Group Project 6

Groups 1 through 4

The attached maps of the Sterling Forest State Park / Harriman State Park include a Google terrain map and a geological map due to Gates et al. 2001. I have co-registered the maps (roughly). Note that the western part of the region, the rock layers strike NNE-SSW, whereas in the eastern part the strike is more rotated to the east. The issue is how the strike of the rock layers affects the development of glacially-plucked cliffs. I have divided the overall map into four sections, labeled G1 through G4, one for each group. For about 20 hills in your group's area, identify the side with the steepest slope. Then measure the downhill direction using the attached instructions.

Plot your data on the angular histogram that is provided, one for downhill direction and one for elongation direction. On the rim of the histogram, plot the strike direction of the rock layers in your area with a blue arrow and the glacial striation direction with a red arrow, taking them from the maps provided.

In class, we will compare the results of the four groups and discuss whether any consistent correlation with rock strike is present.

Group Project 6

Groups 5

The Google terrain attached map, labeled G5, is for southern Maine, near the town of Waterford.

For about 20 hills in your group's area, identify the side with the steepest slope and the hill's long axis (ignore long axis if it not clearly identifiable).

Measure the downhill direction of the slope and the axis of elongation. You need not use my maps; make your own enlarged version of each hill with Google maps. See the attached directions on how to use Powerpoint to measure directions.

Plot your data on the angular histogram. Additionally, measure the glacial striation direction from the map provided and plot it on the rim of the histogram with a red arrow.

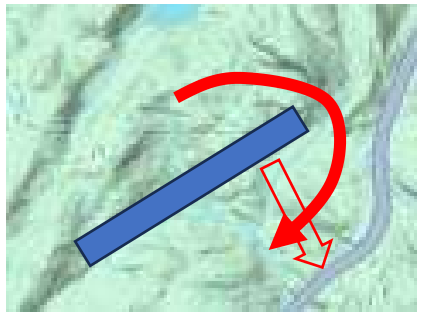
Compare the results for steepest slope and the hill's long axis and discuss whether they are consistent.

Measuring direction with PowerPoint

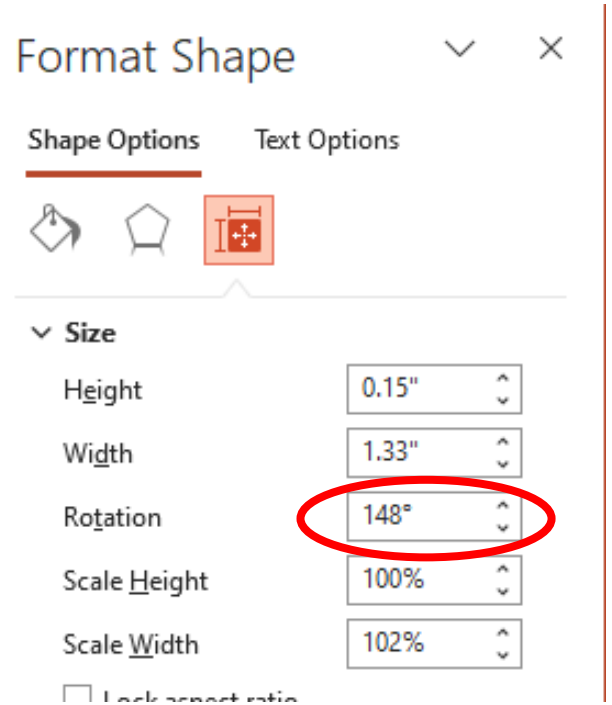
Step 1. Copy the map to Powerpoint. The downslope direction is shown in red (but you do not need to make it).

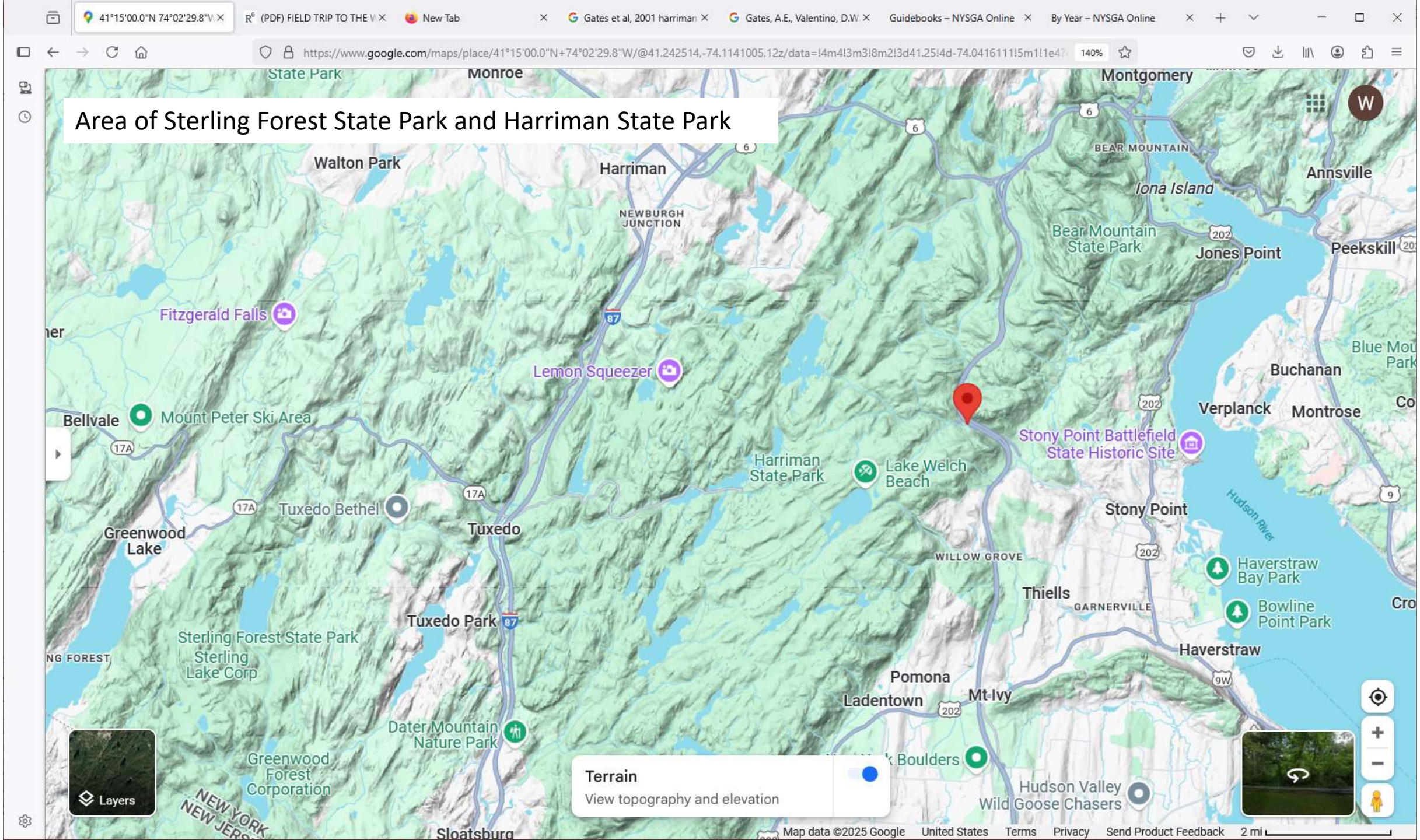
Step 2. Draw a long thin rectangle that has a long-axis pointing east-west (horizontally on the page) and then manually rotate it parallel to the edge of the cliff of slope.

Step 3. reposition it over the slope, and rotate it CLOCKWISE until it aligns with the slope break.



