Mapping elements-at-risk

Kavinda Gunasekara

kavinda@ait.ac.th

Rajitha Athukorala

rajitha@ait.asia

ITC UNIVERSITY OF TWENTE.

GIC Geoinformatics Center

AIT Asian Institute of Technology

Elements at risk

Picture painted by a primary school child in Sri Lanka after the tsunami in 2005

Quantifying elements at risk

Categories

People

Properties

Quantification of elements at risk

A landslide in south california

Count
Ex: Number of people

Value
Ex: Replacement cost of the roads

Perception
Ex: Importance due to historical significance

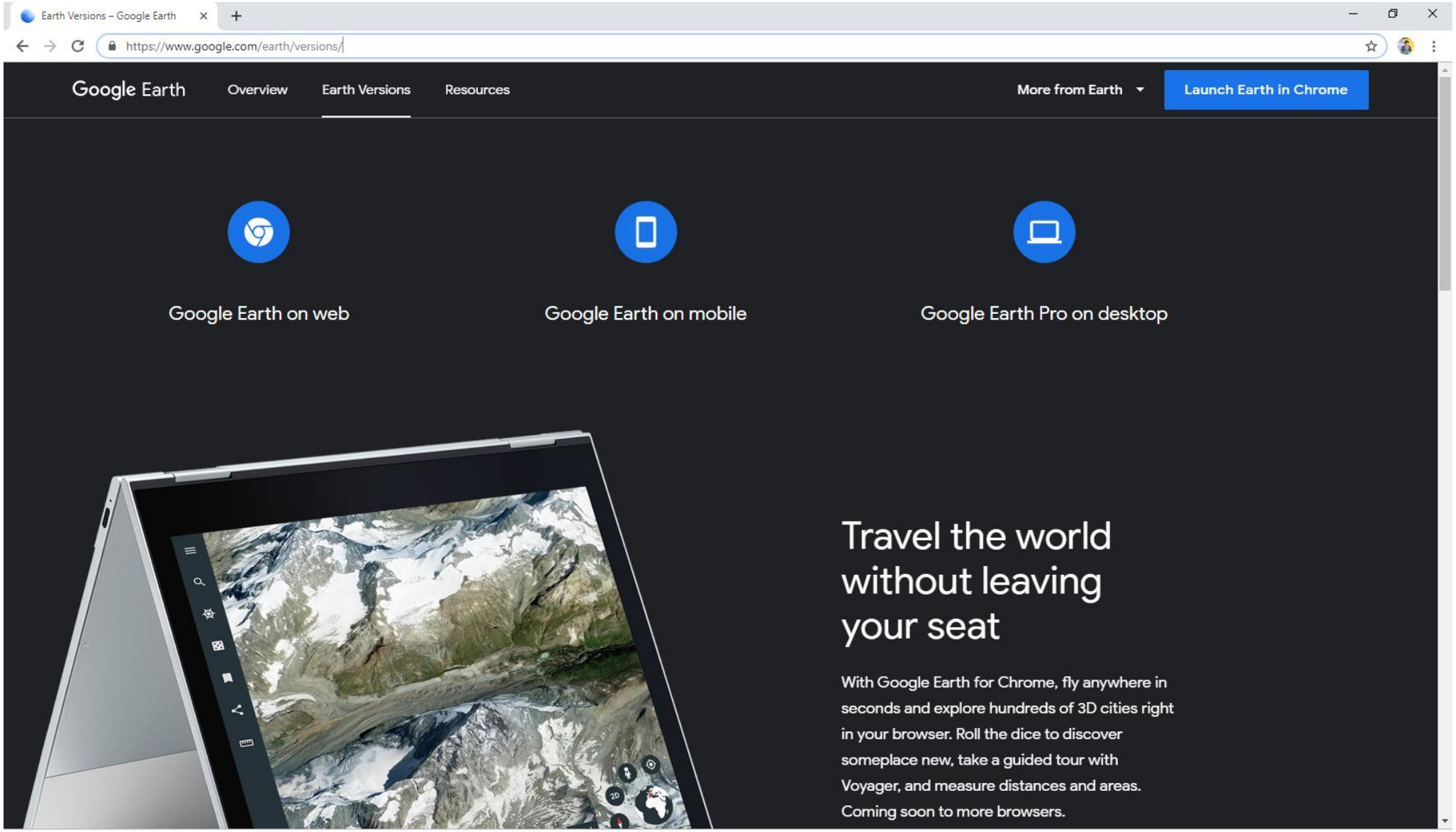
A mudflow landslide in Petropolis near Rio de Janeiro Brazil

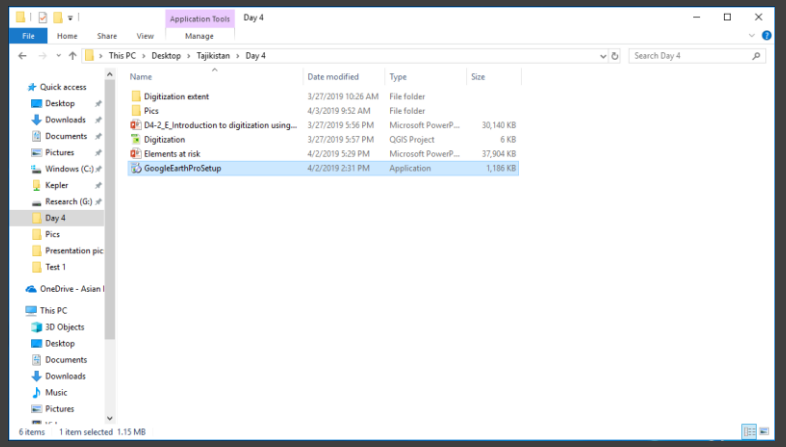
Google Earth

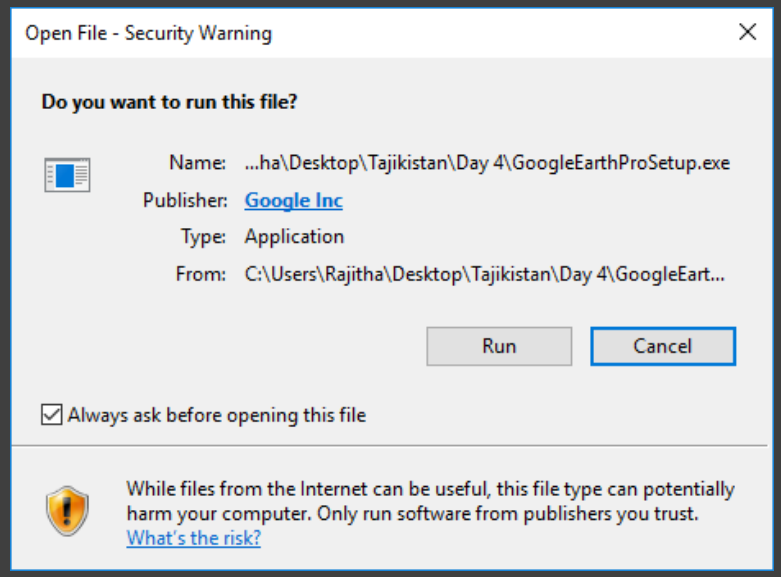
Downloading and installing Google Earth Pro

