

Infusing Relevant, Community-Based Learning into Introductory Environmental and Geoscience Curriculum, Julie Maxson, Metropolitan State University, Saint Paul, MN

Because the majority of Metropolitan State University students are adult residents of the Twin Cities (Minneapolis and Saint Paul) they are strongly place-based, having roots in the urban area and/or the region. They are also far more aware of local and regional events and issues than are most traditional-age students. These are distinct advantages for engaging students in geoscience and environmental content, particularly where it relates to a local event, issue, or phenomenon.

There are abundant, rich opportunities to relate course content to local examples. These include:

- Mississippi River – the river is one of Minnesota’s greatest assets, aesthetically, economically, recreationally, and pedagogically.

The geologic history of the river provides a complex and dramatic story that explains the physiographic features of the Twin Cities, and thereby provides a context for initial settlement of the region by Native American tribes as well as the locations of Saint Paul and Minneapolis. The cities are situated at the uppermost navigable point along the river prior to river engineering (St. Paul), and at its only waterfall (Minneapolis).

The river is prone to flooding, and many students will remember “the big ones” of the 90’s, and 00’s. Urbanization has increased both flood frequency and magnitude in the region, as has the installation of tile drainage throughout southern Minnesota. A combination of this affect with current and projected climate trends toward more intense precipitation events in the Upper Midwest alarms many students, who then become interested in the efficacy of home-, campus- and municipal-scale changes to storm water management.

- Geologic resources – historically, a major component of Minnesota’s economy has derived from mining on the Iron Range in the northern part of the state. Although the economic importance of iron ore has fluctuated significantly in the past few decades, it continues to be an active industry. In the past few years, mining has focused on a very different resource in the southern part of the state: frac sand, or proppant sand, is

abundant in near-surface layers of Paleozoic strata. Regulation of frac sand strip mining is currently developed at the county level; this provides a rich source of comparison for student investigations.

Students in introductory geoscience courses research the environmental impacts of iron mining, frac sand mining, or quarrying of glacio-fluvial gravel deposits around the state

-Groundwater—two neighborhoods in the cities have been directly contaminated by industrial pollutants. In one case, residents are directly affected by VOC vapors seeping through their foundations; in the other, an inner ring suburb where many homes have wells, residents receive bottled water from the company found responsible for the contamination. In a given class of 24 students, several will either currently live in one of these neighborhoods or will have friends or family who live there. A lab investigation for an Environmental Geology course involves student mapping of one of these contaminant plumes.

Additional student investigations focus on lake level drops due to groundwater withdrawal, water quality in deep aquifers, rates of waterfall retreat, and slope instability in the Mississippi River valley.