Step 4. Read the rectangle's rotation angle (in the 0-360 range) from the Formal Shape menu. You need to be careful that you're not 180 degrees off with the angle. In this example, the downslope direction is N148E




Area of Sterling Forest State Park and Harriman State Park
Monroe
Montgomery
Walton Park
Harriman
BEAR MOUNTAIN
Annsville
Iona Island
NEWBURGH JUNCTION
Bear Mountain State Park
Jones Point
Peekskill
Fitzgerald Falls
Lemon Squeezer
Buchanan
Verplanck
Montrose
Bellvale
Mount Peter Ski Area
Stony Point Battlefield State Historic Site
Harriman State Park
Lake Welch Beach
Tuxedo Bethel
Tuxedo
Greenwood Lake
Stony Point
Hudson River
WILLOW GROVE
Haverstraw Bay Park
Thiells
GARNERVILLE
Bowline Point Park
Tuxedo Park
Sterling Forest State Park
Sterling Lake Corp
Haverstraw
Pomona
Ladentown
Mt Ivy
Dater Mountain Nature Park
Greenwood Forest Corporation
Hudson Valley Wild Goose Chasers
Terrain
View topography and elevation
Layers
Map data ©2025 Google
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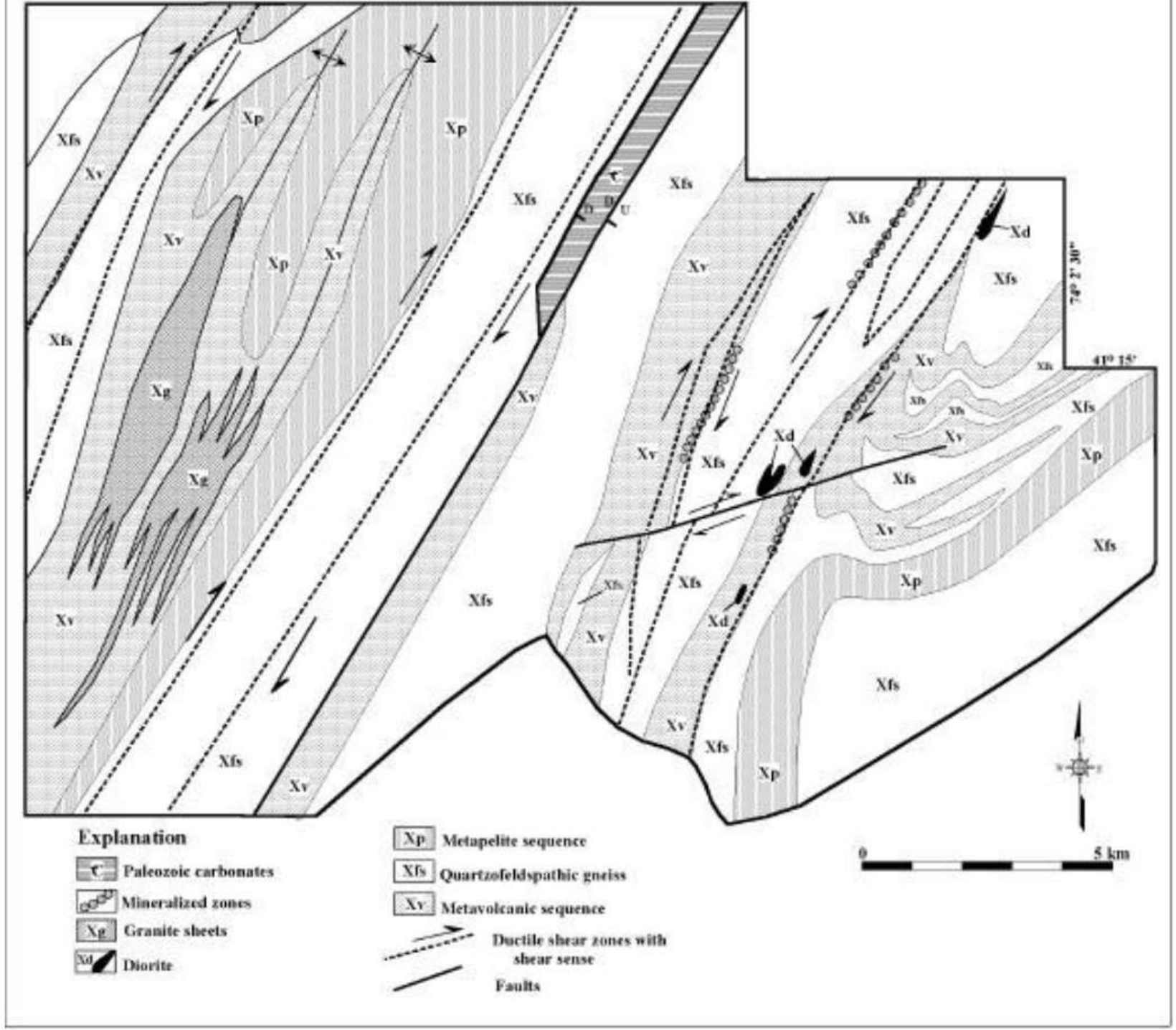
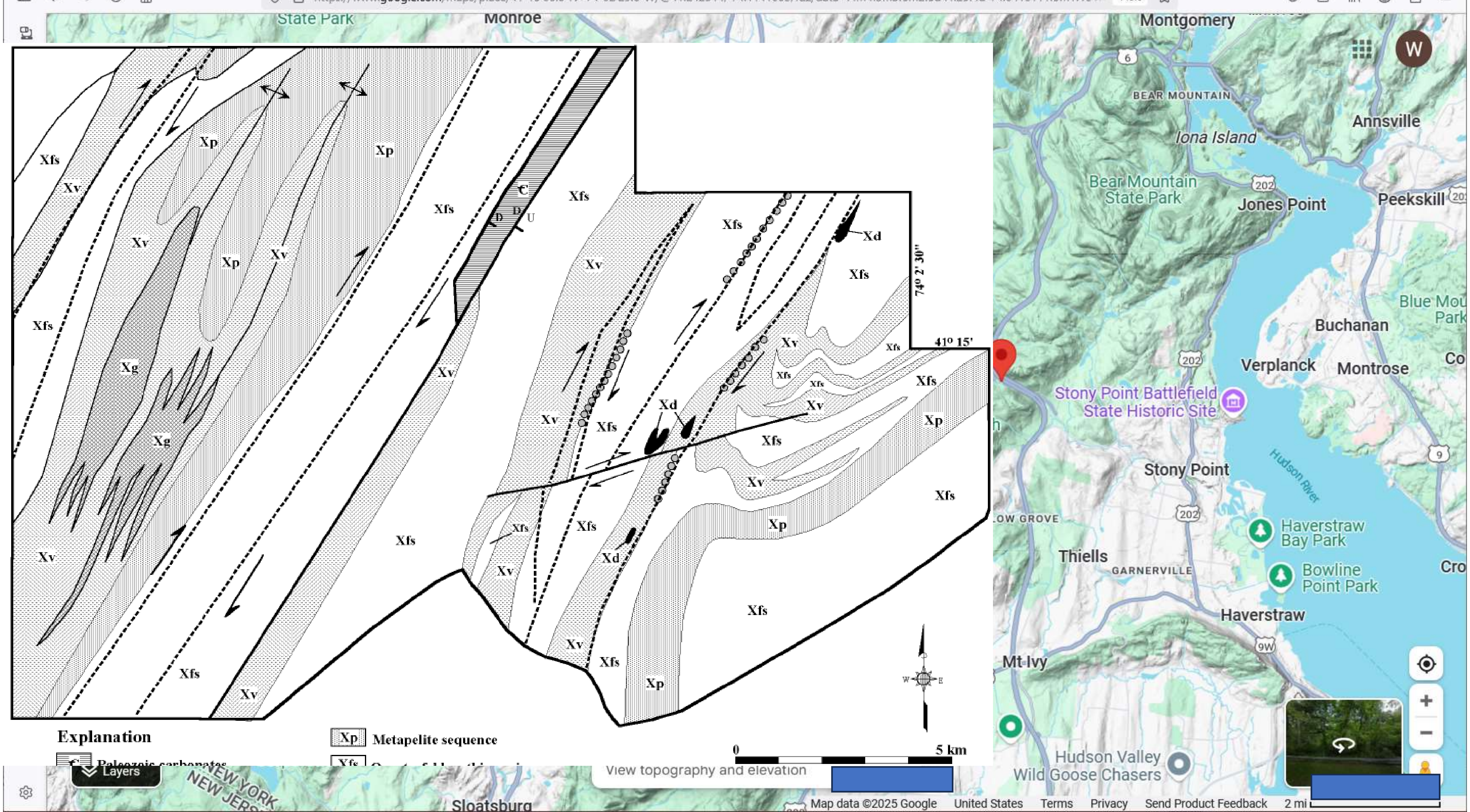
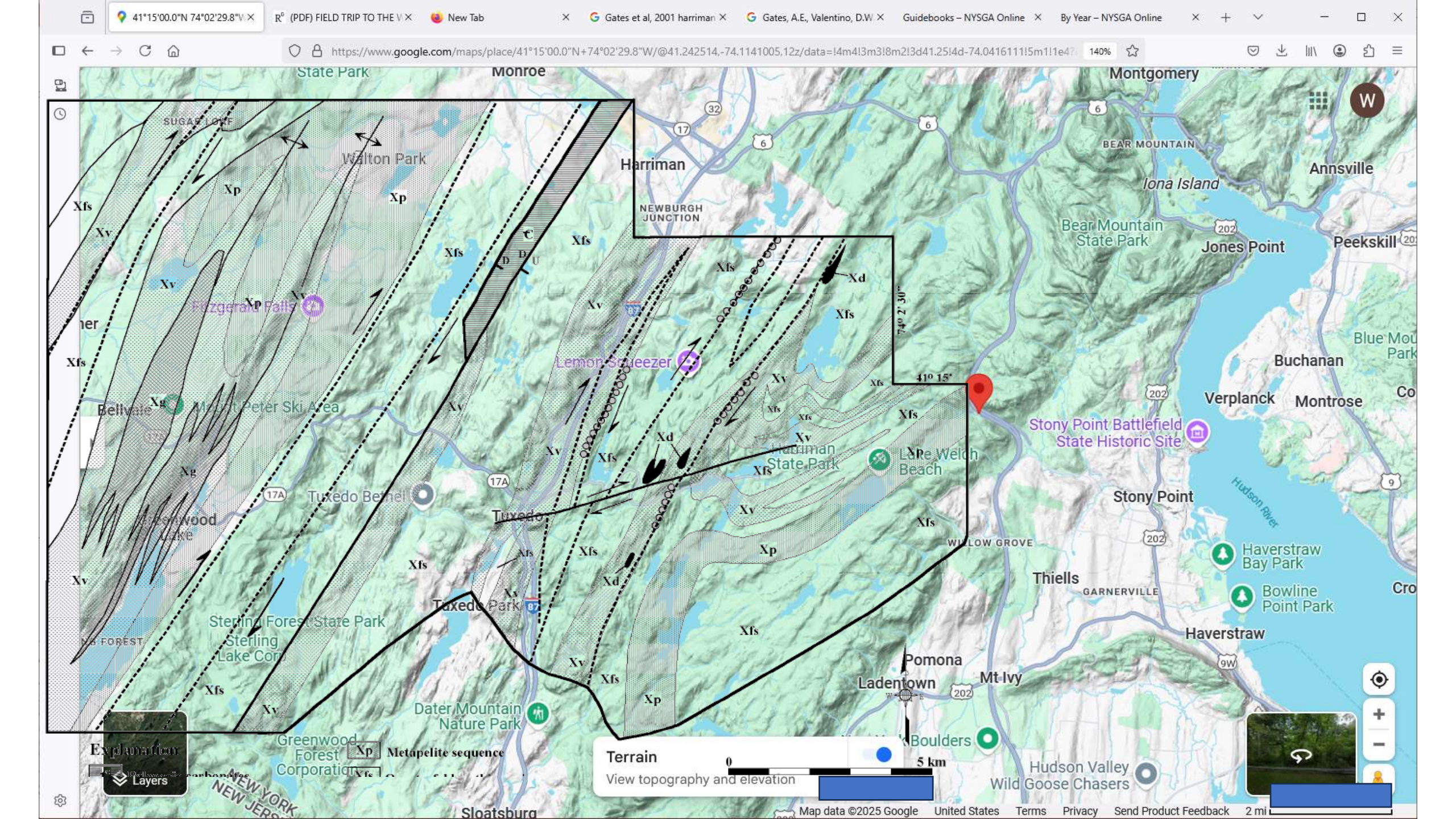
Geological map by Gates et al. 2001