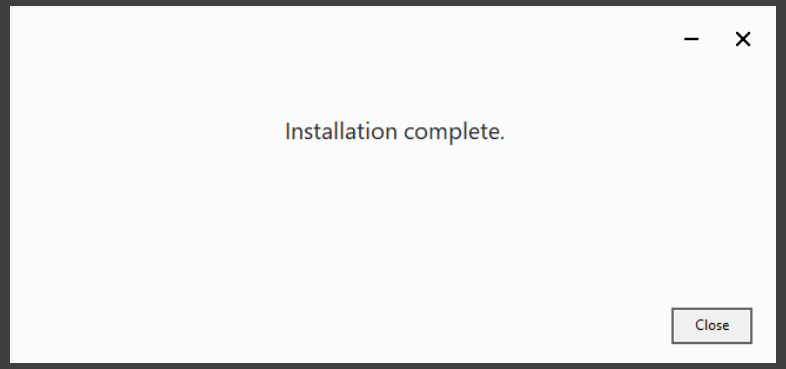
Select the platform to be used for google earth from the link below

https://www.google.com/earth/versions/


Earth Versions – Google Earth
https://www.google.com/earth/versions/
Google Earth
Overview
Earth Versions
Resources
More from Earth
Launch Earth in Chrome
Google Earth on web
Google Earth on mobile
Google Earth Pro on desktop
Travel the world without leaving your seat
With Google Earth for Chrome, fly anywhere in seconds and explore hundreds of 3D cities right in your browser. Roll the dice to discover someplace new, take a guided tour with Voyager, and measure distances and areas. Coming soon to more browsers.

