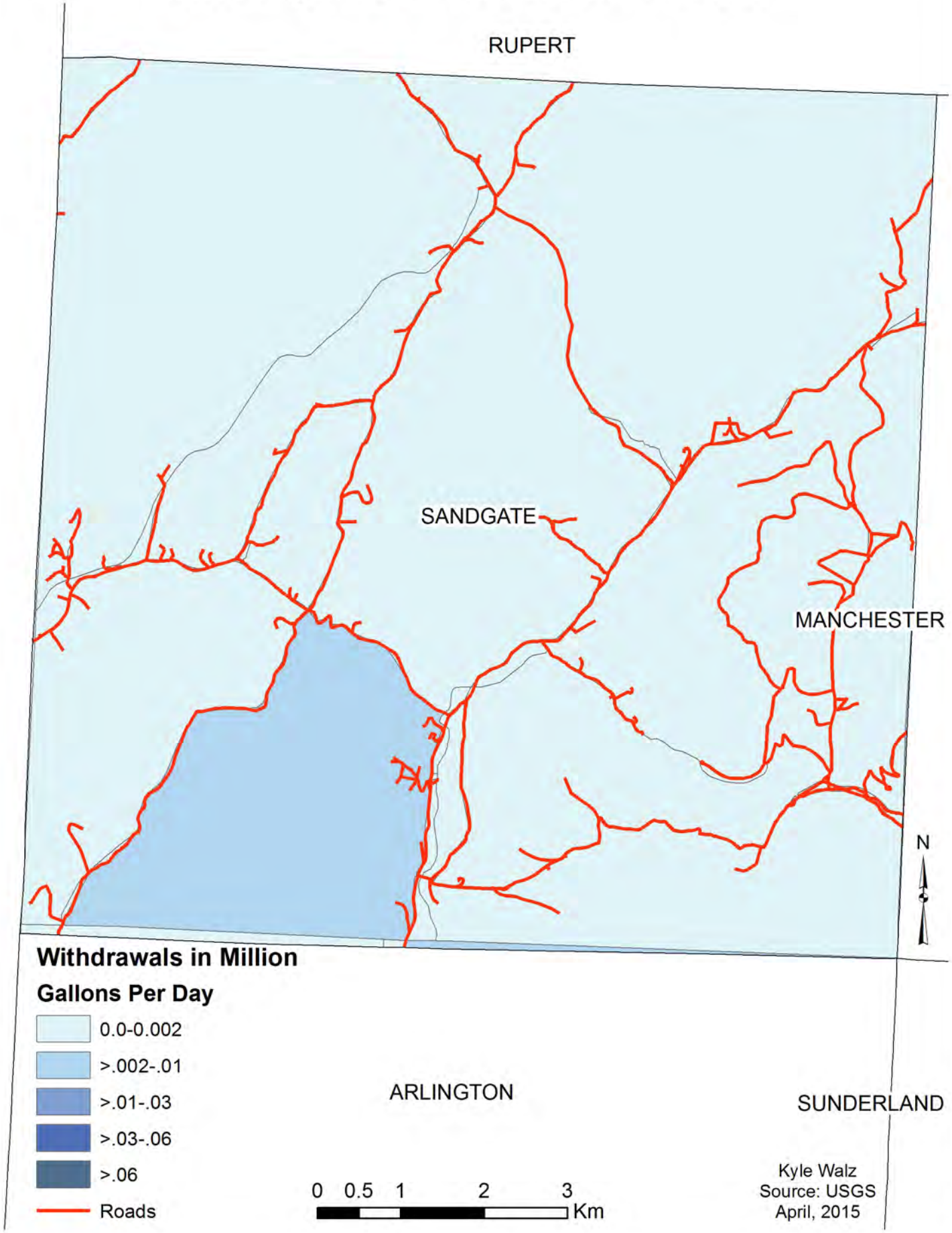


Census Blocks in Rupert, Vermont Showing Water Withdrawals in 2020

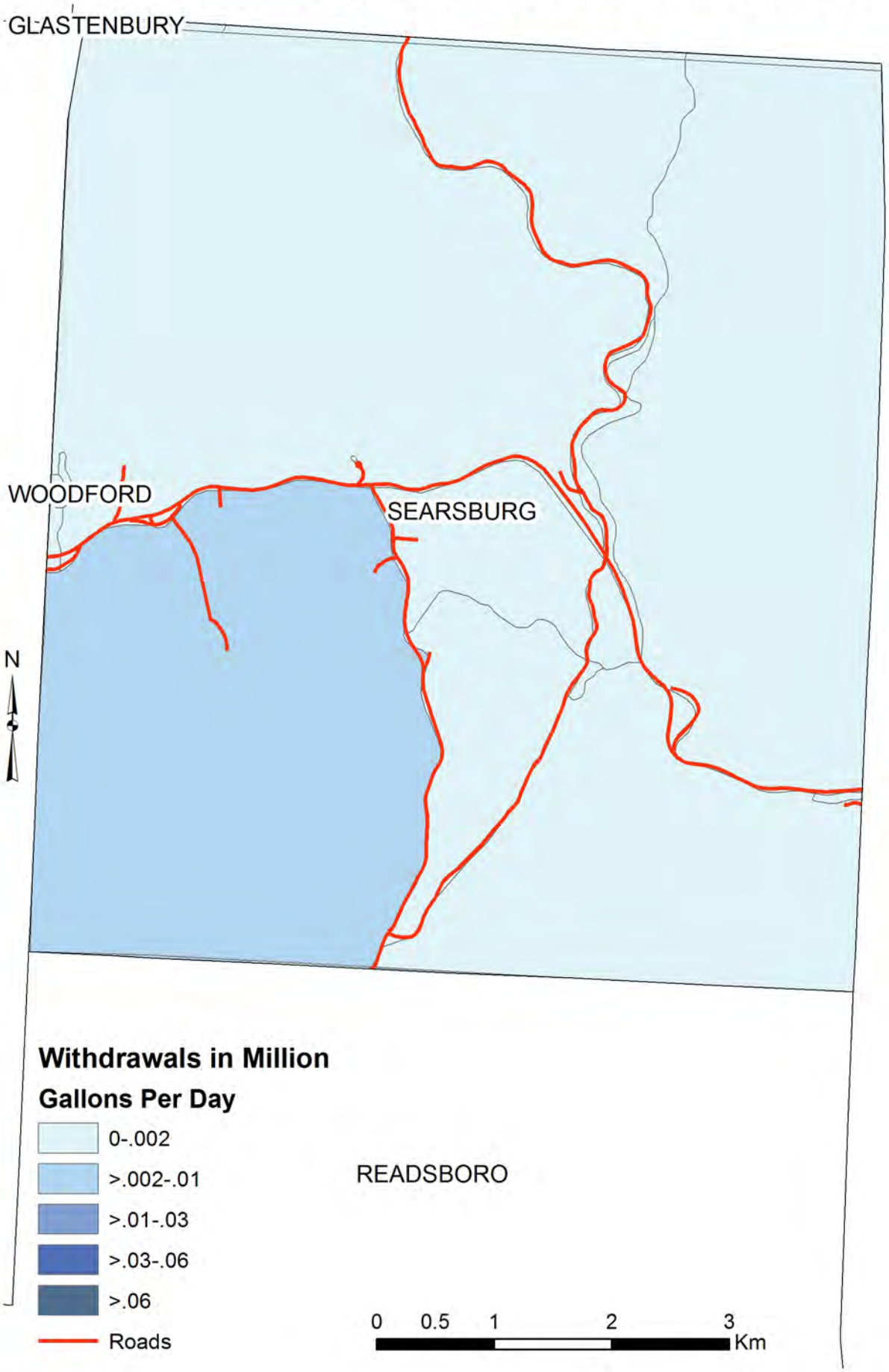
Census Blocks in Sandgate, Vermont Showing Water Withdrawals in 2005