Maps crudely co-registered




Monroe
Harriman
NEWBURGH JUNCTION
Walton Park
SUGAR LOAF
Fitzgerald Falls
Lemon Squeezer
Mount Peter Ski Area
Bellvale
Tuxedo Bemel
Tuxedo
Tuxedo Park
Sterling Forest State Park
Sterling Lake Corp
Greenwood Lake
Dater Mountain Nature Park
Greenwood Forest Corporation
Harriman State Park
Lake Welch Beach
Montgomery
BEAR MOUNTAIN
Iona Island
Annsville
Bear Mountain State Park
Jones Point
Peekskill
Buchanan
Verplanck
Montrose
Stony Point Battlefield State Historic Site
Stony Point
Hudson River
WILLOW GROVE
Haverstraw Bay Park
Bowline Point Park
Thiells
GARNERVILLE
Haverstraw
Pomona
Ladentown
Mt Ivy
Boulders
Hudson Valley Wild Goose Chasers
74° 2' 30"
41° 15'
Xfs
Xv
Xp
Xd
Xg
Explanation
Metapelite sequence
Layers
Terrain
View topography and elevation
0
5 km
Map data ©2025 Google
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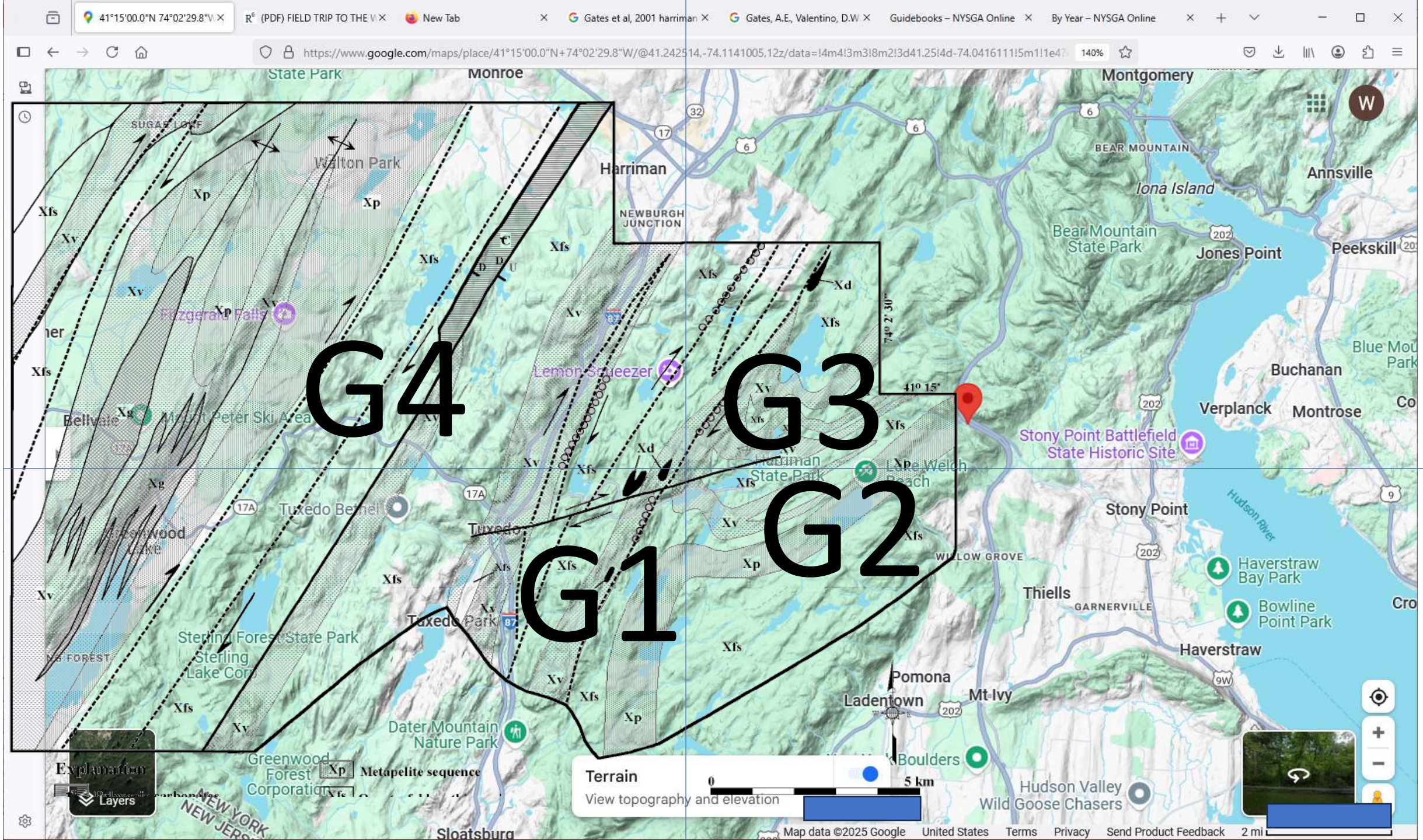
G4
G3
G2
G1
Explanation
Metapelite sequence
Terrain
View topography and elevation
Map data ©2025 Google
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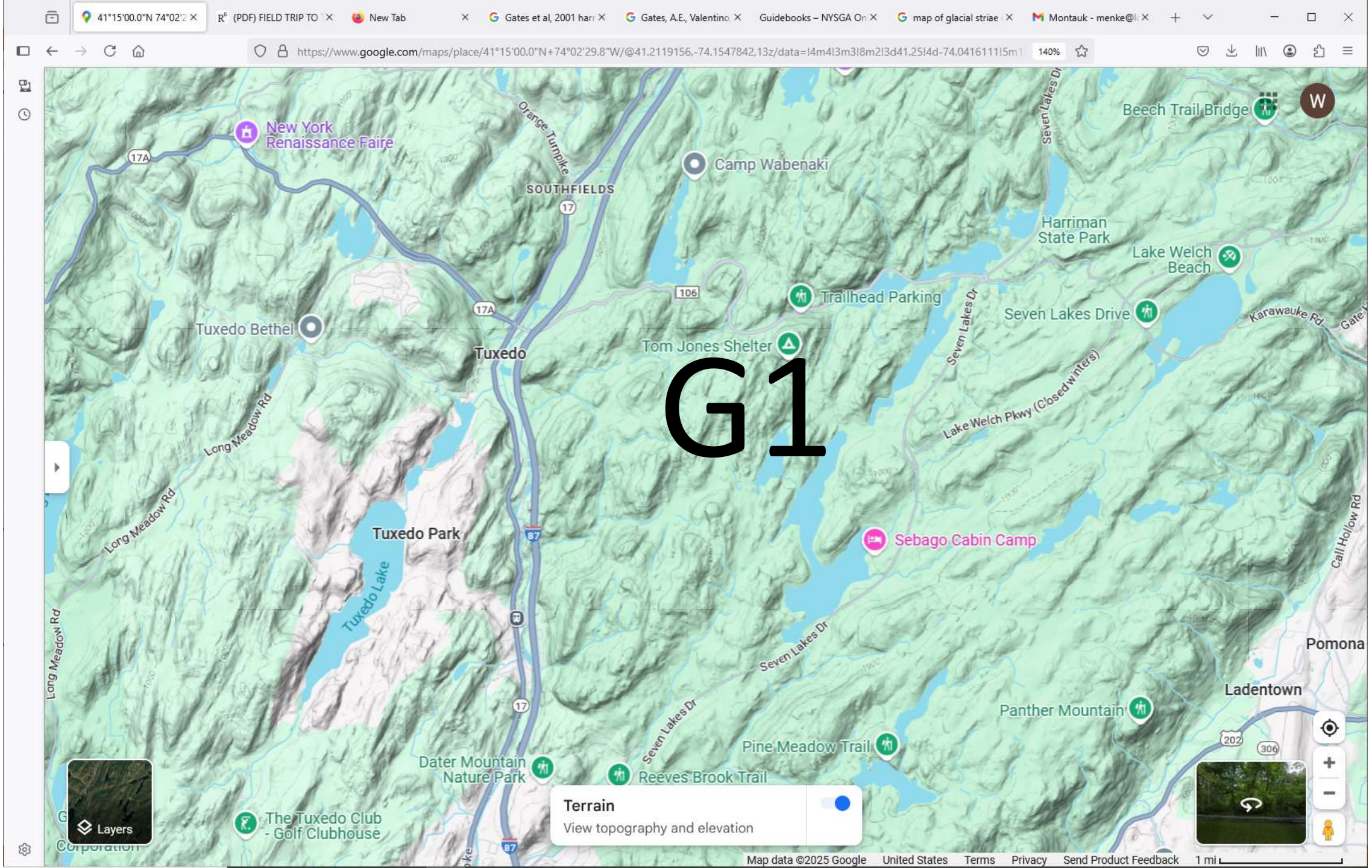
G1
New York Renaissance Faire
Orange Turnpike
SOUTHFIELDS
Camp Wabenaki
Beech Trail Bridge
Seven Lakes Dr
Harriman State Park
Lake Welch Beach
Trailhead Parking
Seven Lakes Drive
Karawauke Rd
Tuxedo Bethel
Tuxedo
Tom Jones Shelter
Lake Welch Pkwy (Closed winters)
Long Meadow Rd
Tuxedo Park
Tuxedo Lake
Sebago Cabin Camp
Call Hollow Rd
Pomona
Ladentown
Panther Mountain
Pine Meadow Trail
Reeves Brook Trail
Dater Mountain Nature Park
The Tuxedo Club - Golf Clubhouse
Terrain
View topography and elevation
Layers
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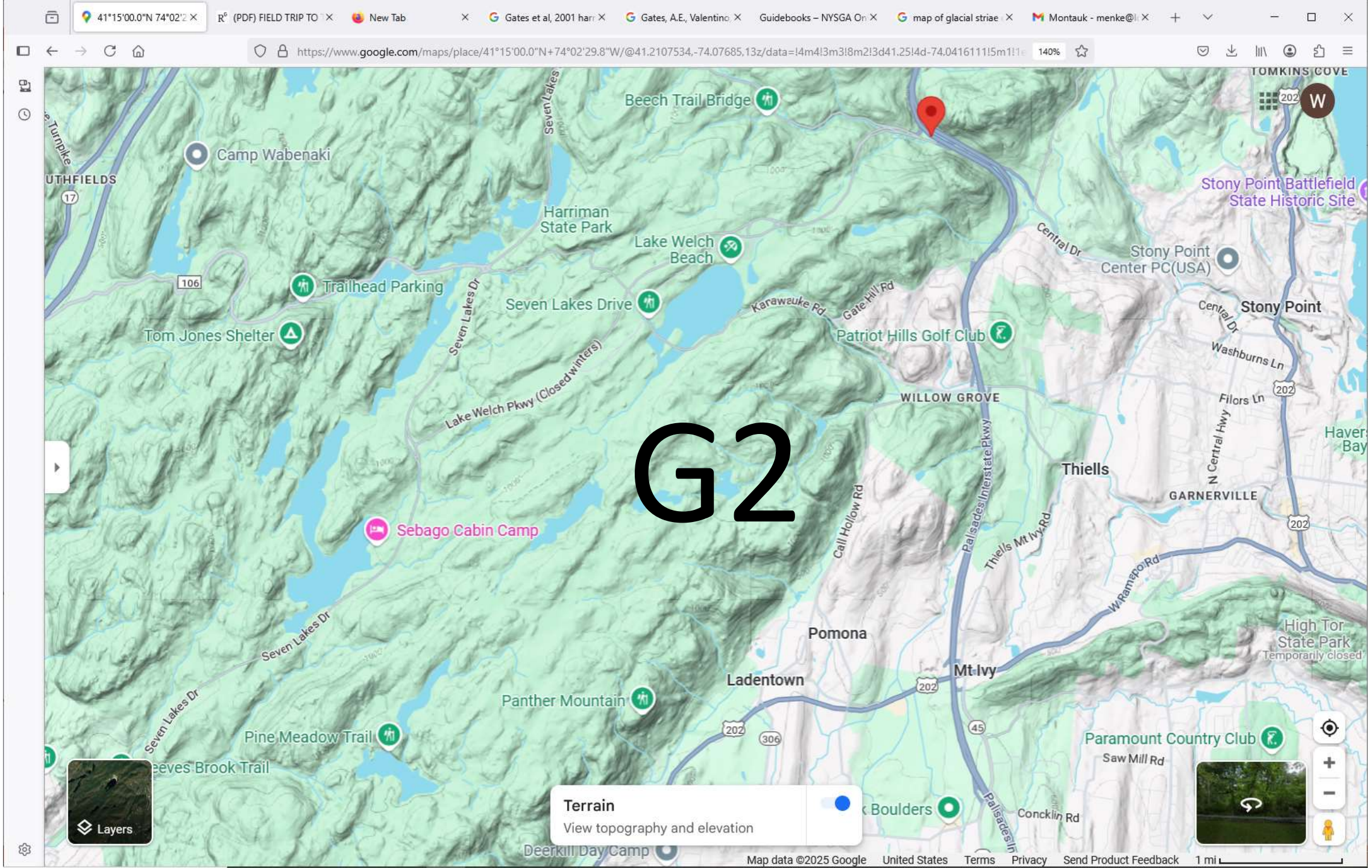