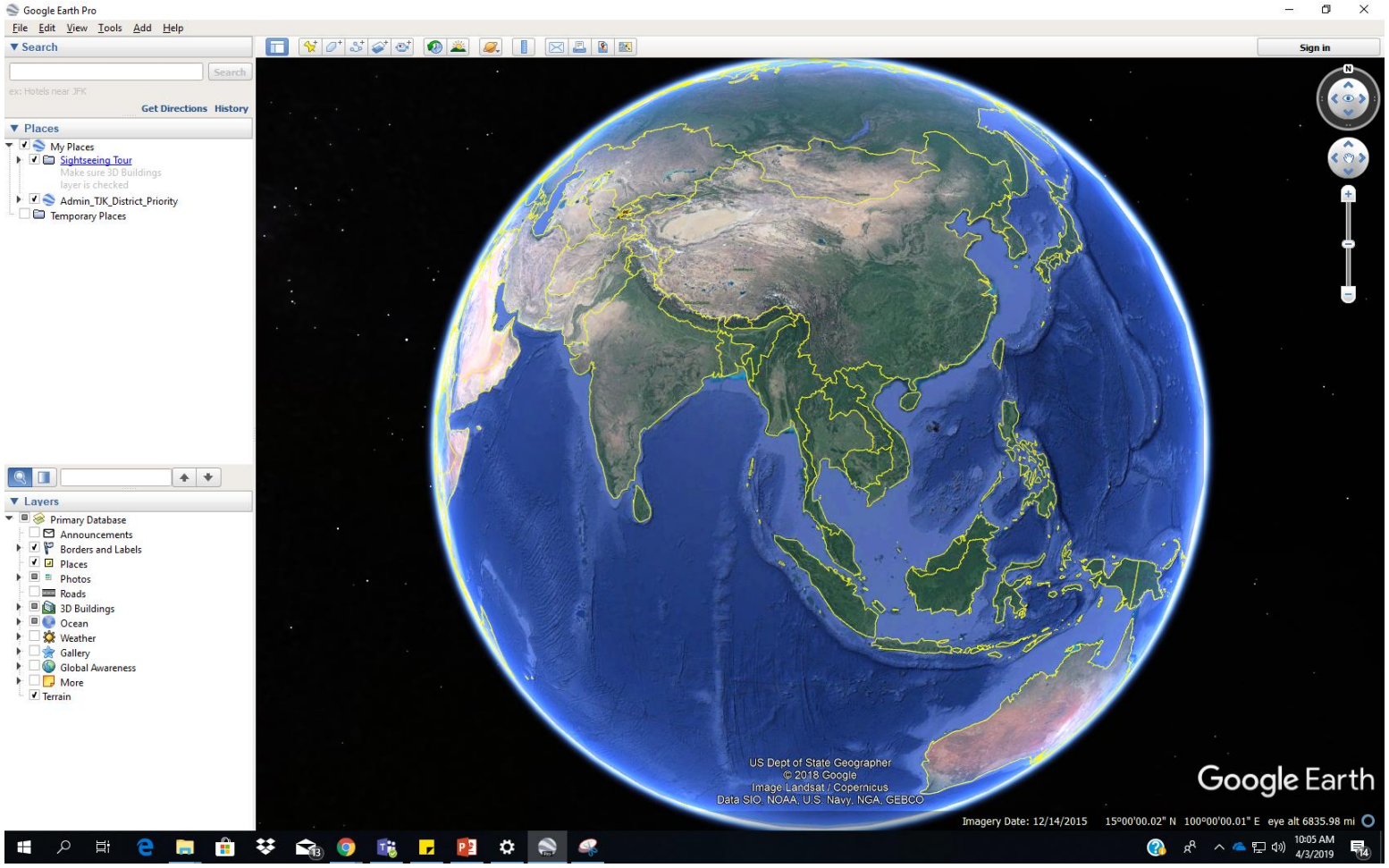




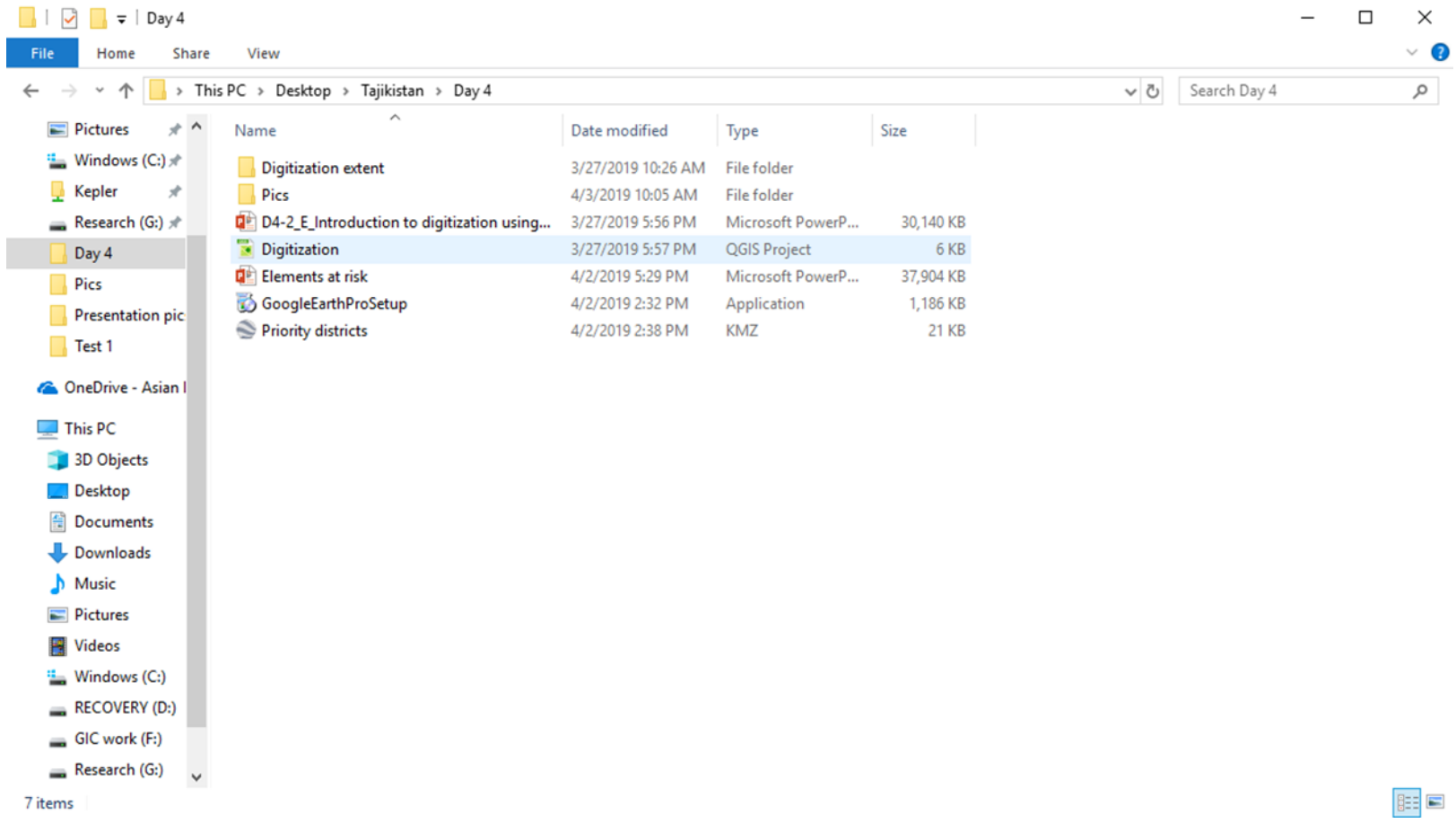


The setup file is already provided to you

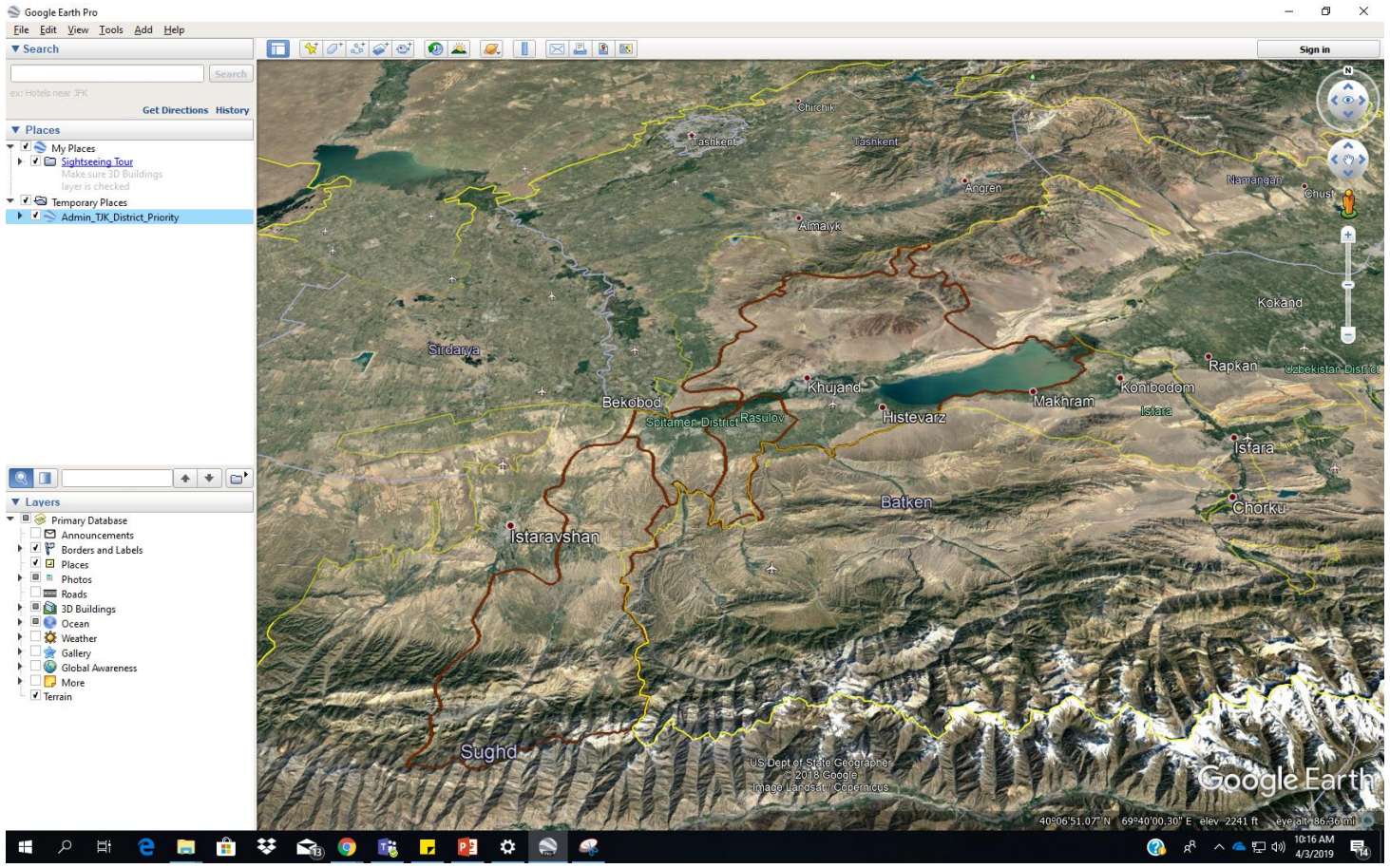
Once the setup in finish, the Google Earth Pro interface will appear



A kml file is provided for the priority districts. Load it in Google Earth Pro



The priority district boundary will appear



Navigation keys in Google Earth Pro

3D Viewer	
Left arrow	Move Left - Moves the viewer in the direction of the arrow.
Right arrow	Move Right - Moves the viewer in the direction of the arrow.
Up arrow	Move Up - Moves the viewer in the direction of the arrow.
Down arrow	Move Down - Moves the viewer in the direction of the arrow.
Shft+Right arrow, Ctrl + scroll DOWN	Rotate Clockwise - Rotates the view clockwise. The earth spins counter-clockwise.
Shft+Left arrow, Ctrl + scroll UP	Rotate Counter-clockwise - Rotates the view counter-clockwise.
Shft + Up arrow, PgUp key, Shft + scroll wheel	Tilt Up - Tilts the viewer toward "top-down" view. Tip: to use the Page Up key, make sure Num Lock on your keyboard is off.
Shft+Down arrow, PgDn key, Shft + scroll wheel	Tilt Down - Tilts the viewer toward "horizon" view. Tip: to use the Page Up key, make sure Num Lock on your keyboard is off.
Ctrl + Up Arrow, scroll wheel	Zoom in - Zooms the viewer in. If your mouse has a scroll wheel in the middle, pull it toward you to zoom in.
Ctrl + Down Arrow, scroll wheel, - key (both keyboard and numpad)	Zoom out - Zooms the viewer out. If your mouse has a scroll wheel in the middle, push it away from you to zoom out.
Spacebar	Stop Current Motion - When the viewer is in motion, stops movement
n	Reset view to north - up - Rotates view so that view is north-up.
u	Reset tilt to top-down view - Resets angle to view scene in top-down or up mode.