Census Blocks in Sandgate, Vermont Showing Water Withdrawals in 2020

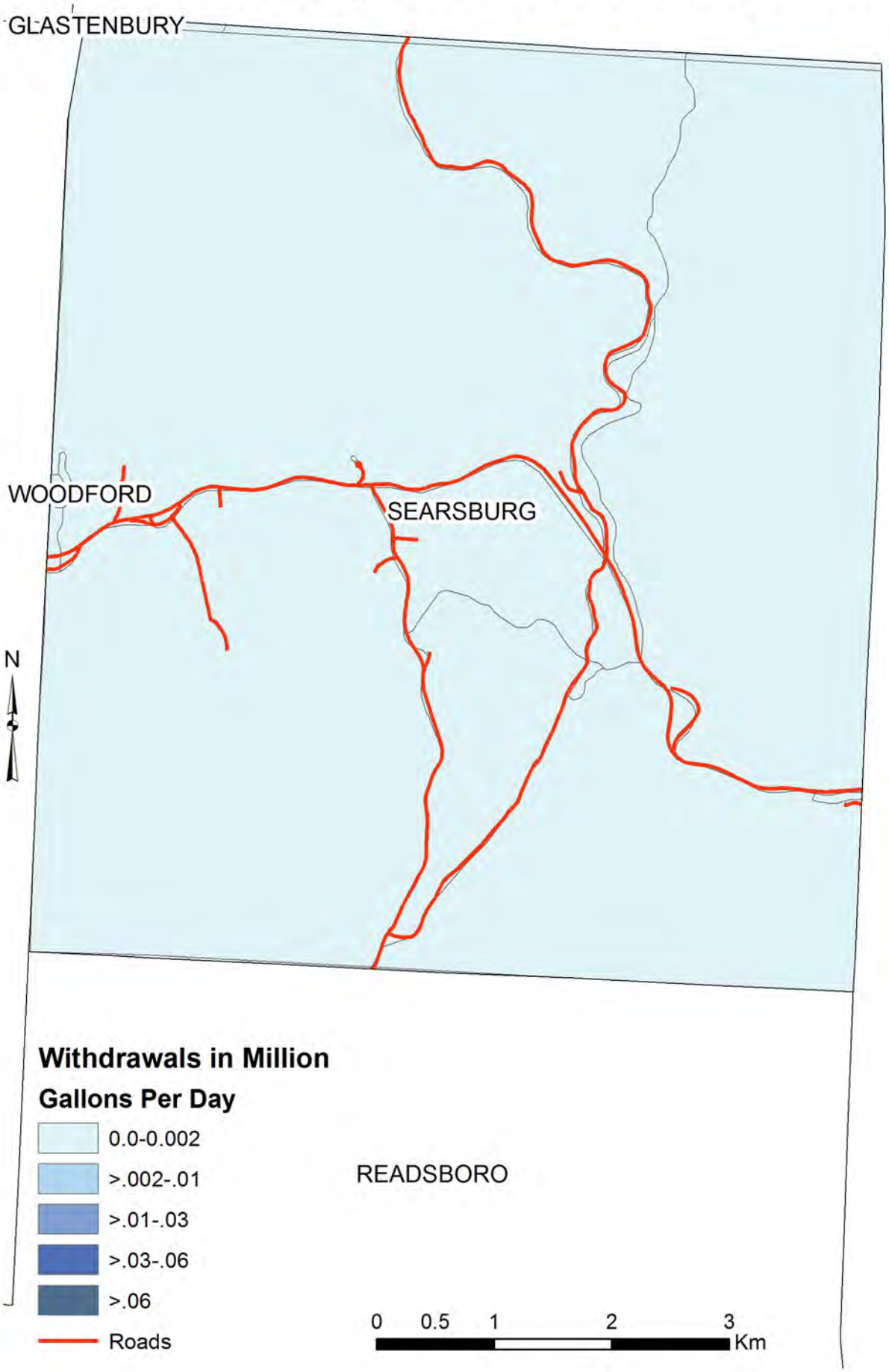


Census Blocks in Searsburg, Vermont Showing Water Withdrawals in 2005



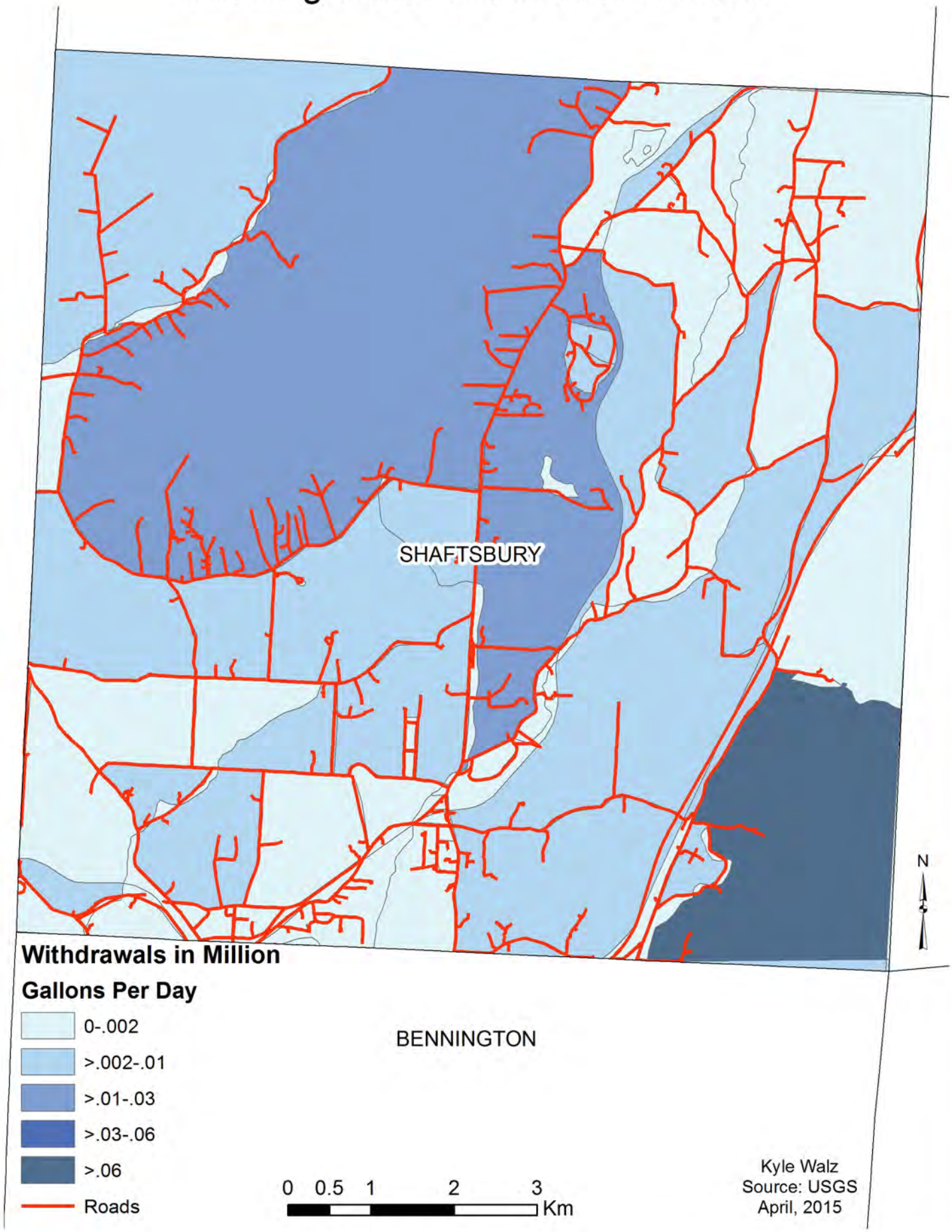
Kyle Walz
Source: USGS
April, 2015

