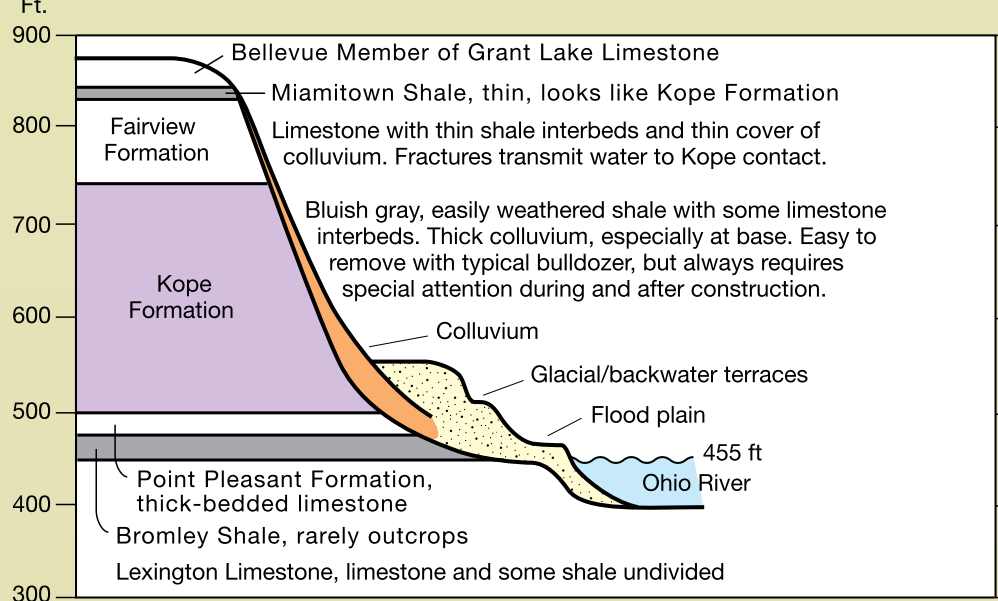


Landslides in Kenton County

Kenton County and the Greater Cincinnati area is home to one of the most active landslides spots in the country prompting some of the highest per capita costs to prevent and mitigate their effects.

Graphics and portions of text courtesy of: KGS Publication #17740 "Landslides and Your Property" (2013)

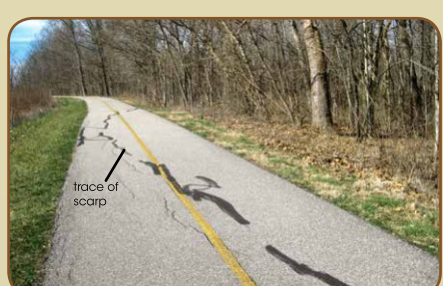
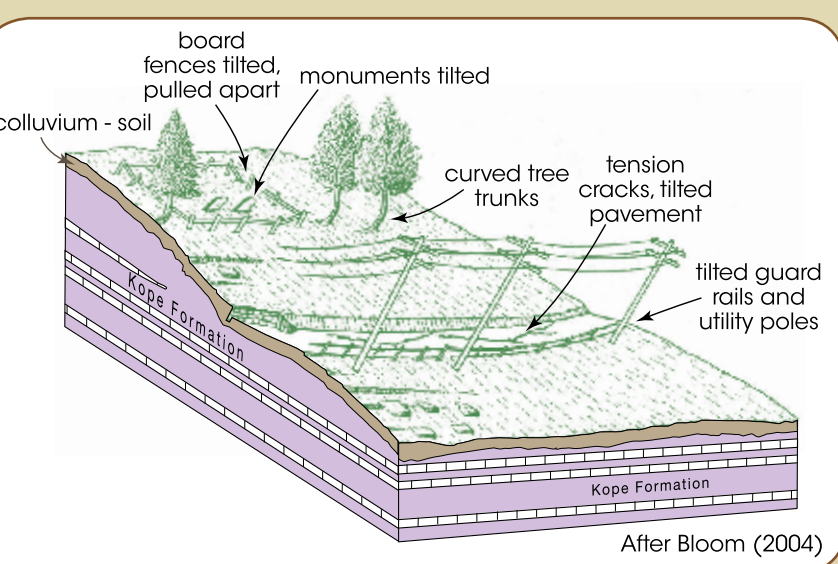
Why Do Slides Occur?