Identifying landslides in Google Earth

Fresh landslides do not have much vegetation. With time, vegetation starts to cover the landslides but it takes a lot of time to come back to its original state.

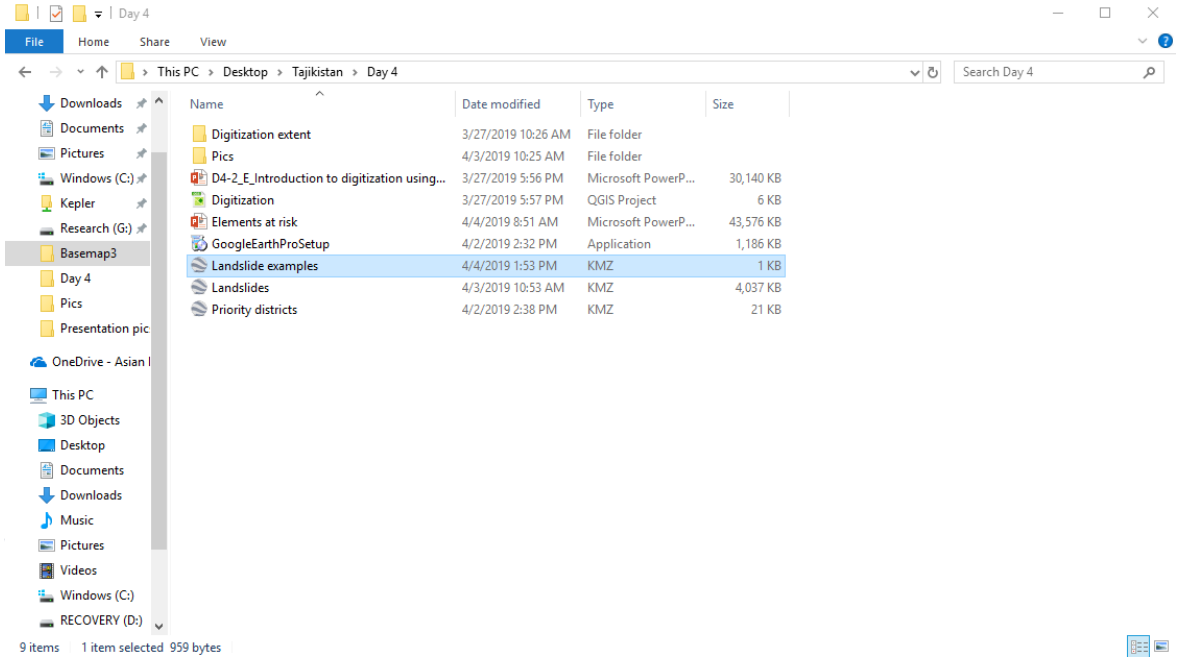
The sudden change of color, tone and texture helps to identify a landslide.

Landslide boundaries are rugged and sharp.

Best way to validate a landslide is to compare time series satellite images to identify changes.

Lets try to familiarize with few examples from Tajikistan

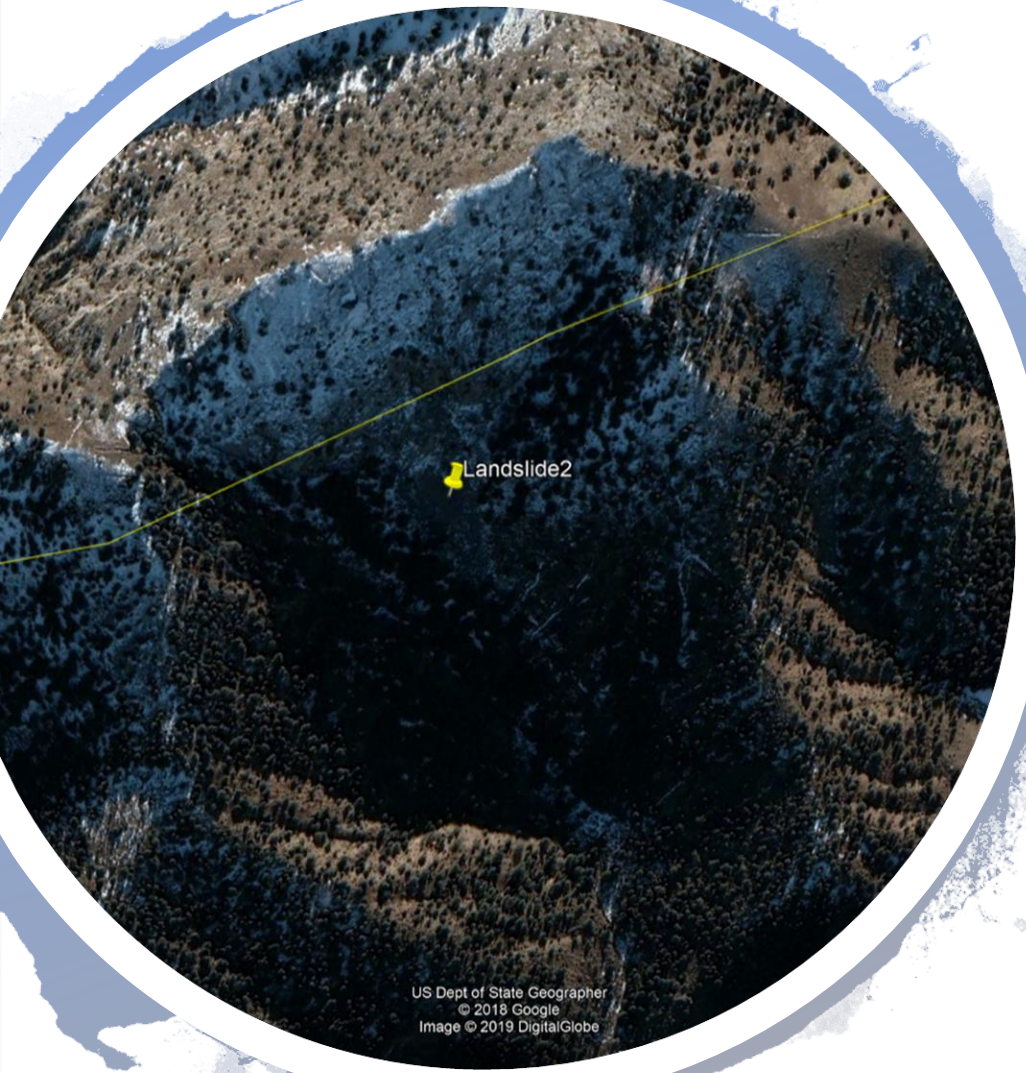
Load the given landslide examples kml file