Census Blocks in Searsburg, Vermont Showing Water Withdrawals in 2020

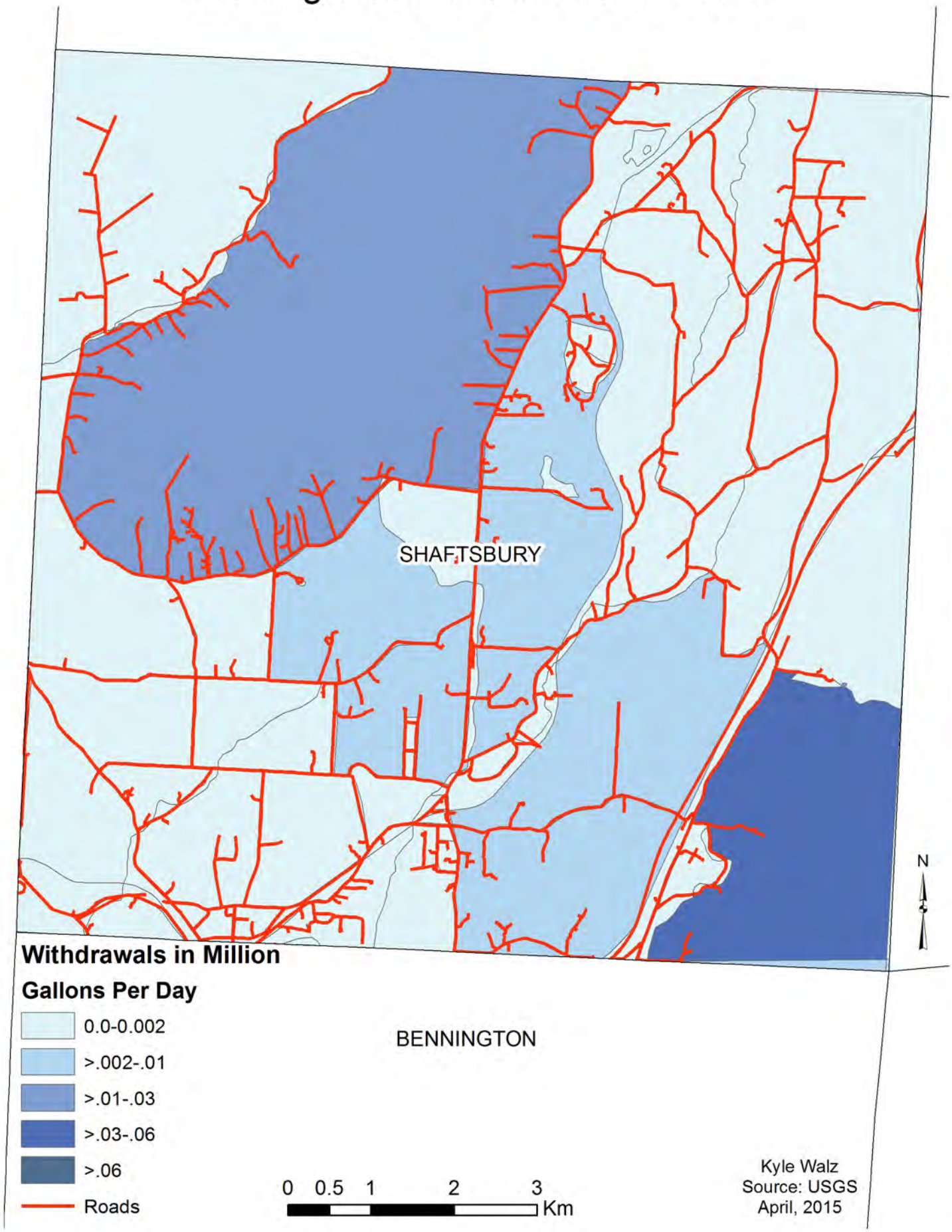


Kyle Walz
Source: USGS
April, 2015

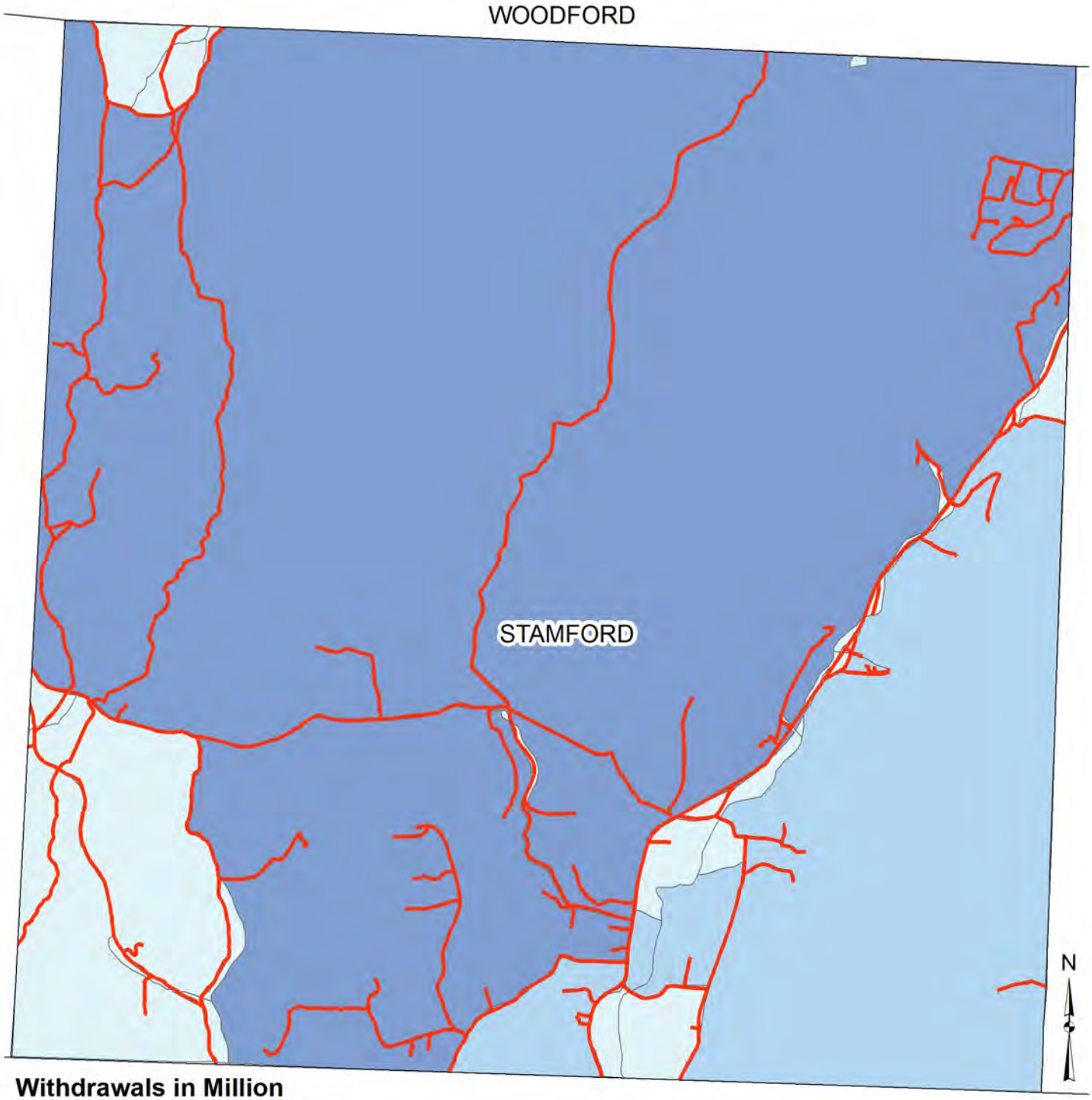
Census Blocks in Shaftsbury, Vermont Showing Water Withdrawals in 2005



