Appendix A: Data Source Credits

Chapter 1: Data source include

Aerial Photograph of Faxon Creek clipped from the "2013 County Aerial 1 Meter Resolution" and downloaded from city of Superior, WI web page: http://www.ci.superior.wi.us/618/Imagery.

Jafr DEM clipped from SRTM 90m Digital Elevation Data downloaded from CGIAR-CSI HOME http://srtm.csi.cgiar.org.

Data (HugIsland, MurphyOil, NewtonCreek, and Sampling layers) are derived from the author article: Assessment of Newton Creek and Its Effect on Hog Island Inlet of Lake Superior. *Journal of Water Quality, Exposure and Health*, 2012 https://link.springer.com/article/10.1007/s12403-012-0071-1.

All graphs are created by the author.

Chapter 2: Data source include

Data (ca_airport, ca_cities, ca_school, and ca_volcanic layers) are taken from ESRI Data and Maps, 2012 https://my.esri.com/#/downloads/Data%20and%20Content.

Data (groundwater wells and pipeline in Texas) created new by the author.

Chapter 3: Data source include

Data (Fault, Geology, and Well layers) are derived from the author article: Recharge origin, overexploitation, and sustainability of water resources in an arid area from Azraq basin, Jordan: case study, 2006 http://hr.iwaponline.com/content/37/3/277.

Chapter 4: Data source include

Data (Douglas, Tract, Lake, and Stream) are derived from TIGER/Line Shapefiles from United States Census Bureau web page: https://www.census.gov/geo/maps-data/data/tiger.html.

GPS data (Coord.txt) created new by students using Garmin GPS designed by the author.

The software (dnrgps.exe) to integrate GPS data into GIS is downloaded from DNR web page: http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html.

Data (World Basemap) is part of ArcGIS Explorer downloaded from ESRI web page: http://www.esri.com/software/arcgis/explorer-desktop.

The image (ortho 1-1 1n s wi031 2015 1.sid) is downloaded from the Wisconsin View web page: ftp://ftp.ssec.wisc.edu/pub/wisconsinview/NAIP_2015/Douglas/.

Data (Protected USA layer) is integrated from ArcGIS Online https://www.arcgis.com/home/index.html.

Data (Catch and Well layers) are derived from the author article: Recharge mechanism and hydrochemistry evaluation of groundwater in the Nuaimeh area, Jordan, using environmental isotope techniques, 2006 http://link.springer.com/article/10.1007/s10040-004-0352-2.

Data (points, lines, polygons) are created new by students using on screen digitizing designed by the author.

The image (UWS_UTM15.tif) is clipped and projected from the "2013 County Aerial 1 Meter Resolution" and downloaded from city of Superior, WI web page: http://www.ci.superior.wi.us/618/Imagery.

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https://doi.org/10.1007/978-3-319-61158-7

Chapter 5: Data source include

Data (streets of Superior, street of Duluth, and WI layers) are derived from TIGER/Line Shapefiles from United States Census Bureau web page: https://www.census.gov/geo/maps-data/data/tiger.html.

Data (Lake.tif clipped from ortho_1-1_1n_s_wi078_2015_1.sid) downloaded from the Wisconsin View web page: ftp://ftp.ssec.wisc.edu/pub/wisconsinview/NAIP_2015/Menominee.

Data (GPS layer) created new by the author using Garmin GPS.

The image (Aquifer.jpg) represents the Eastern dolomite aquifer of Wisconsin is downloaded from the web page: http://wgnhs.uwex.edu/water-environment/wisconsin-aquifers/.

Data (Well table and Dhuleil layer) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan 2015 http://link.springer.com/article/10.1007/s13201-014-0263-x.

Data sketch No. 2, 3, and 7 are taken from ESRI web page: http://desktop.arcgis.com.

Chapter 6: Data source include

The image (Rec_Stream.tif) is derived from the author article: Recharge origin, overexploitation, and sustainability of water resources in an arid area from Azraq basin, Jordan: case study, 2006 http://hr.iwaponline.com/content/37/3/277.

Chapter 7: Data source include

Data (image_rectify, Dam, Stream, and StudyArea layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015 http://link.springer.com/article/10.1007/s13201-014-0263-x.

Data (Well, Fault, and Plant layers) are created new using geodatabase forms designed by the author.

Data (Well, Catchment, Table 1, and Table 2 layers) are created new by the author.

Data (Well and Dhuleil layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan 2015 http://link.springer.com/article/10.1007/s13201-014-0263-x.