G2
Beech Trail Bridge
Camp Wabenaki
Harriman State Park
Lake Welch Beach
Trailhead Parking
Seven Lakes Drive
Tom Jones Shelter
Sebago Cabin Camp
Patriot Hills Golf Club
Stony Point Battlefield State Historic Site
Stony Point Center PC(USA)
Stony Point
WILLOW GROVE
Thiells
GARNERVILLE
Pomona
Ladentown
Mt Ivy
Panther Mountain
Pine Meadow Trail
High Tor State Park
Temporarily closed
Paramount Country Club
Terrain
View topography and elevation
Layers
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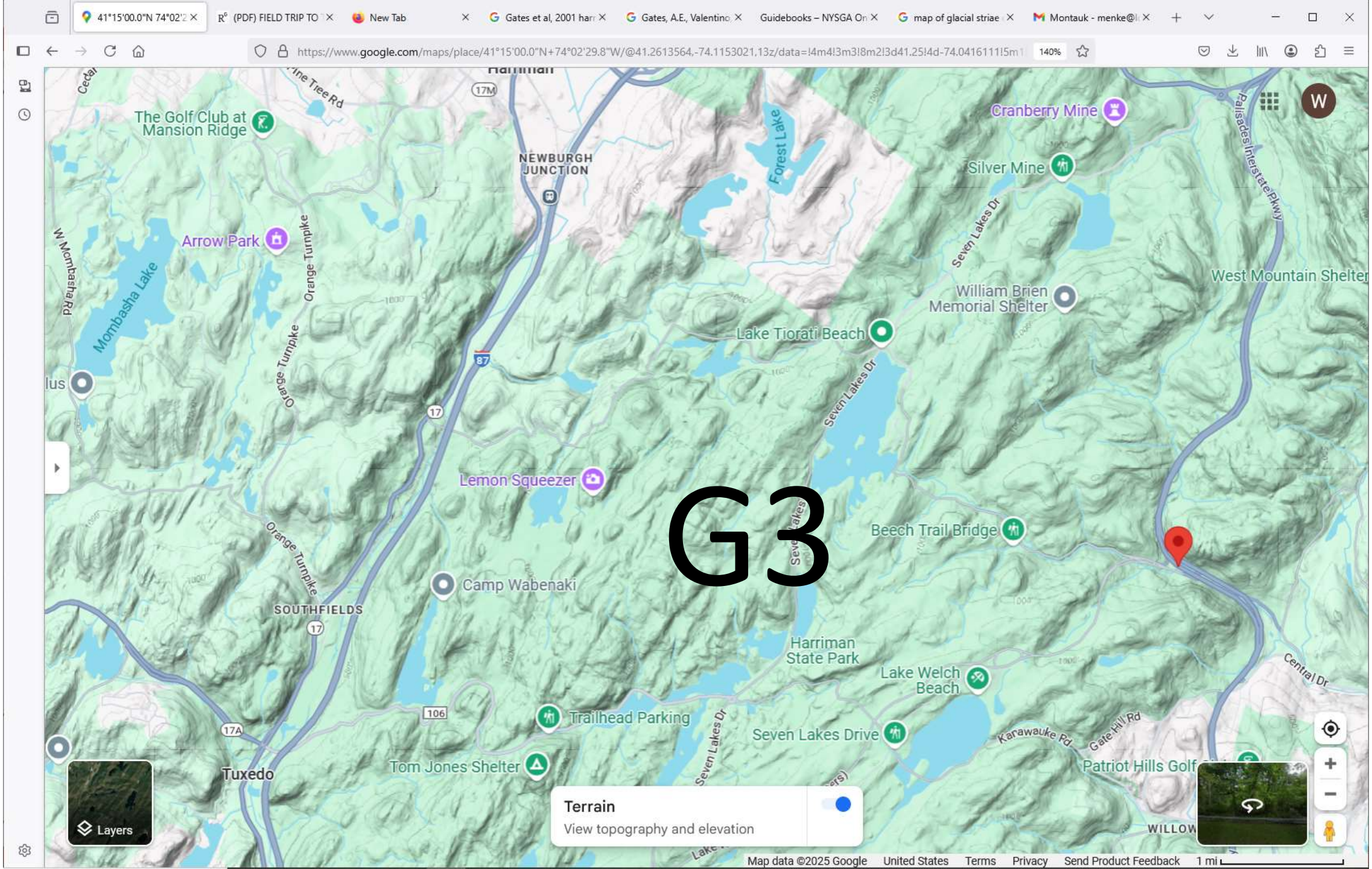
G3
The Golf Club at Mansion Ridge
NEWBURGH JUNCTION
Forest Lake
Cranberry Mine
Silver Mine
Arrow Park
Mombasha Lake
W Mombasha Rd
Orange Turnpike
Seven Lakes Dr
William Brien Memorial Shelter
West Mountain Shelter
Lake Tiorati Beach
Lemon Squeezer
Beech Trail Bridge
Camp Wabenaki
SOUTHFIELDS
Harriman State Park