Landslides are somewhat difficult to predict, but observed landslides often share several common characteristics: soil, geology, and slope. Soil naturally moves downhill, so the steeper the slope, the more severe the soil erosion can be. These two factors, when combined with a type of geology called the "Kope Formation" can make areas of the county particularly prone to landslides. The Kope Formation (a type of blueish-gray shale) tends to be the dominant bedrock in many areas. This shale tends to weather easily, especially once it is exposed to the elements, or by removing the soils above it. When a type of material called "Colluvium" is present at the bottom of these slopes, it can often be an indicator that landslides have happened, or are happening. Colluvium is a collection of loose rock and soil fragments that collect at the base of a slope. The colluvium is often deposited through rainwash, sheetwash or slow downslope soil creep.

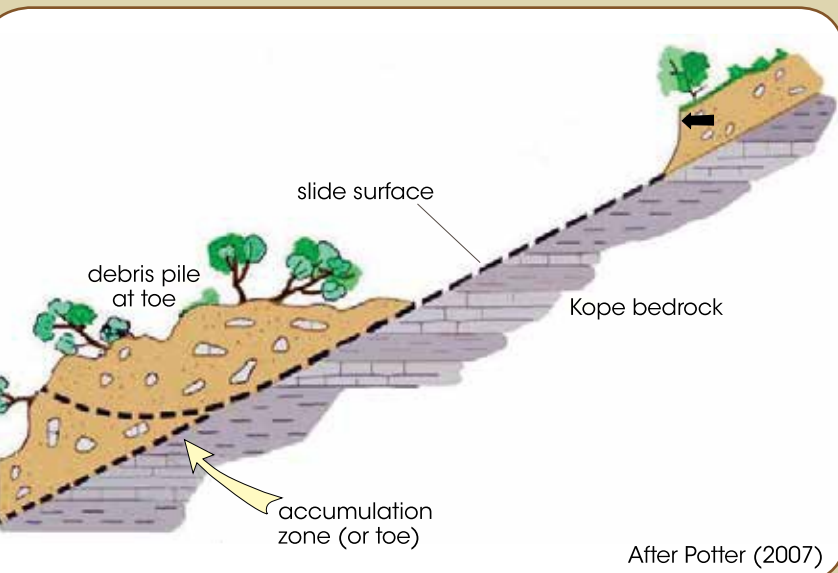
Graphics and portions of text courtesy of: KGS Publication #17740 "Landslides and Your Property" (2013)

Types of Slides



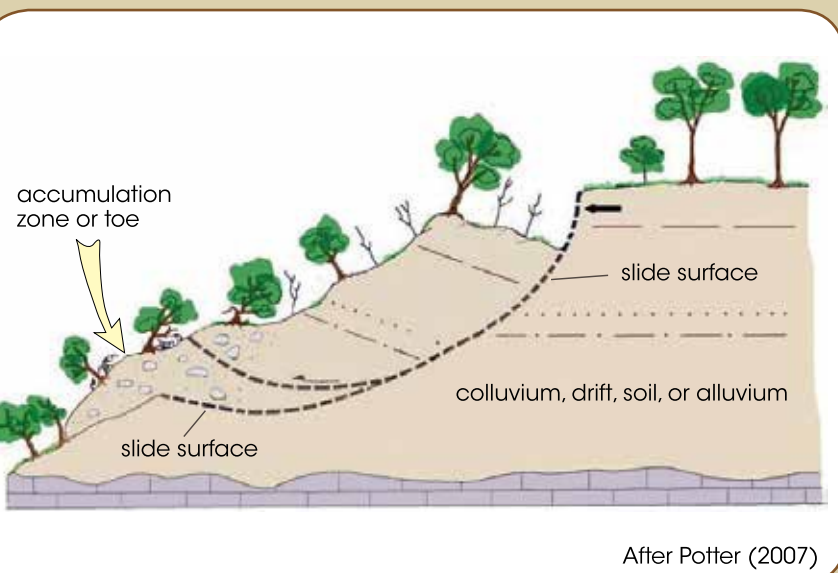
Creep

A shallow and slow moving landslide. The most widespread type of slide.