Chapter 8: Data source include

Data (Farm and LandB layers) created new by the author for editing purposes.

Data (Street_Mn, River_MN, Lake_MN, Fault, Watershed_1, and Watershed_2 layers) created new by the author for editing purposes.

Data (Geology and Field_Geology layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015 http://link.springer.com/article/10.1007/s13201-014-0263-x.

The image (North_Duluth.jpg) is an aerial photograph of St. Louis County derived and downloaded from MN-DNR web page: http://www.dnr.state.mn.us/maps/landview.html.

Chapter 9: Data source include

Data (watershed, stream, soil, FarmA, FarmB, FarmC, and FarmD layers) are created new by the author.

Chapter 10: Data source include

Data (Landuse, Pipeline, StudyArea, and Vegetation layers) are digitized on screen from an image representing University of Jordan. The image had been downloaded from Google Earth (https://www.google.com/earth). The image then clipped and georeferenced using local projection.

Data (Well, Fault, Stream, KSWTP, and GEOL_KS layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015. http://link.springer.com/article/10.1007/s13201-014-0263-x.

Chapter 11: Data source include

Data (ZipCode_WI and Street of city of superior layer) are derived from ESRI Data and Maps, 2012 https://my.esri.com/#/downloads/Data%20and%20Content.

Data (Well_Owner layer and Well table) are created new by the author for the purpose of Geocoding.

Chapter 12: Data source include

The elevation image of city of Superior in Wisconsin (USGS_NED_13_n47w093_ArcGrid.zip) is downloaded from the USGS web page: http://viewer.nationalmap.gov/.

The images (AZ_DEM, Dhuleil.tif and KTDam grids) are downloaded and clipped from SRTM 90m Digital Elevation Data downloaded from CGIAR-CSI HOME http://srtm.csi.cgiar.org.

Data (Geology, stream, and Luhfi_Dam layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015. http://link.springer.com/article/10.1007/s13201-014-0263-x.

Chapter 13: Data source include

Data (Dam, Stream, Watershed and Well layers) are derived from the author article: Model the effect of four artificial recharge dams on the quality of groundwater using geostatistical methods in GIS environment, Oman, 2005 http://www.spatialhydrology.net/index.php/JOSH/article/view/39.

Chapter 14: Data source include

Data (DEM and layer of Dhuleil) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015. http://link.springer.com/article/10.1007/s13201-014-0263-x.

Chapter 15: Data source include

Data (Governorate, Town, Well, WalaWatershed, Grid_1000, Geology, and WWTP layers) are derived from GIS Workshop in Hydrogeology at Water Authority of Jordan, Ministry of Water and Irrigation, September 2-6, 2012 created and instructed by the author.

Data (Dam, Geology, Stream, and Well layers) are derived from the author article: Water quality and geochemistry evaluation of groundwater upstream and downstream of the Khirbet Al-Samra wastewater treatment plant/Jordan, 2015. http://link.springer.com/article/10.1007/s13201-014-0263-x.

Chapter 16: Data source include

Data (Dam, Region, Road, Stream, Street, Town, Well, Well_Supply, and WWTP layers) are derived from GIS Workshop in Hydrogeology at Water Authority of Jordan, Ministry of Water and Irrigation, September 2–6, 2012 created and instructed by the author.

Chapter 17: Data source include

The DEM of city of Duluth, MN (Duluth.tif) is downloaded from the USGS web page: http://viewer.nationalmap.gov/. The data (Contour and Duluth layers) are obtained from the DEM (Duluth.tif).

Data (City and Stream layers) are taken from ESRI Data and Maps, 2012 https://my.esri.com/#/downloads/Data%20and%20Content.

Data (RainStation layer) is created new by the author.

Data (Building, Farm, GasStation, ObserbationWell, Plume, Street, SupplyWell, Tree, Valley, and WWTP layers) are derived from GIS Workshop in Hydrogeology at Water Authority of Jordan, Ministry of Water and Irrigation, September 2–6, 2012 created and instructed by the author.

Chapter 18: Data source include

The aerial photograph images (UWS_GCS.tif and Holden.tif) are clipped from the image "2013 County Aerial 1 Meter Resolution" downloaded from the city of Superior web page: http://www.ci.superior.wi.us/618/Imagery.

Data (Building, Sidewalk, and Tree feature classes) are created new by students using on screen digitizing designed by the author.

Appendix B: Task-Index

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