Zoom into landslide 1

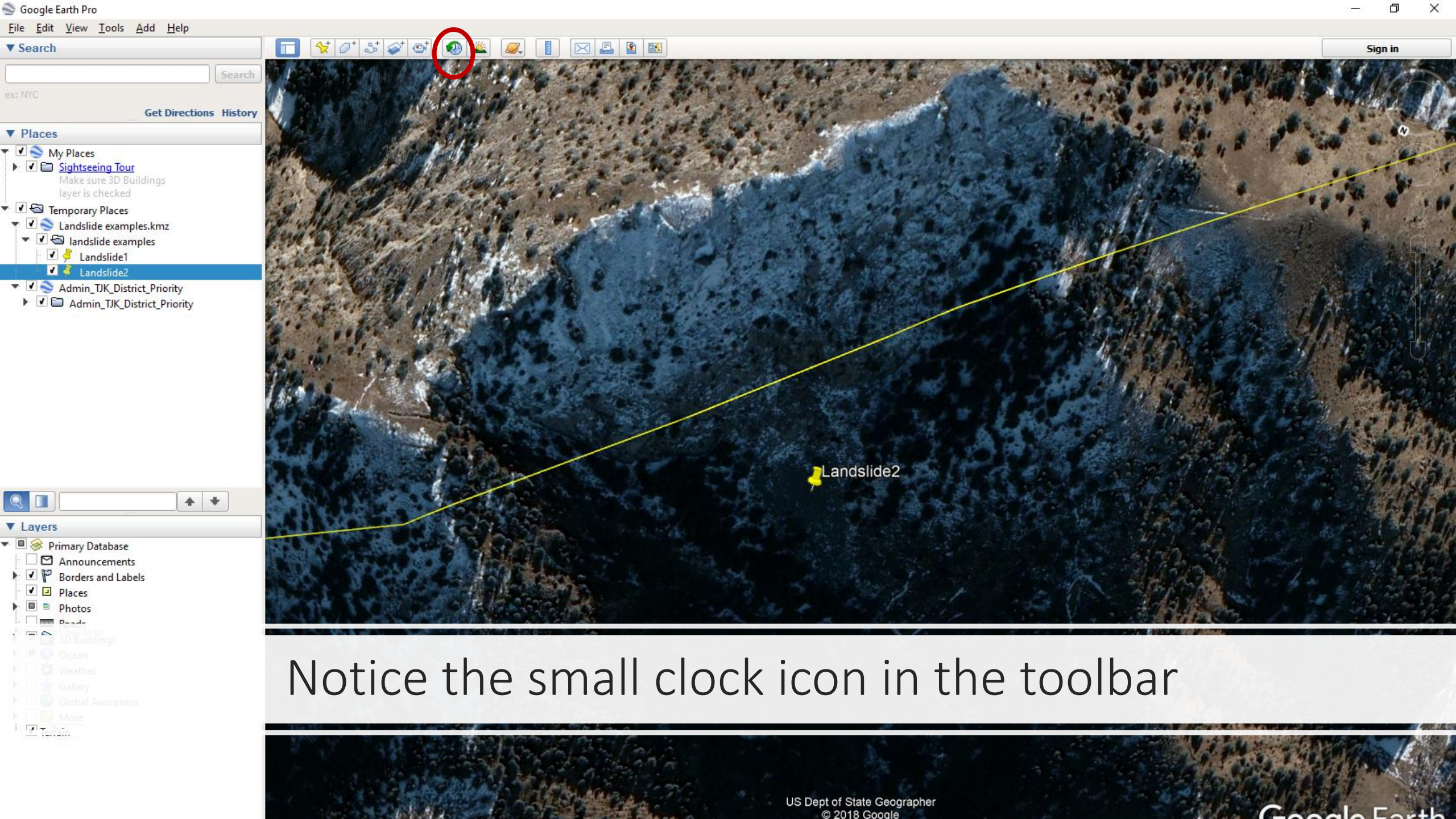
- The landslide is clearly visible
- The texture and tone is different from the rest of the region

CAN YOU IDENTIFY THE ELEMENTS AT RISK IN THIS SITUATION?



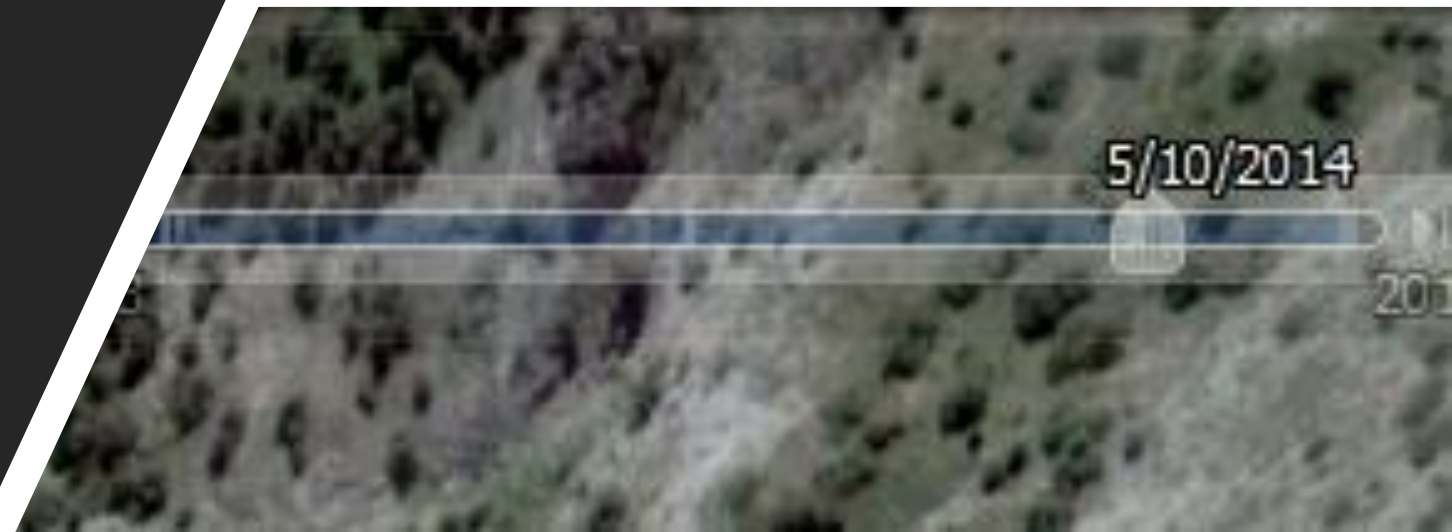
Zoom into landslide 2

- Google earth Pro by default displays the most latest images they have in their archives.
- Lets try to move back in time and see what has happened.