Translational

A shallow and fast moving landslide. The bedrock is not involved in this type of slide.

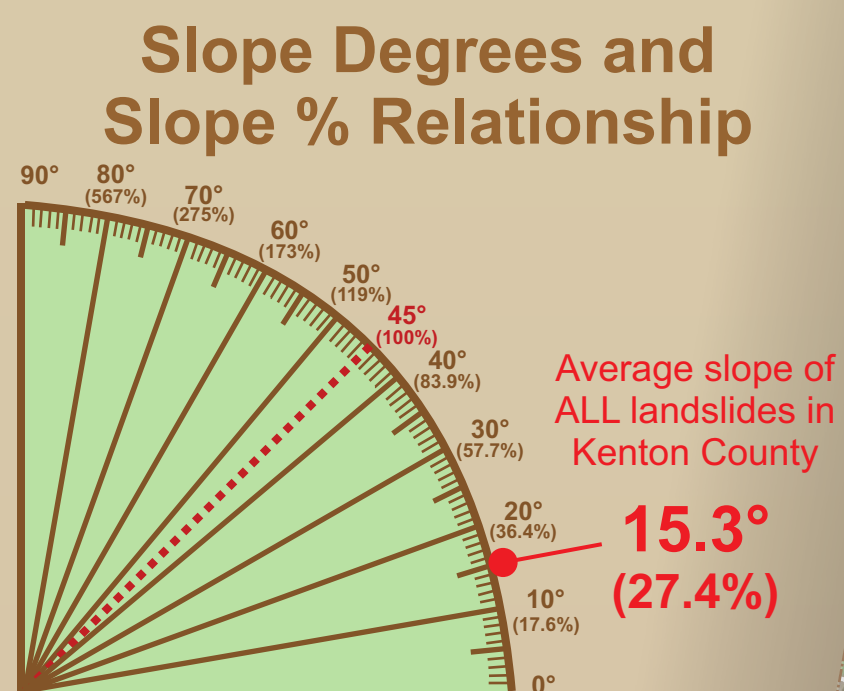
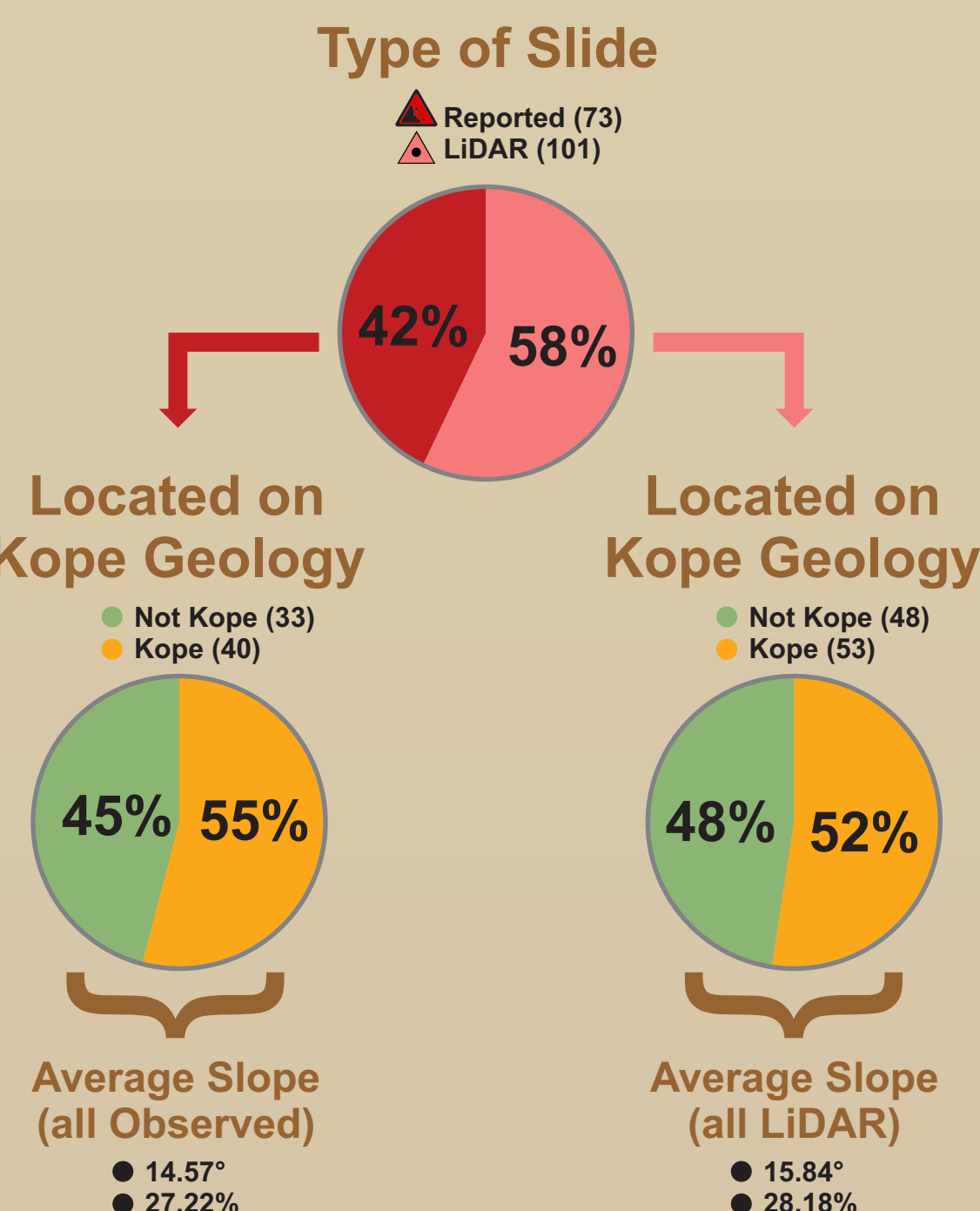


