Trip A5

Return to the Tully Valley – the Continuing Environmental Impacts of Natural- and Anthropogenic-Induced Change

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The Tully Valley is the southern extent of the greater Onondaga Trough valley of central New York. A large amount of research has occurred in the valley focusing on the effects of mudboil (mud volcano) discharges on the quality and ecology of Onondaga Creek. Very active land-surface subsidence features are also present, related to 1.) mudboils, 2.) landslides which have occurred in the Tully Valley, most recently in 1993, and reoccurring within two major tributary valleys – Rainbow Creek on the east side of the Tully Valley and Rattlesnake Creek (Fall Creek) on the west side and 3.) brine mining in the southern extent of the valley along its lower east and west valley walls from the 1890s through the 1980s. Removal of halite beds 1,200 to 1,400 feet below land surface have resulted in induced land-surface subsidence within these two brine-mined areas.

The relationship between the brine-mining-induced subsidence and changes in mudboil activity noted in the 1950s is of concern to the Onondaga Nation and local, State, and other water-resource agencies. The reduction of mudboil activity is the ultimate goal—to reduce the discharge of sediment-laden and increasingly-salty water to Onondaga Creek which affects the ecology of the Creek from the active mudboil area down to Onondaga Lake at Syracuse.

ROADSIDE STOPS OVERVIEW

This fieldtrip will visit three areas:

1. The Tully Valley Mudboils along the floor of the valley
2. The 1993 landslide area on the western valley wall, north of the mudboil area

-Lunch break-

3. The former Brine Field area – eastern valley wall

Discussions at each location will center on the continuing changes seen in areas 1 and 2, and the interrelationship between the brine field areas and the down-gradient mudboil area as currently understood. Dependent on arrival of fieldtrip participants from Hobart-William Smith, we will break from the fieldtrip, likely after the 1993 landslide site and travel up and over the Tully Moraine for a lunch and "pit stop". Dependent on your tastes there is a fast food restaurant (Burger King), or a gas station deli (Circle K) at the Tully interchange at I-81 or you can bring your own. We will allow about an hour for you to replenish yourself before heading back into the valley to visit the eastern brine field area.

Disclaimer

All field sites to be visited are on private property. As such it is imperative that we respect the rights and wishes of these land owners. Please do not visit these site on our own, as it may jeopardize future field-trip opportunities. Over the past several decades it has become difficult to maintain our access agreements as individuals and even groups of people enter these properties without land-owner permission. We continue to maintain good relations with the land owners and do not want inappropriate actions of a few to ruin the educational opportunities for future visitors who wish to visit these areas. The USGS is one 'gatekeeper' for the property owners and we would be happy to facilitate your future educational access to these sites. Please contact USGS (Bill Kappel) for any questions of access.

Secondly, in order to have access you must fill out waivers of liability (hold harmless agreements) required by the respective land owners. These forms will be made available to you prior to the fieldtrip and will need to be completely filled-out, signed, and turned in at the first fieldtrip site.

RESEARCH OVERVIEW

This fieldtrip will be a retrospective assessment of activities which have occurred since 2007 at the NYSGA 79th annual meeting at the State University of New York at Cortland, and the earlier fieldtrip in 1997 at the NYSGA 69th annual meeting at Hamilton College – Clinton, New York. The two fieldtrips that occurred in 2007 are summarized in the fieldtrip guidebook for the 79th annual meeting (Fieldtrips A-1 and B-1) and the supporting documentation from that guidebook will not be reproduced here as it can be found on the NYSGA website –

http://www.nysga-online.net/wp-content/uploads/2018/09/2007_bookmarked.pdf

The 1997 guidebook (fieldtrip A8) can be found on the NYSGA website –
http://www.nysga-online.net/wp-content/uploads/2018/09/1997_bookmarked.pdf

Mudboil area – Background information on the Tully Valley hydrogeology and the mechanics of the mudboils can be found in the following USGS publications and associated links:

Kappel, W.M., Sherwood, D.A., and Johnston, W.H., 1996, Hydrogeology of the Tully Valley and characterization of mudboil activity, Onondaga County, New York, U.S. Geological Survey Water-Resources Investigations Report 96-4043, 71 p. http://ny.water.usgs.gov/pubs/wri/wri964043/

Kappel, W.M. and McPherson, W.S., 1998, Remediation of mudboil discharges in the Tully Valley of Central New York, U.S. Geological Survey Fact Sheet FS 143-97, 4 p. http://ny.water.usgs.gov/pubs/fs/fs14397/

Kappel, W.M., Miller, T.S., and Hetcher, K.K., 2001, Hydrogeology of the Tully Lakes area in southern Onondaga and northern Cortland Counties, New York, U.S. Geological Survey Water-Resources Investigations Report 01-4166, 16 p. http://ny.water.usgs.gov/pubs/wri/wri014166/

Kappel, W.M. and Miller, T.S., 2003, Hydrogeology of the Tully Trough -- Southern Onondaga County and Northern Cortland County, New York, U.S. Geological Survey Water-Resources Investigations Report 03-4112, 16 p. http://ny.water.usgs.gov/pubs/wri/wri034112/

Kappel, W.M. and Miller, T.S., 2005, Hydrogeology of the Valley-Fill Aquifer in the Onondaga Trough, Onondaga County, New York, U.S. Geological Survey Scientific Investigations Report 2005-5007, 13 p. http://ny.water.usgs.gov/pubs/wri/sir055007/

Kappel, W.M., 2009, Remediation of Mudboil Discharges in the Tully Valley of Central New York: U.S. Geological Survey Open File Report 2009-1173, 8p. http://pubs.usgs.gov/of/2009/1173/