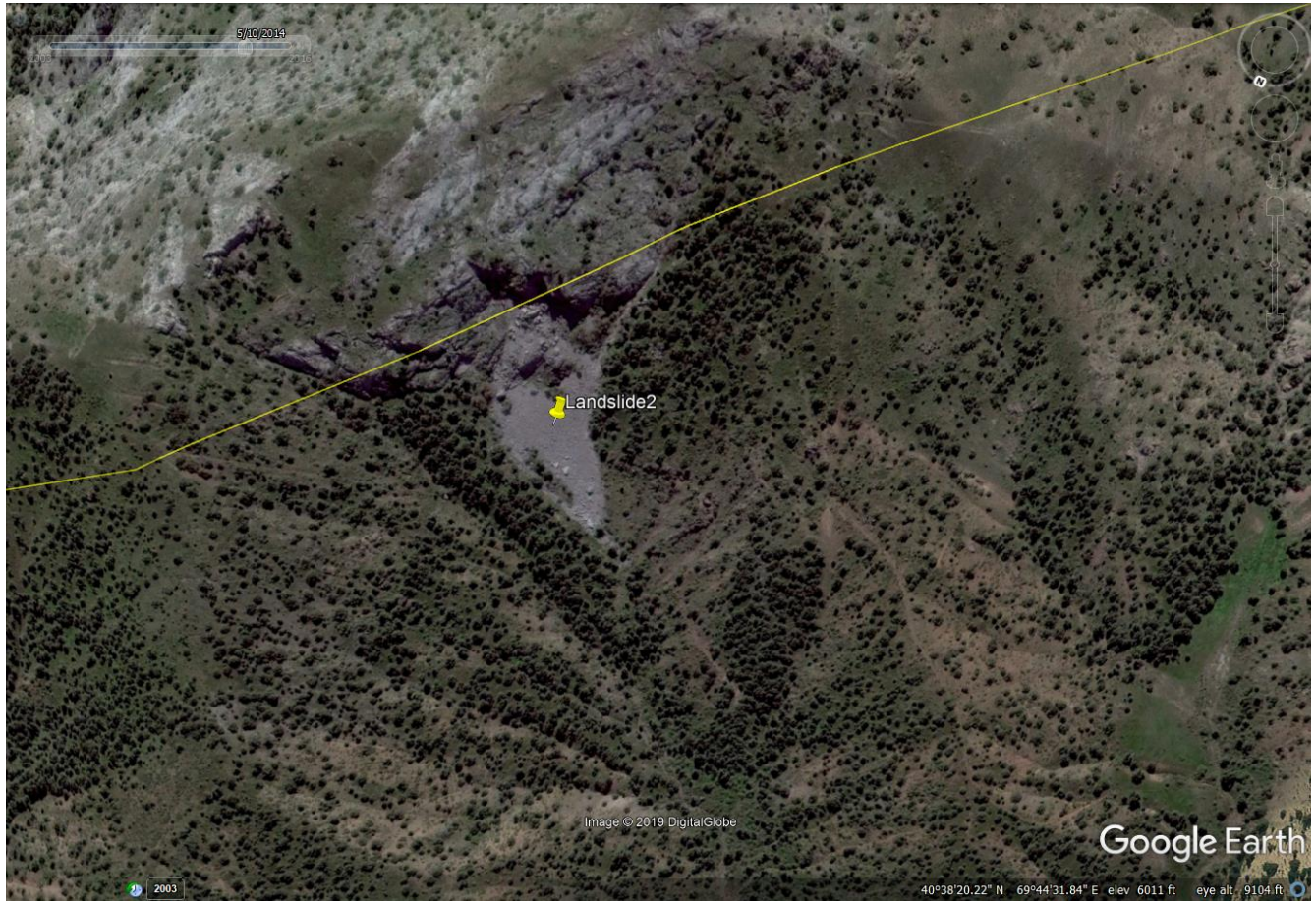

Google Earth Pro
File Edit View Tools Add Help
Search
Search
ex: NYC
Get Directions History
Places
My Places
Sightseeing Tour
Make sure 3D Buildings layer is checked
Temporary Places
Landslide examples.kmz
landslide examples
Landslide1
Landslide2
Admin_TJK_District_Priority
Admin_TJK_District_Priority
Layers
Primary Database
Announcements
Borders and Labels
Places
Photos
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Terrain
Sign in
Landslide2
Notice the small clock icon in the toolbar
US Dept of State Geographer
© 2018 Google
Google Earth

A slider will appear to move back and forth in time

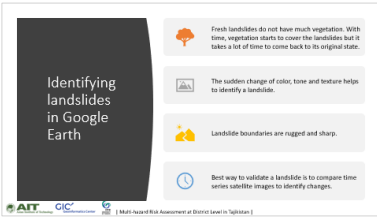
Slide it back to 2014/10/05



5/10/2014
2003
2016
Landslide2
N



Remember the 4 main points for identifying landslides



Why past landslide identification is necessary for analyzing elements at risk?

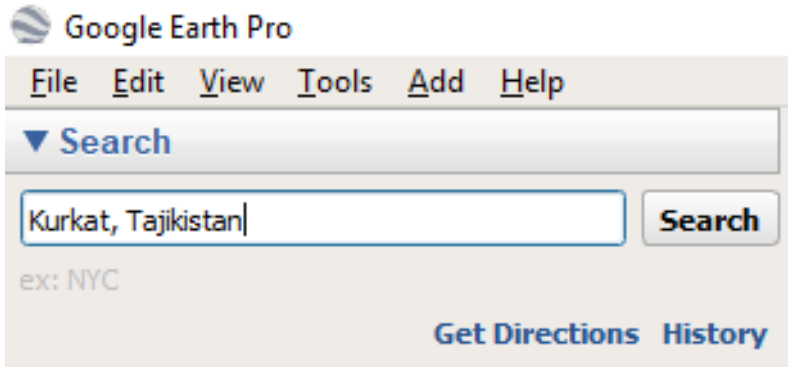
Lets now try to identify few categories of elements at risk
Google Earth
©2018 Google
Image © 2019 DigitalGlobe
Auchi
1000 ft

Buildings and settlements

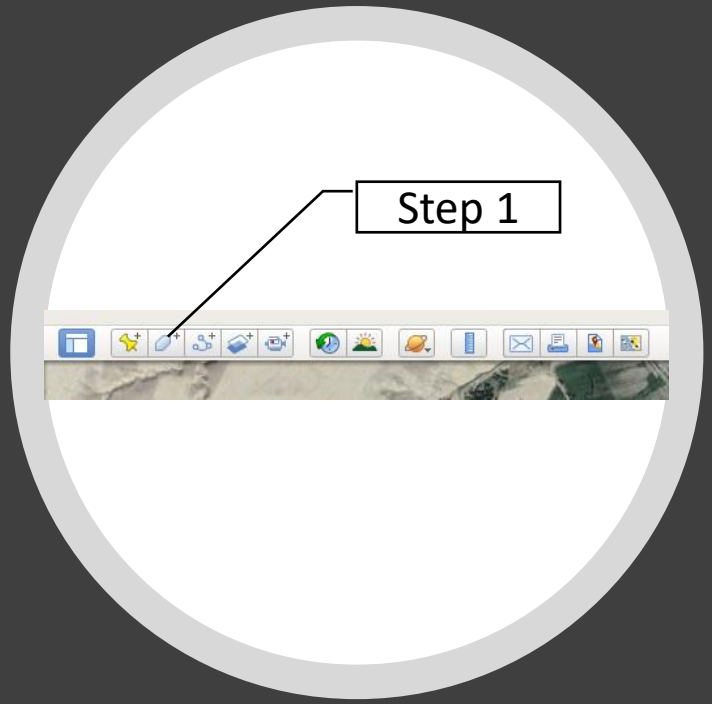
Try to find areas with many buildings.

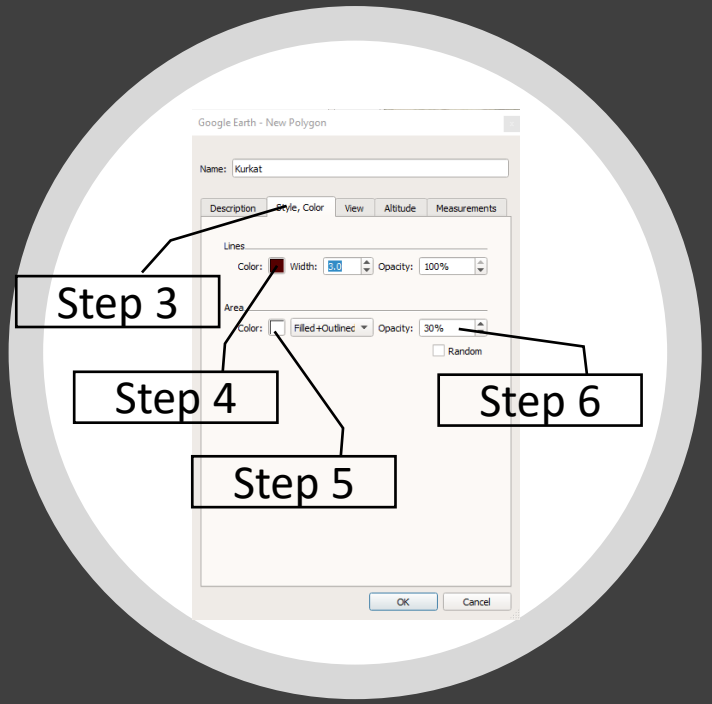
Isolated settlements in rural areas are also at risk from hazards at different levels.