Rotational

A deep and slow moving landslide, the most damaging type. Often occur on thick colluvium.

Graphics and portions of text courtesy of: KGS Publication #17740 "Landslides and Your Property" (2013)

Slides by Kope and Slope



NKYmapLAB

February 2016 Volume 2: Map 2

Northern Kentucky mapLAB is a copyrighted, published product of Planning and Development Services of Kenton County. The goal of this initiative is to analyze a wide variety of landslide data and present them in a more visual format that facilitates understanding by the public and its elected leaders. Suggestions for future analyses are always welcome.

Landslides

- Reported Landslides
- LiDAR-Indicated Landslides

Streets

- Major Street, Interstate, or Highway
- Local Street

Featured Data Sources

- www.direction2030.org
- www.linkgis.org
- www.uky.edu/kgs/
- www.igs.indiana.edu
- www.ohiodnr.gov

"Landslides and Your Property"

KGS Publication #17740: Joint project of University of Cincinnati and geological survey of Ohio, Kentucky, and Indiana. Potter, F.E., Brown, M., Maynard, J.B., Crawford, M.M., Wessert, G.A., and Agnello, T.

@NKYmapLAB

Kope Geology

- Kope Formation

Other Geology

- Alluvium
- Alluvium of valley sides, and abandoned channels
- Artificial fill
- Bull Fork Formation
- Fairview Formation
- Glacial outwash (Wisconsinian)
- Grant Lake Limestone
- Outwash deposits (pre-Illinoian)
- Point Pleasant Tongue of Clays Ferry Formation
- Terrace deposits