Census Blocks in Shaftsbury, Vermont Showing Water Withdrawals in 2020



Census Blocks in Stamford, Vermont Showing Water Withdrawals in 2005



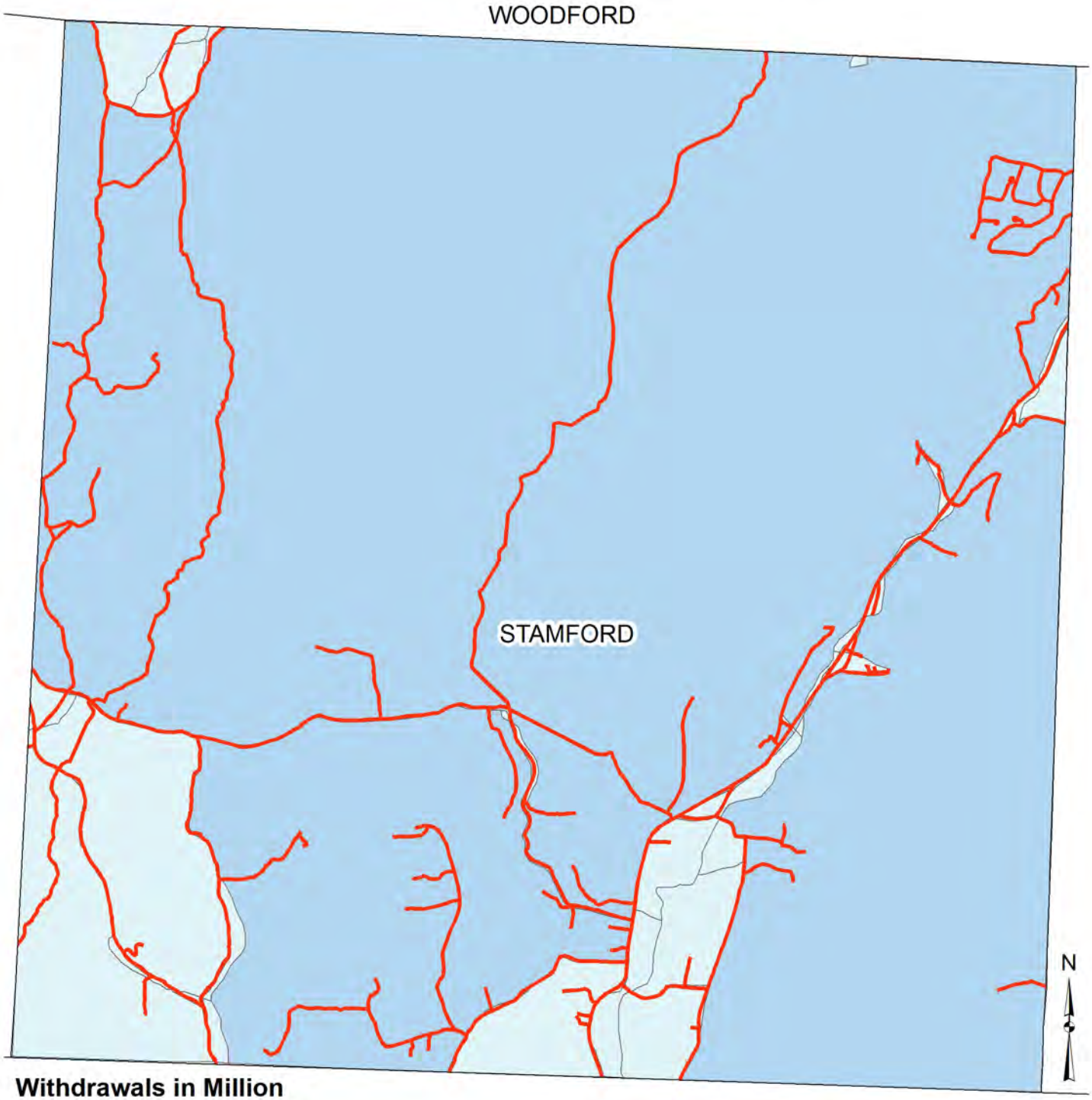
Withdrawals in Million Gallons Per Day