Lake Welch Beach
Trailhead Parking
Seven Lakes Drive
Tom Jones Shelter
Tuxedo
Patriot Hills Golf
Central Dr
Karawauke Rd
Gate Hill Rd
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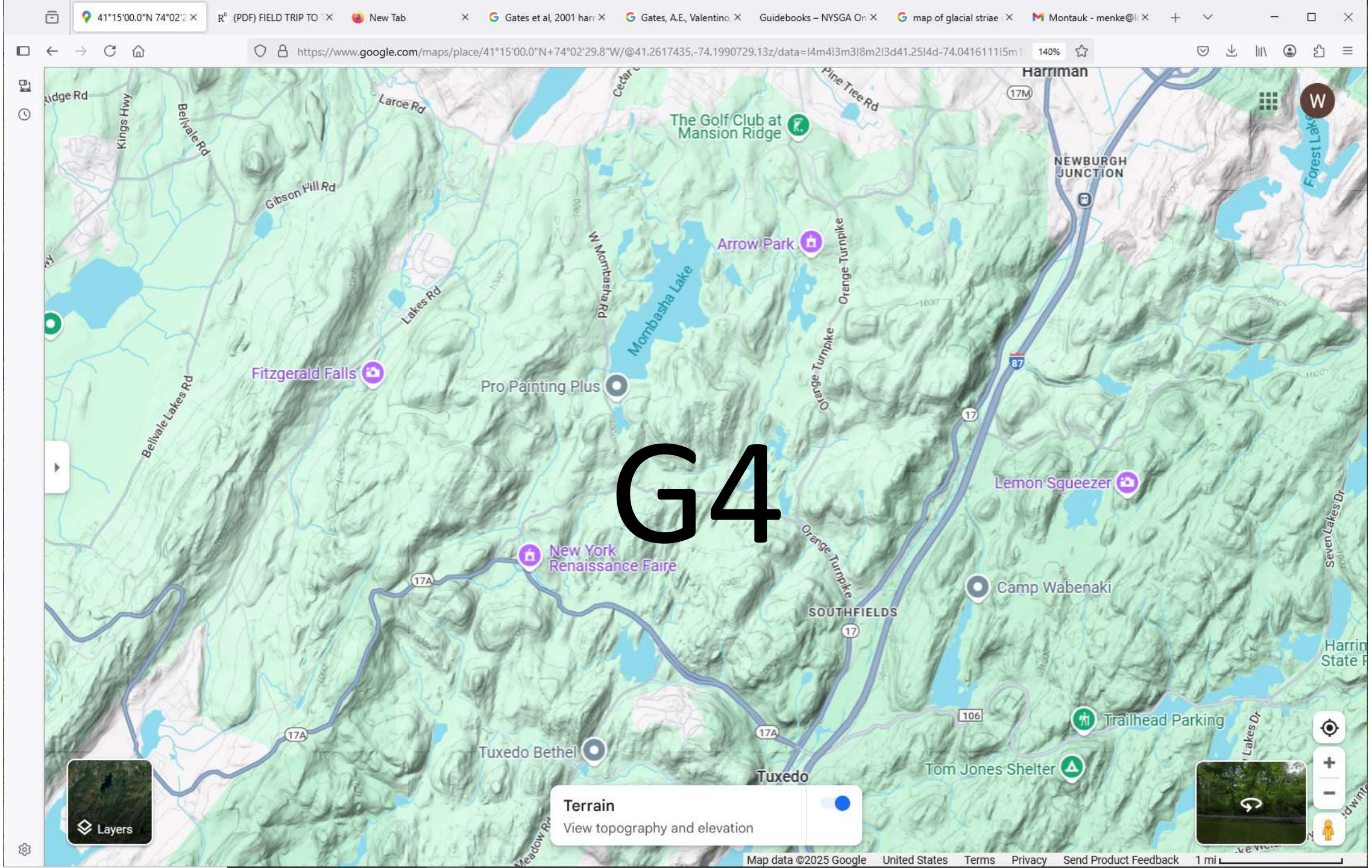
G4
The Golf Club at Mansion Ridge
Arrow Park
Mombasha Lake
W Mombasha Rd
Fitzgerald Falls
Pro Painting Plus
Bellvale Lakes Rd
Lakes Rd
Gibson Hill Rd
Larce Rd
Kings Hwy
Bellvale Rd
Pine Tree Rd
Orange Turnpike
NEWBURGH JUNCTION
Harriman
17M
87
17
Lemon Squeezer
Seven Lakes Dr
New York Renaissance Faire
17A
Camp Wabenaki
SOUTHFIELDS
106
Trailhead Parking
Tom Jones Shelter
Tuxedo Bethel
Tuxedo
Layers
Terrain
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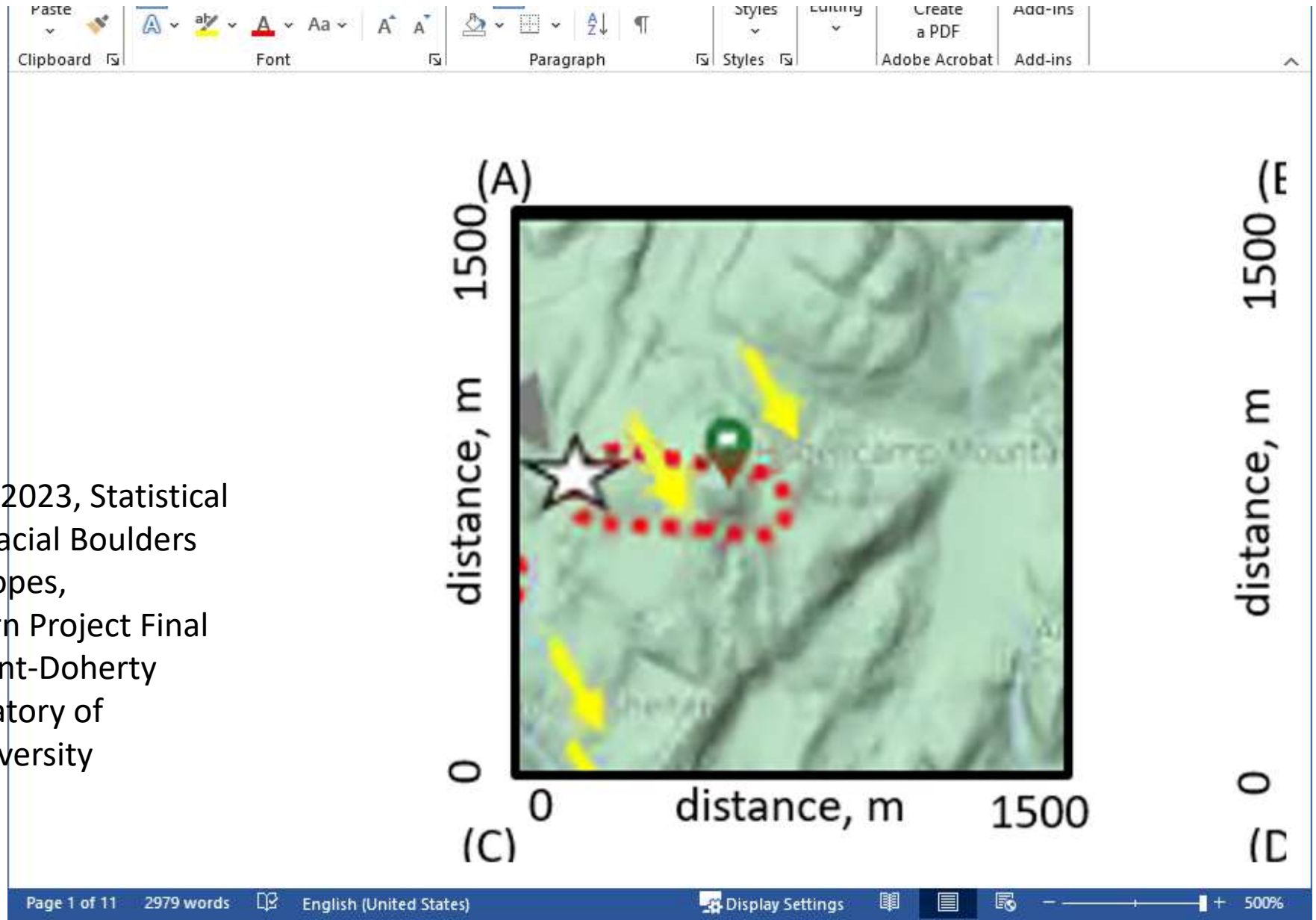
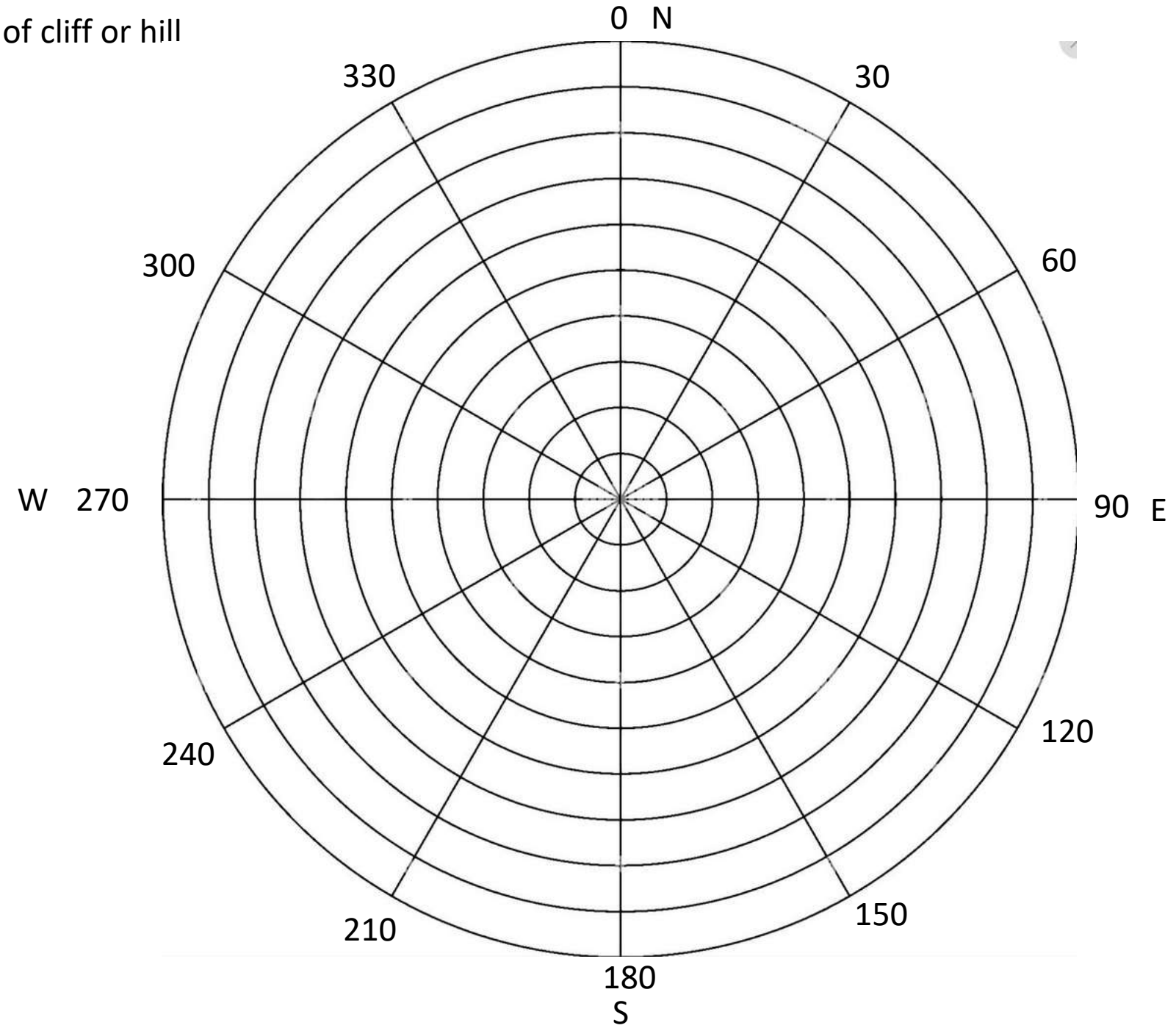
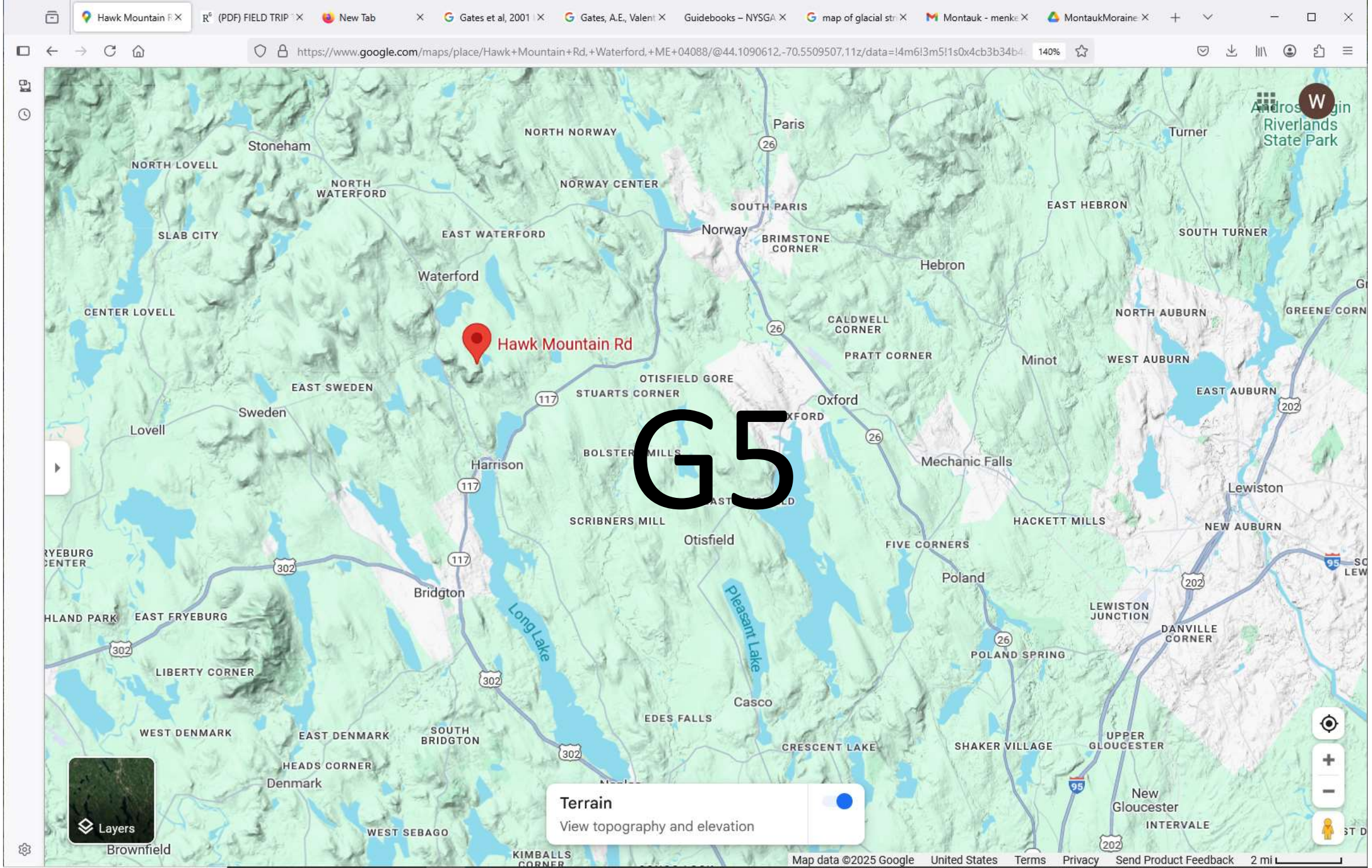
striations in harriman park (yellow)