PDS

NKYmapLAB Awards

- 2015 KY GIS Map Gallery
- 2015 ESR UC Map Gallery



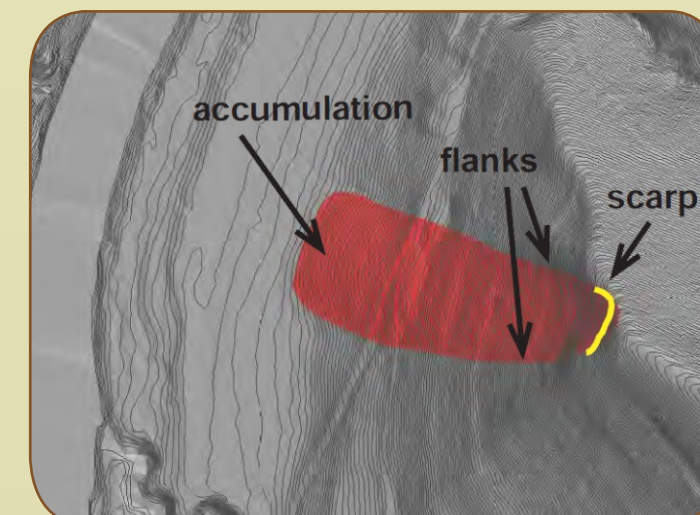
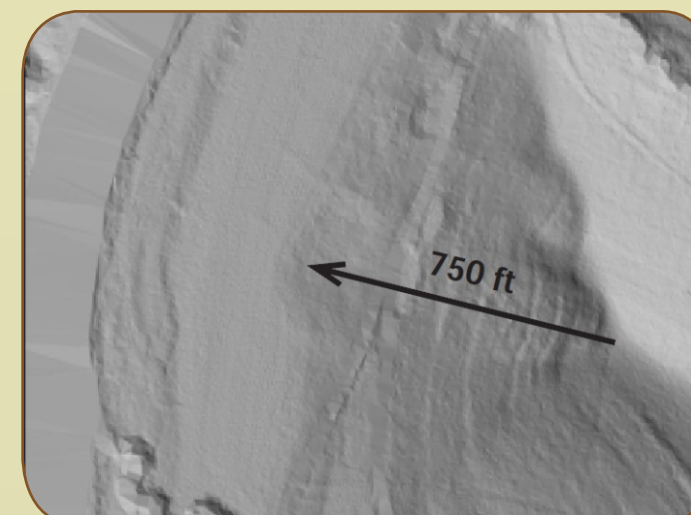
LiDAR-Indicated Slides

Approximately 42% of the landslides shown on the map have been reported (multiple sources), and the remaining 58% are LiDAR-indicated. LiDAR-indicated landslides are identified using a "Light Detection and Ranging" (LiDAR) technology, which provides high-resolution elevation maps and derivative products that reveal landslides better than conventional air photos or satellite images. The advantage this data is its potential to identify landslides previously undocumented or not visible on earlier maps.



The image on the left is a hillshade created from LiDAR data, and shows a potential landslide area. The image on the right shows a 3D view of the same area using Quick Terrain Modeler. The 3D scene more clearly shows the landslide scarp (top) and flanks. Because of this remote sensing data, this landslide was termed confident.

Graphics and portions of text courtesy of: KGS Publication #17614 "Using LiDAR to map landslides in Kenton and Campbell Counties, Kentucky" (2012) Crawford, M.M.