Kappel, W.M., 2014, The hydrogeology of the Tully Valley, Onondaga County, New York—An overview of research, 1992–2012: U.S. Geological Survey Open-File Report 2014–1076, 28 p., plus 3 appendixes http://dx.doi.org/10.3133/ofr20141076

Landslide areas in and near the Tully Valley - Background information on landslide research in the Tully Valley can be found in the following USGS publications and associated links:

Wieczorek, G.F., Negussey, Dawit, and Kappel, W.M., 1998. Landslide hazards in glacial lake clays-Tully Valley, New York http://pubs.er.usgs.gov/pubs/fs/fs01398

Pair, D.L., Kappel, W.M., and Walker, M.S., 2000, History of landslides at the base of Bare Mountain, Tully Valley, Onondaga County, New York, U.S. Geological Survey Fact Sheet FS 0190-99, 6 p. http://ny.water.usgs.gov/pubs/fs/fs19099/

Tamulonis, K.L., Kappel, W.M., and Shaw, S.B., 2009, Causes and movement of landslides at Rainbow Creek and Rattlesnake Gulf in the Tully Valley, Onondaga County, New York: U.S. Geological Survey Scientific Investigations Report 2009–5114, 18 p. http://pubs.usgs.gov/sir/2009/5114/

Tamulonis, K.L., and Kappel, W.M., 2009, Dendrogeomorphic assessment of the Rattlesnake Gulf landslide in the Tully Valley, Onondaga County, New York: U.S. Geological Survey Scientific Investigations Report 2009–5134, 14 p. http://pubs.usgs.gov/sir/2009/5134/

Land-surface subsidence – Background information on hydrogeologic effects related to brine mining in the Tully Valley can be found in the following USGS publications and associated links: (see also reports in the Mudboil section)

Yanosky, T.M. and Kappel, W.M., 1997, Tree rings record 100 years of hydrologic change within a wetland. U.S. Geological Survey Fact Sheet FS 0057-97, 4 p. http://ny.water.usgs.gov/pubs/fs/fs05797/

Hackett, W.R., Gleason, G.C., Kappel, W.M., 2009, Land-surface subsidence and open bedrock fractures in the Tully Valley, Onondaga County, New York: U.S. Geological Survey Open-File Report 1188, 16 p. http://pubs.usgs.gov/of/2009/1188/

Hayhurst, Brett, and Kappel, W.M., 2013, Natural Heat Storage in a Brine-Filled Solar Pond in the Tully Valley of Central New York: U.S. Geological Survey Open-File Report 2013–1266, 14 p., http://pubs.usgs.gov/of/2013/1266/

Other Tully and Onondaga Valley reports of interest: Background information on hydrogeology, groundwater and surface water modelling, and other USGS-related research can be found in the following publications and associated links:

McKenna, J.E., Chiotti, T.L., and Kappel, W.M., 1999, Ecological status of Onondaga Creek in Tully Valley, New York -- Summer 1998, U.S. Geological Survey Fact Sheet FS 141-99, 6 p. http://ny.water.usgs.gov/pubs/fs/fs14199/

Kappel, W.M., 2000, Salt production in Syracuse, New York ("The Salt City") and the hydrogeology of the Onondaga Creek Valley, U.S. Geological Survey Fact Sheet FS 139-00, 8 p. http://ny.water.usgs.gov/pubs/fs/fs13900/

Kappel, W.M., and Teece, M.A., 2007, Paleoenvironmental Assessment and Deglacial Chronology of the Onondaga Trough, Onondaga County, New York: U.S. Geological Survey Open-File Report 2007-1060, 12 p. http://pubs.usgs.gov/of/2007/1060/

Yager, R.M., Kappel, W.M., and Plummer, L.N., 2007, Origin of halite brine in the Onondaga Trough near Syracuse, New York State, USA: modeling geochemistry and variable-density flow: Hydrogeology Journal – online. http://www.springerlink.com/content/008m772313n73413/

Yager, R.M., Kappel, W.M., and Plummer, L.N., 2007, Halite brine in the Onondaga Trough near Syracuse NY: Characterization and simulation of variable-density flow: U.S. Geological Survey Scientific Investigations Report 2007-5058. http://pubs.usgs.gov/sir/2007/5058

Kappel, W.M. and Yager, R.M., 2008, Ground-water-flow modeling of a freshwater and brine-filled aquifer in the Onondaga Trough, Onondaga County, New York--A summary of findings: U.S. Geological Survey Open-File Report 2007-1409, 12 p. http://pubs.usgs.gov/of/2007/1409

Coon, W.F. and Reddy, J.E., 2008, Hydrologic and water-quality characterization and modeling of the Onondaga Lake basin, Onondaga County, New York: U.S. Geological Survey Scientific Investigations Report 2008-5013, 88 p. http://pubs.usgs.gov/sir/2008/5013/

Coon, W.F., 2008, Simulation of streamflow and selected water-quality constituents through a model of the Onondaga Lake basin, Onondaga County, NY--A guide to model application: U.S. Geological Survey Open-File Report 2008-1188, 27 p., online only. http://pubs.usgs.gov/of/2008/1188/

Coon, W.F., Hayhurst, B.A., Kappel, W.M., Eckhardt, D.A.V., and Szabo, C.O., 2009, Water-quality characterization of surface water in the Onondaga Lake basin, Onondaga County, New York, 2005-08: U.S. Geological Survey Scientific Investigations Report 2009-5246, 68 p. http://pubs.usgs.gov/sir/2009/5246/

Coon, W.F., 2011, Improvement in precipitation-runoff model simulations by recalibration with basin-specific data, and subsequent model applications, Onondaga Lake Basin, Onondaga County, New York: U.S. Geological Survey Scientific Investigations Report 2011-5203, 37 p. http://pubs.usgs.gov/sir/2011/5203/