Caguana, M., 2023, Statistical Analysis of Glacial Boulders on Varying Slopes, Summer Intern Project Final Report, Lamont-Doherty Earth Observatory of Columbia University

Downslope direction of cliff or hill




Hawk Mountain Rd
G5
Waterford
Stoneham
Paris
Norway
Oxford
Hebron
Turner
Minot
Lewiston
Mechanic Falls
Otisfield
Poland
Casco
Bridgton
Harrison
Sweden
Lovell
Denmark
Brownfield
Long Lake
Pleasant Lake
NORTH NORWAY
NORWAY CENTER
SOUTH PARIS
EAST HEBRON
SOUTH TURNER
NORTH AUBURN
WEST AUBURN
EAST AUBURN
NEW AUBURN
HACKETT MILLS
FIVE CORNERS
POLAND SPRING
LEWISTON JUNCTION
DANVILLE CORNER
NORTH LOVELL
NORTH WATERFORD
EAST WATERFORD
SLAB CITY
CENTER LOVELL
BRIMSTONE CORNER
CALDWELL CORNER
PRATT CORNER
OTISFIELD GORE
STUARTS CORNER
EAST SWEDEN
BOLSTER MILLS
SCRIBNERS MILL
EAST FRYEBURG
LIBERTY CORNER
WEST DENMARK
EAST DENMARK
SOUTH BRIDGTON
HEADS CORNER
EDES FALLS
CRESCENT LAKE
SHAKER VILLAGE
UPPER GLOUCESTER
New Gloucester
INTERVALE
WEST SEBAGO
KIMBALLS CORNER
Riverlands State Park
Terrain
View topography and elevation
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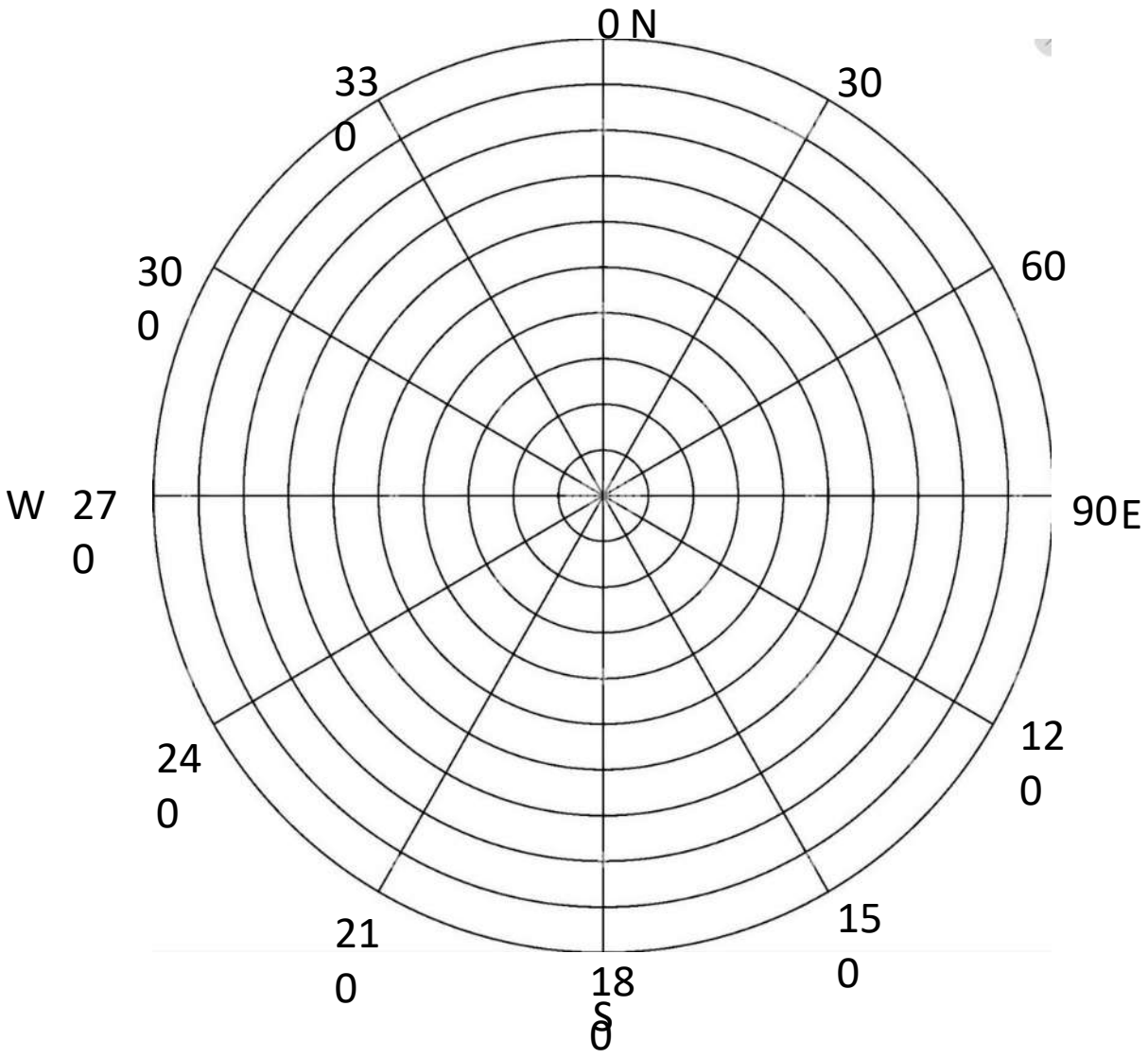
Thompson, W. B.., and Borns, H.W., Jr. (editors), 1985, Surficial geologic map of Maine: Maine Geological Survey, 42" x 52" color map, scale 1:500,000. *Maine Geological Survey Maps*. 15. http://digitalmaine.com/mgs_maps/15

symbol showing striae directions

Downslope direction of cliff or hill



elongation direction of ladform