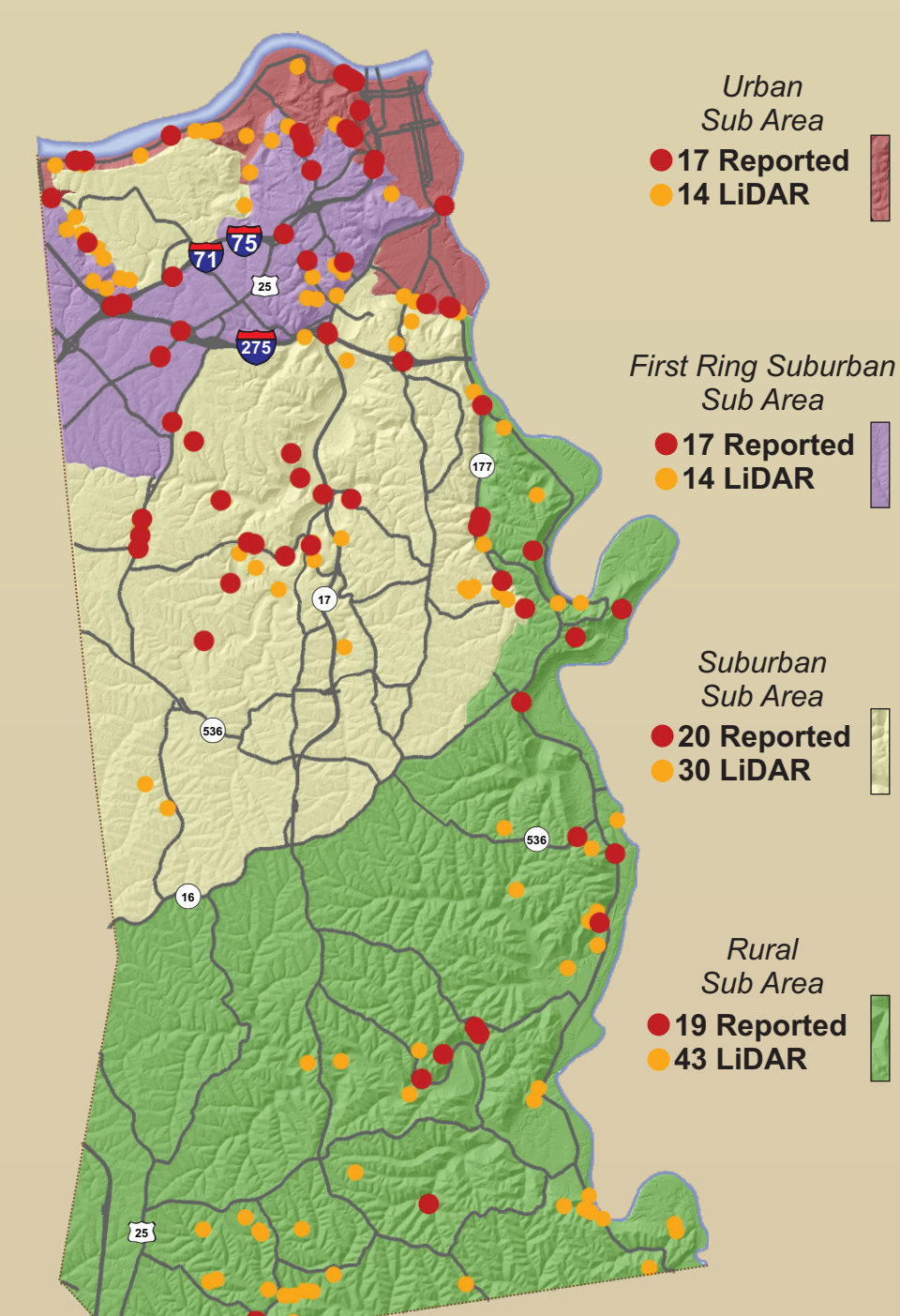
The image on the left is a LiDAR-indicated landslide. The image on the right shows a GIS overlay of the landslide boundaries. The landslide location is shown in GIS with 2-foot contours overlaid. This landslide was attributed as moderately confident.

Graphics and portions of text courtesy of: KGS Publication #17614 "Using LiDAR to map landslides in Kenton and Campbell Counties, Kentucky" (2012) Crawford, M.M.

Direction 2030 and Slide Locations

Landslides by Direction 2030 Sub Areas

(see "LiDAR-Indicated Slides" section of poster for LiDAR details)



"While development on hillsides can often produce high property values due to viewsheds, developing in these areas can cause hillside slippage and drainage issues, often affecting neighboring properties if not pursued in a safe manner."

- Direction 2030: Research Report, Environment Element

direction 2030

Your Voice. Your Choice.