- 0-.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

Census Blocks in Stamford, Vermont Showing Water Withdrawals in 2020



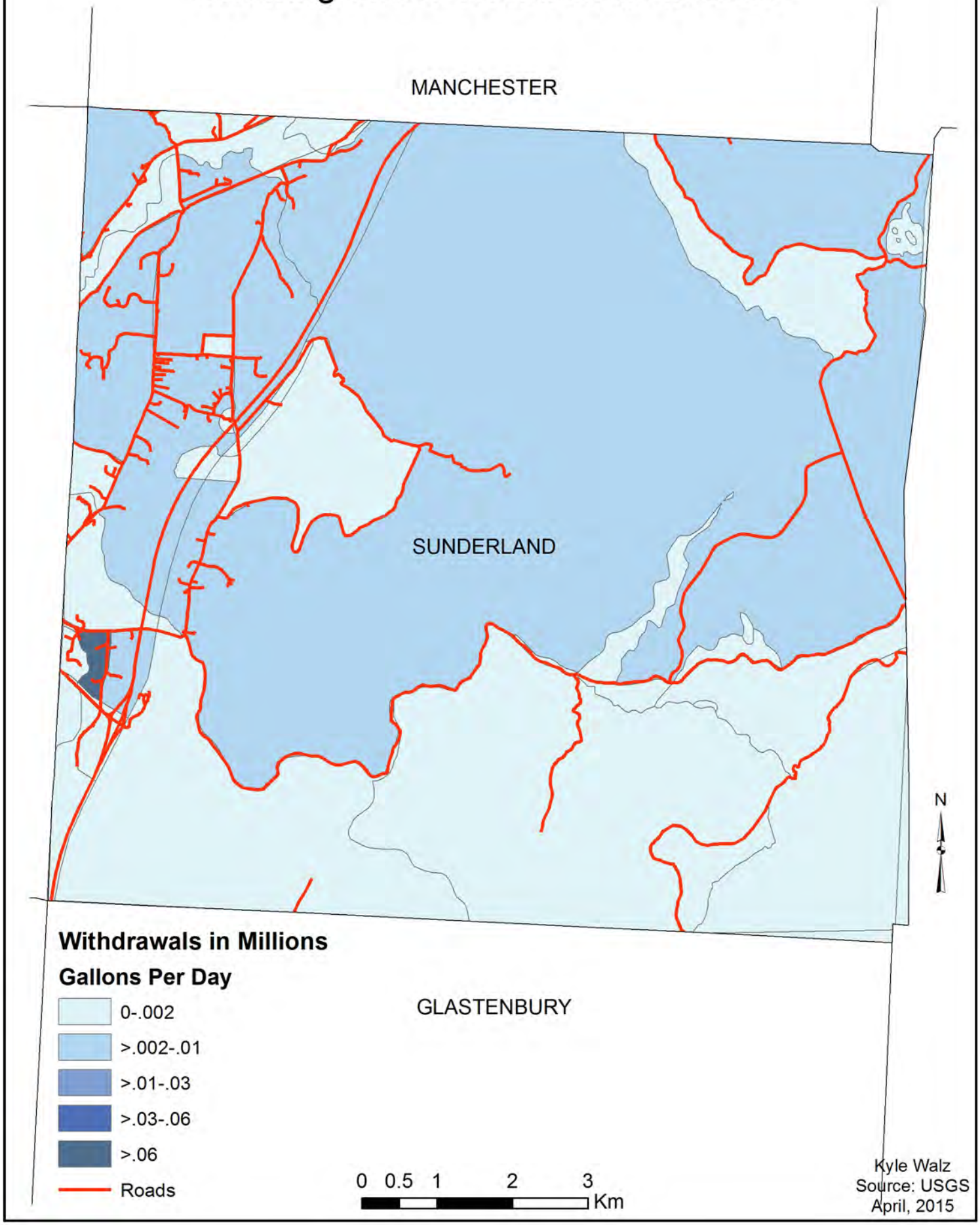
Withdrawals in Million Gallons Per Day

- 0.0-0.002
- >.002-.01
- >.01-.03