Mapping building clusters

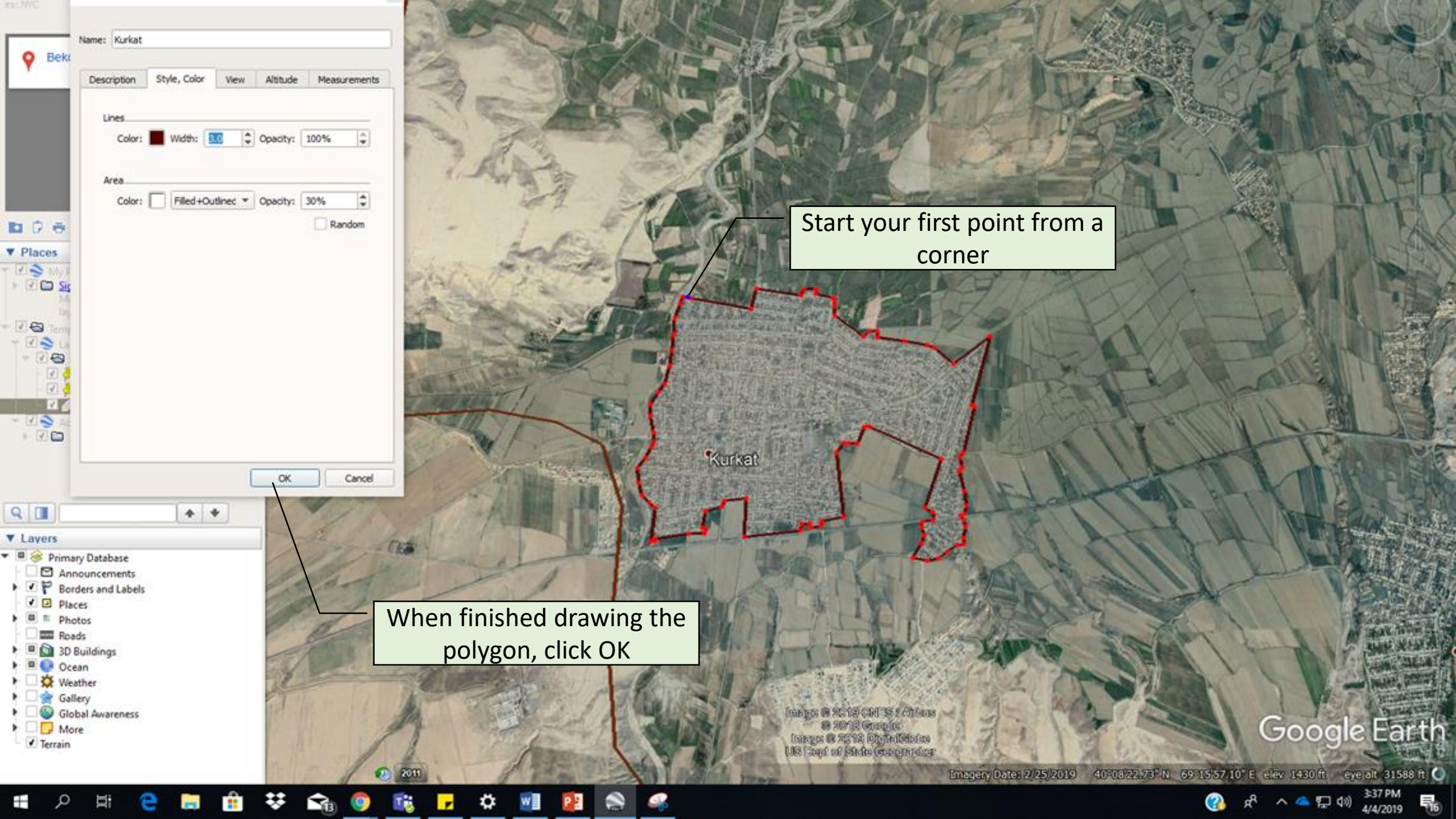


Type Kurkat in the search bar and hit Enter



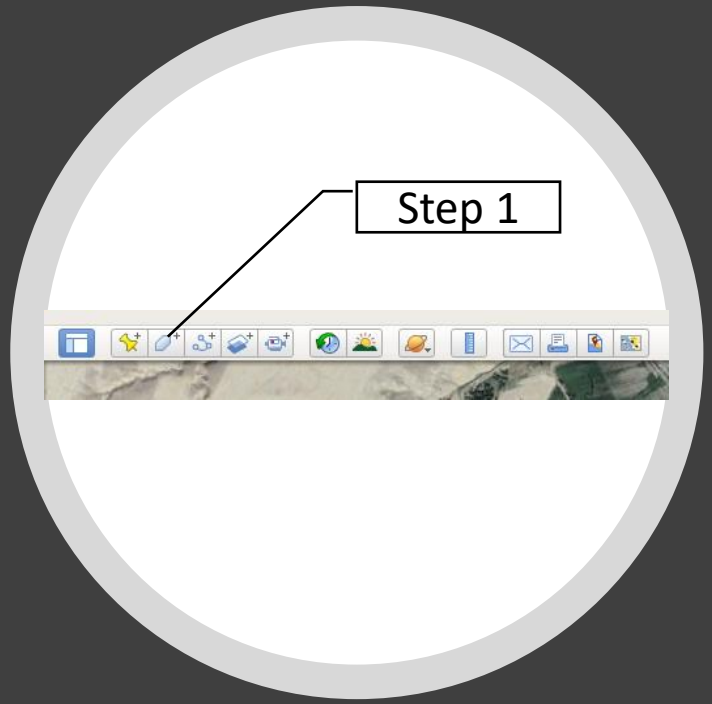


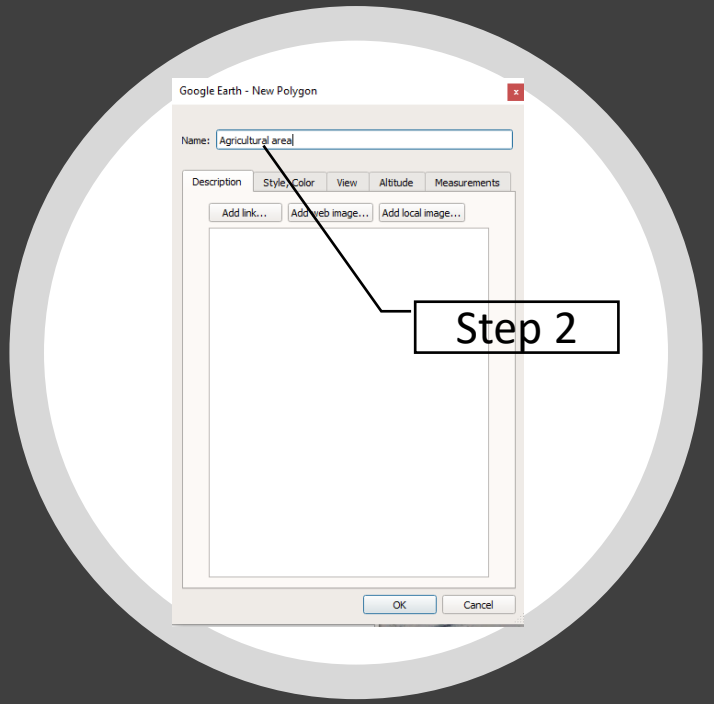
Lets try to map the building cluster now