Goals and Objectives

- C Community Identity
- E Economy
- G Governance
- H Health
- HC Healthy Communities
- M Mobility
- N Natural Systems
- Primary Goal
- Secondary Goal

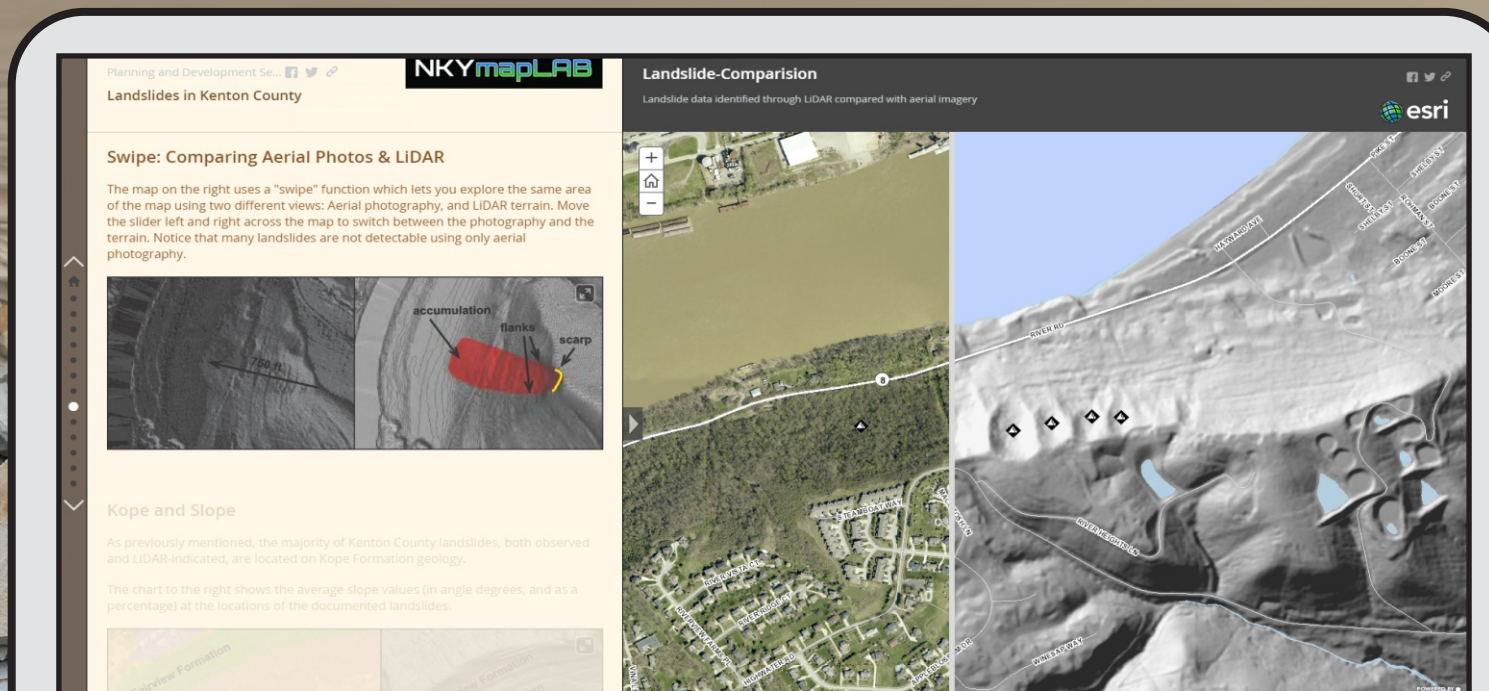
How Does This Topic Apply to Direction 2030?

- E** Strive to achieve a balance between development and preservation.
- N** Encourage innovative design on sites with constraints based on the presence of natural systems and incentivize the protection of quality open space.

Recommendations:

- "Property that lies in an area that has moderate or steep slopes, sensitive geology, or a combination of these characteristics, as well as soils subject to occasional or frequent flooding may require further site and geologic examination prior to construction and excavation activity."
- "Pursue and promote varied approaches for the safe development and preservation of hillsides"

-Direction 2030, Environment Element



Kenton County has 174 landslides, both historic and current. Landslides often share several common characteristics: soil, geology, and slope. The "Kope Formation" geology is common in Kenton County, and is particularly prone to landslides. This interactive Story Map shows the locations of existing and historic landslides and allows users to further explore the conditions of individual landslides. More information can be found at: linkgis.org