- >.03-.06
- >.06
- Roads

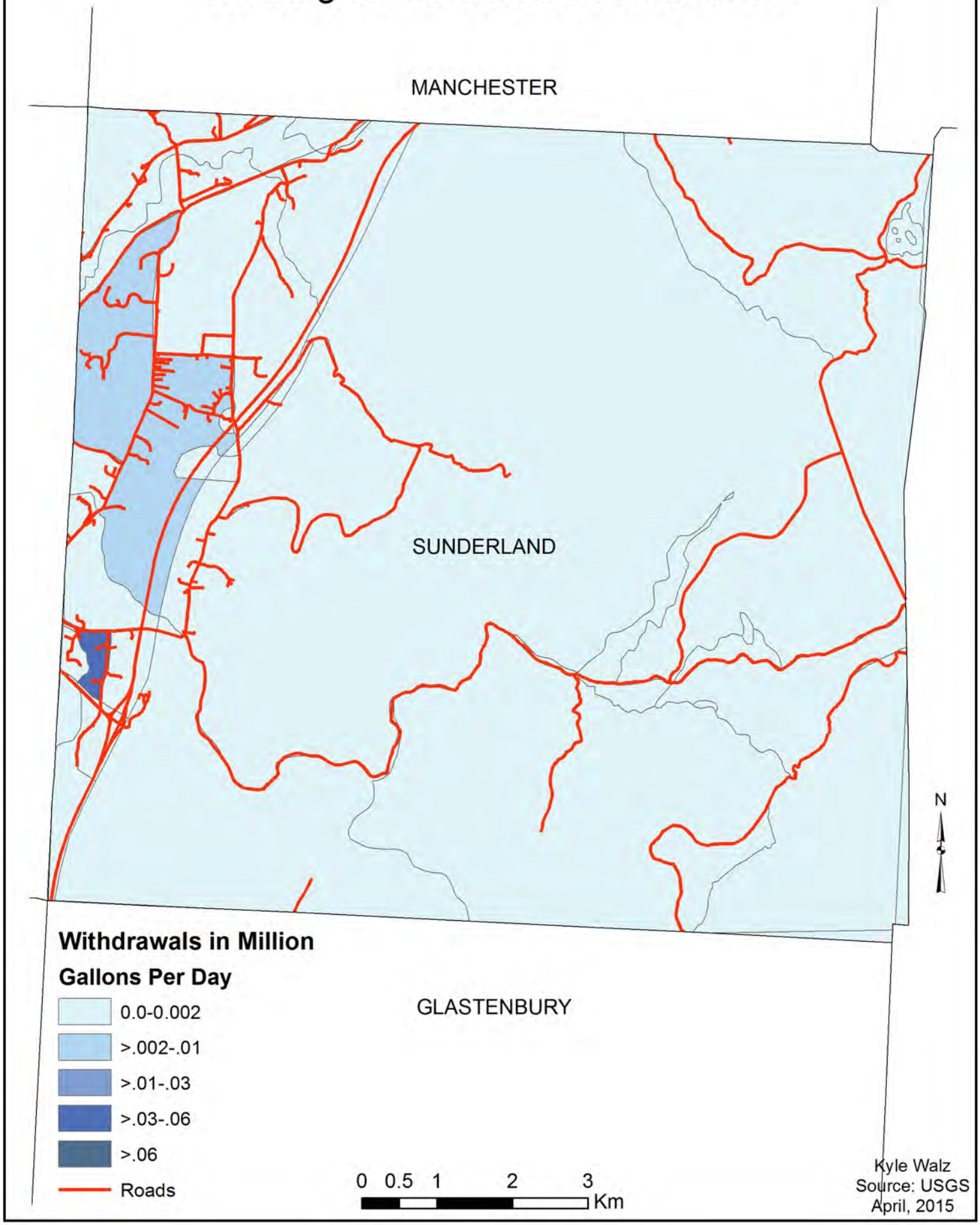
0 0.5 1 2 3 Km

Kyle Walz
Source: USGS
April, 2015

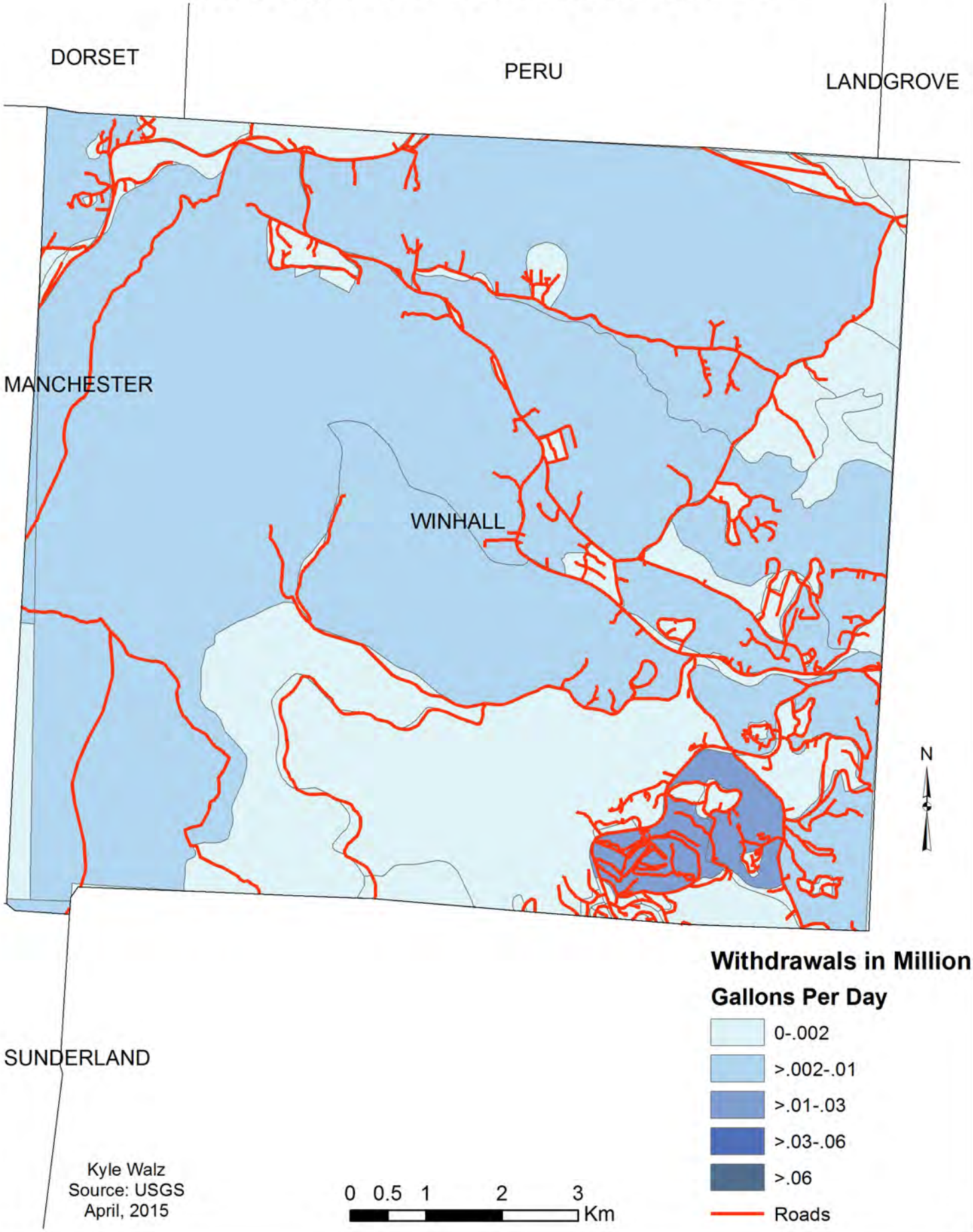
Census Blocks in Sunderland, Vermont Showing Water Withdrawals in 2005



