

3. Introduction and Recent Events

Introduction

The Twin Cities Metropolitan Area (Minnesota, USA) has experienced an increase in landslide activity over the past decade. Local area landslides have threatened critical infrastructure, disrupted transportation routes, closed public parklands, cost millions of dollars to stabilize and most tragically, have resulted in several injuries and deaths.

The significant and sometimes tragic impacts of these landslides have revealed a regional natural hazard largely unknown among government officials and the public, as well as underappreciated by scientists. When they happen, the sudden onset of landslides, the technical complexity of landslide rescue, and the expense and difficulty of landslide stabilization have surprised the affected Twin Cities' communities.

Before this effort, which culminated in the production of the Hennepin County Landslide Hazard Atlas, a comprehensive landslide hazard assessment in the Twin Cities region did not exist. The lack of detailed local landslide knowledge has worsened their impacts. Critical decisions made by governments, industry and the public have not had the benefit of an evidence-based assessment to consider landslide risk in their plans. This left the region vulnerable.

Fortunately, detailed scientific assessments of local landslide environments and the threats they pose to people, infrastructure and human activities is possible. Other regions of the United States, especially those with frequent major landslide activity, have conducted assessments to understand their own local landslide situations. These pioneering assessments provided a pathway to develop this assessment and atlas of Hennepin County landslides.

A comprehensive assessment of county landslide hazards is important. Residents of the relatively flat Twin Cities region have learned that mountains are not required to host a killer landslide. A disruptive slide that costs millions of dollars to stabilize does

not need an earthquake to trigger it. Instead, water saturation of/or extreme precipitation on susceptible slopes of modest height drives most Twin Cities' landslide activity.

Climate data show a clear trend of increasing intense rainfall events across Minnesota (*Metropolitan Council, 2018*). The area's recent increasing landslide activity may correlate with this change in rainfall patterns. A growing regional population and expanding construction activity will also continue to push people into areas with identified landslide risk. Unwitting human activities can sometimes make slides even more likely.

Hennepin County Emergency Management decided to assess landslide hazards in the county and adjacent areas. Lacking the appropriate geological science expertise, the department turned to other government agencies and academic institutions for assistance.

Recent Events

On May 22, 2013, a landslide raced down a bluff near Saint Paul and barreled into a grade-school class on a field trip just after their lunchbreak to look for fossils. Most of the class escaped unharmed except for four children who were covered by the slide. Two were rescued quickly. A third student was freed from the debris, but later died at the hospital. Too dangerous to walk on, the unstable mix of mud, sand and shale had to be slowly removed using focused streams of high-pressure water in a search for the last missing student. Firefighters discovered the child's body under five feet of slide debris the next day (*Gottfried, 2013*).

The next spring in 2014, the Twin Cities' already soggy ground received several large rainfall events. By April, small landslides occurred on artificial slopes along the I-494 corridor in Eden Prairie, in southern Hennepin County. By early May, a landslide along the Purgatory Creek in suburban Eden Prairie forced the evacuation of several homes. Eventually, one home was condemned and demolished. Slide activity

continued through June across all of southeastern Minnesota, closing roads, snapping power lines and destroying homes.

The most notable and expensive landslide of this entire outbreak occurred after heavy rains dumped over four inches on Minneapolis in 24 hours. On June 19, 2014, a 100-yard (91 meter) length of slope beneath the Fairview Riverside Medical Center gave way and sent debris onto West River Road and into the Mississippi River (Figure 3.1). The slide narrowly missed pushing a passing car into the river (Smith, 2014). The landslide left the hospital's electrical power infrastructure, steam plant and oxygen supply uncomfortably close to the edge, requiring emergency measures to keep the hospital operating. The significant cost to respond and recover from this single landslide led directly to the inclusion of Hennepin County in Federal disaster declaration FEMA DR-4182.

The years since 2014 have seen continued sporadic landslide activity in the Twin Cities. Rock falls have disrupted rail traffic and closed roads in Saint Paul with significant costs to repair. Small slides have also been an occasional nuisance in Hennepin County. The region's climate trend of increasing numbers of intense rainfall events make other significant landslide events seem more likely.

Figure 3.1 — Slide Beneath the Fairview Riverside Medical Center

On June 19, 2014, a 100-yard (91 meter) length of slope gave way and sent debris onto West River Road and into the Mississippi River. Image credit: Dr. Kent Kirkby