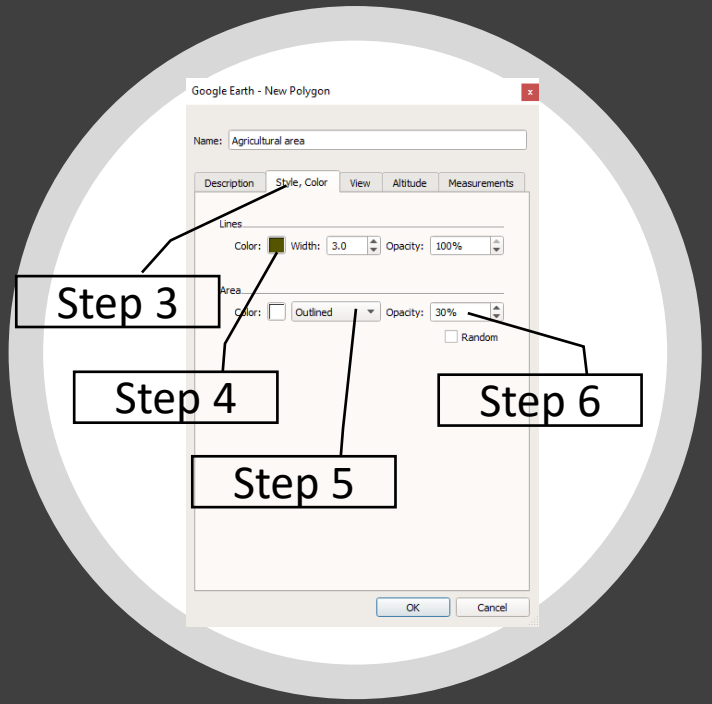

Name: Kurkat
Description
Style, Color
View
Altitude
Measurements
Lines
Color:
Width:
Opacity:
100%
Area
Color:
Filled+Outlinec
Opacity:
30%
Random
OK
Cancel
Start your first point from a corner
When finished drawing the polygon, click OK
Kurkat
Places
Layers
Primary Database
Announcements
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Terrain
Google Earth
Imagery Date: 2/25/2019
3:37 PM
4/4/2019

Agricultural areas

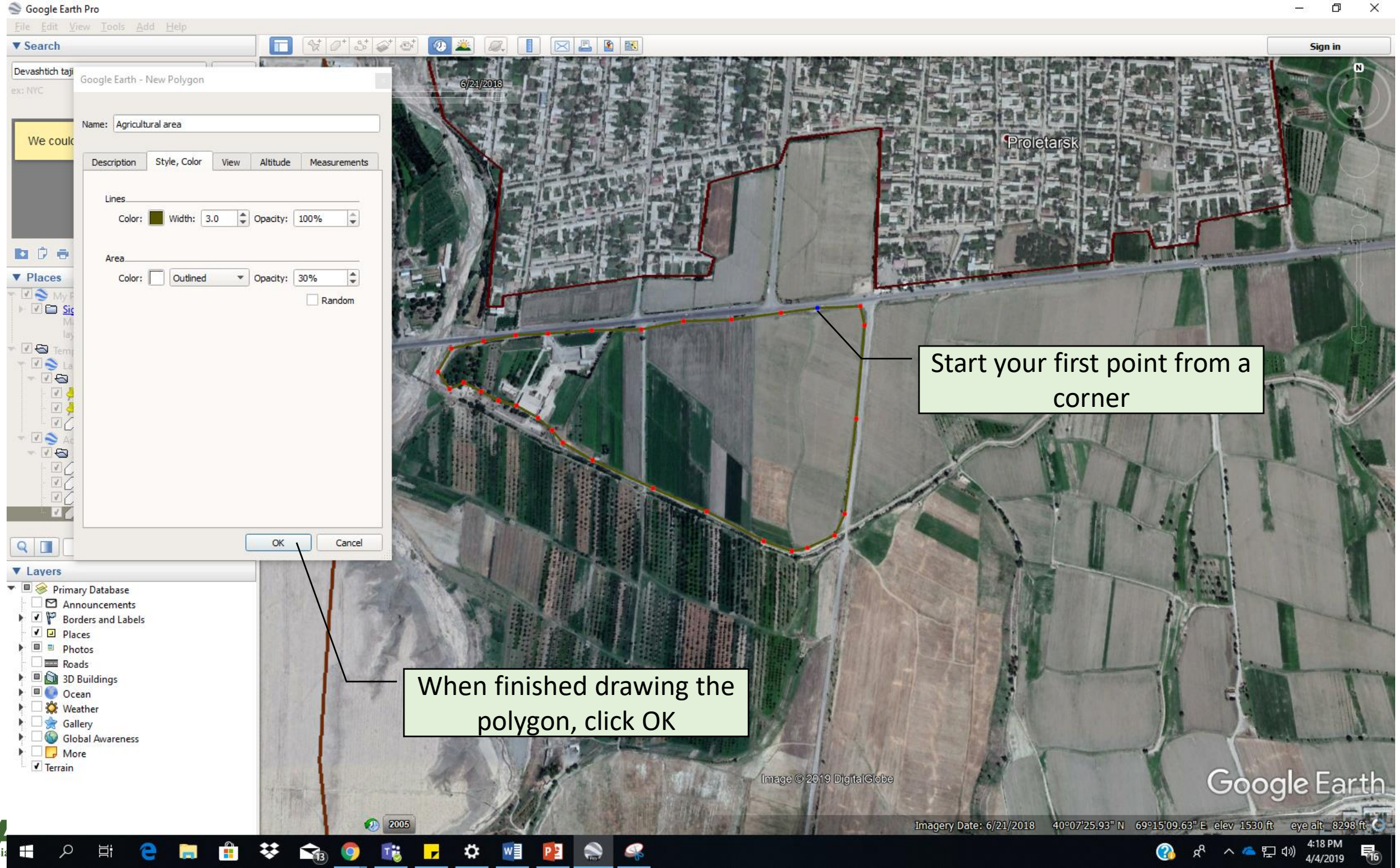
Agricultural areas are frequently affected by hydrological hazards like floods since they are located in floodplains







Lets try to map the agricultural area now


Google Earth Pro
File Edit View Tools Add Help
Search
Sign in
Google Earth - New Polygon
Name: Agricultural area
Description
Style, Color
View
Altitude
Measurements
Lines
Color:
Width: 3.0
Opacity: 100%
Area
Color:
Outlined
Opacity: 30%
Random
OK
Cancel
Places
Layers
Primary Database
Announcements
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Terrain
6/21/2018
Proletarsk
Start your first point from a corner
When finished drawing the polygon, click OK
Image © 2019 DigitalGlobe
Google Earth
2005
Imagery Date: 6/21/2018 40°07'25.93" N 69°15'09.63" E elev 1530 ft eye alt 8298 ft
4:18 PM
4/4/2019

We learnt how to map building clusters and agricultural areas. What other elements at risk can we possibly map using Google Earth Pro?