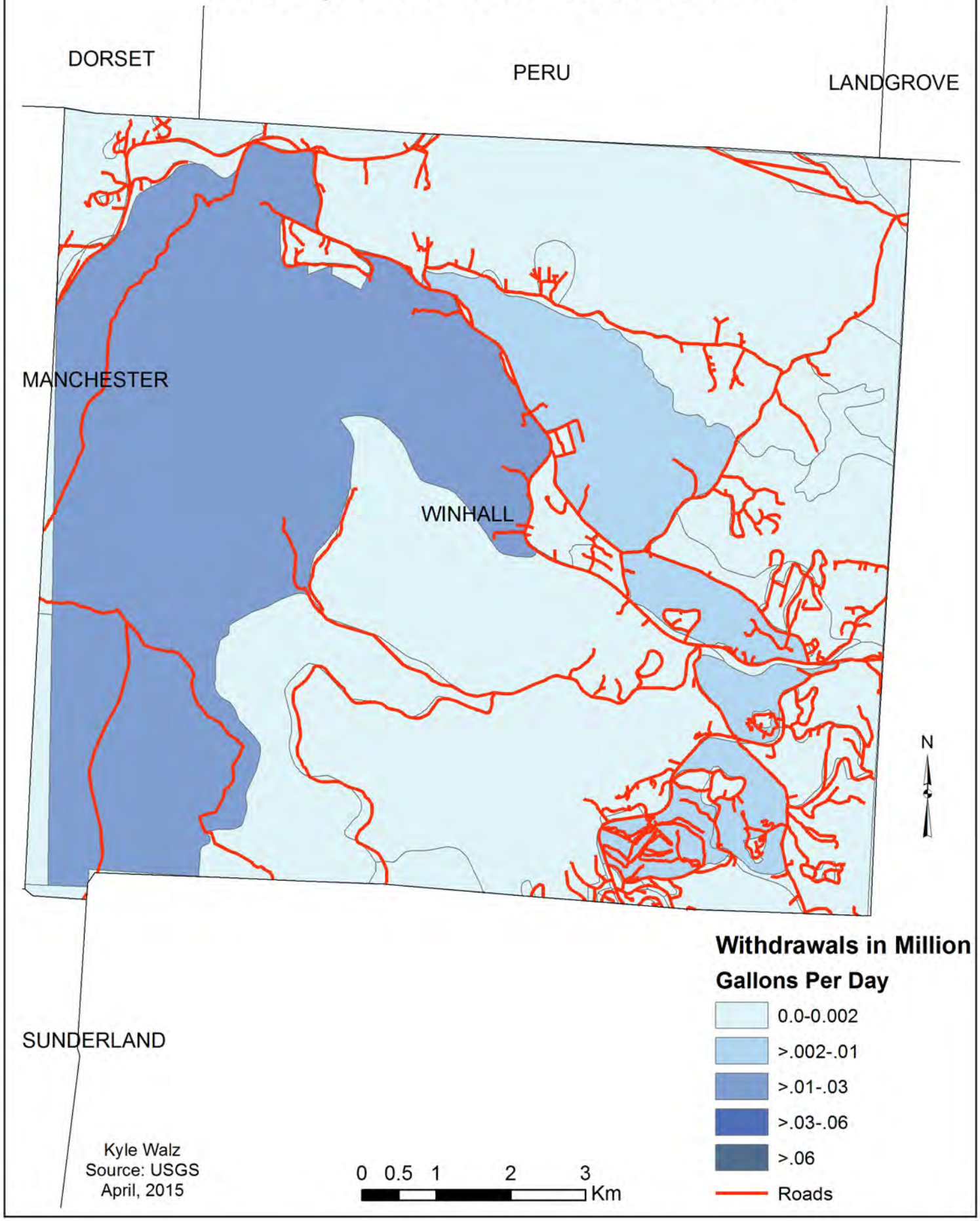
Census Blocks in Sunderland, Vermont Showing Water Withdrawals in 2020



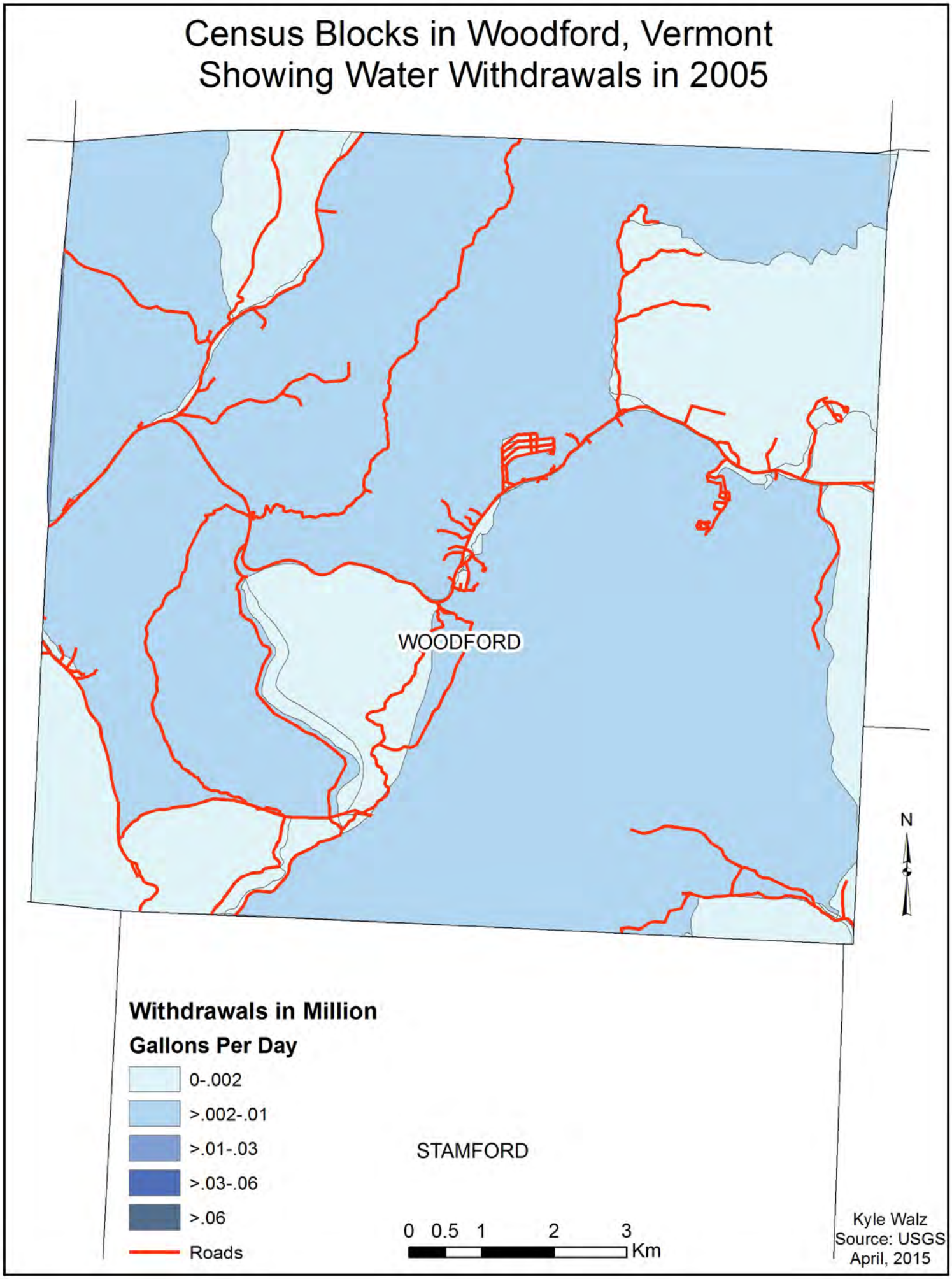
Census Blocks in Winhall, Vermont Showing Water Withdrawals in 2005



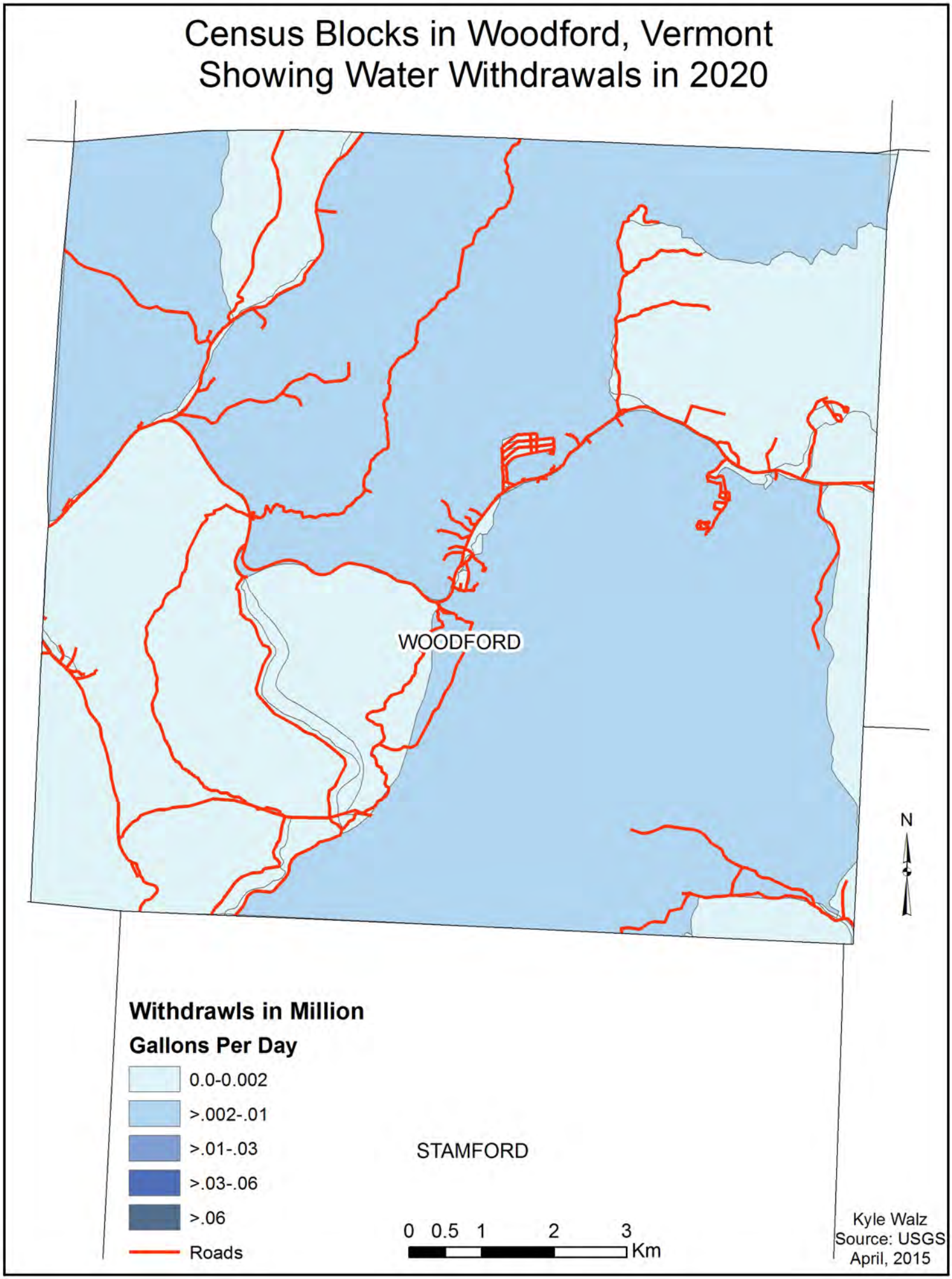
Census Blocks in Winhall, Vermont Showing Water Withdrawals in 2020



Census Blocks in Woodford, Vermont Showing Water Withdrawals in 2005



Census Blocks in Woodford, Vermont Showing Water Withdrawals in 2020



Kyle Walz, Nathaniel Laymon, Elijah Mendelsohn
Mapping Groundwater Withdrawals for 2005 and 2020 in Vermont

Introduction:

Groundwater is becoming a valuable resource and having the ability to see where and how water is getting used is very important. Based on census block data we were able to map the use of groundwater in three counties, Addison, Bennington, and Chittenden counties in the state of Vermont. United States Geological Survey provided withdrawal data, which allowed us to map each town for the counties listed above. Data from 2005 was provided and the projection for 2020 was also provided. Mapping this will be important so necessary precautions can be made for the management of groundwater in Vermont

Methods:

In order to map this data we needed to join different data sets in order to get the correct data. In order to check to see if the joins we were doing were correct we checked based on figure 10 on page 23 in the USGS publication called "Estimated Water Withdrawals and Return Flows in Vermont In 2005 and 2020." The steps below show what data we joined and how we mapped each county.

1) The first step we had to do was to separate all the data in the Vermont Water Use Database Generic Excel file. We separated everything based on whether it was surface water or groundwater and whether it was return flow or withdrawal. We needed withdrawal data and groundwater data. In order to do this we put this file into Microsoft Access and sorted it based on groundwater and withdrawal.
2) Next, we took all of the withdrawals of groundwater and took the sum of all withdrawals for each STFID number. We did this using the query wizard in Microsoft Access.
3) We took the the new Access query that we created which included both 2005 and 2020 water use data and put them into a Microsoft Excel Spreadsheet and then saved it as a .csv file.
4) We put the saved .csv file that we just created and the "New_DemoBlock" data that Marjorie Gale sent us and uploaded those into QGIS. We joined the data in QGIS and exported that new layer as an ESRI Shapefile. We needed to do this in QGIS because ArcMap was unable to perform this part of the join.
5) We took that new shapefile created in QGIS called "Joined_Data" (shapefile) and uploaded that file into ArcMap.
6) In order to put the 2005 and 2020 data onto the maps we needed to convert the "Sum of Wat" field (Water use for 2005) and the Sum of W_1 field (Water use for 2020) into numeric values because when converted in QGIS it was in text and had no numeric value. We added a new field in the attribute table for each field, naming them "Water_05" and "Water_20" and used the field calculator to make them the same value as the ones in the original columns.
    a) Note: The precision was set to 10 and the scale was set to 11.

7) Once all these steps were complete we were able to begin making maps for all the towns in county we each chose for both 2005 and 2020.

Conclusion:

This project showed many challenges when trying to join data. At first the data we were joining was not working and was not as easy as we expected it. We tried sorting the data in Microsoft Excel and realized, based on figure 10 in the “Estimated Water Withdrawals and Return Flows in Vermont In 2005 and 2020” journal that was provided. We also did not have updated DemoBlock data, and once this was provided we were able to have the right census blocks available. This project was difficult, but now that the data is joined and we have the correct shapefile, the state of Vermont now has groundwater withdrawals represented with the correct data.