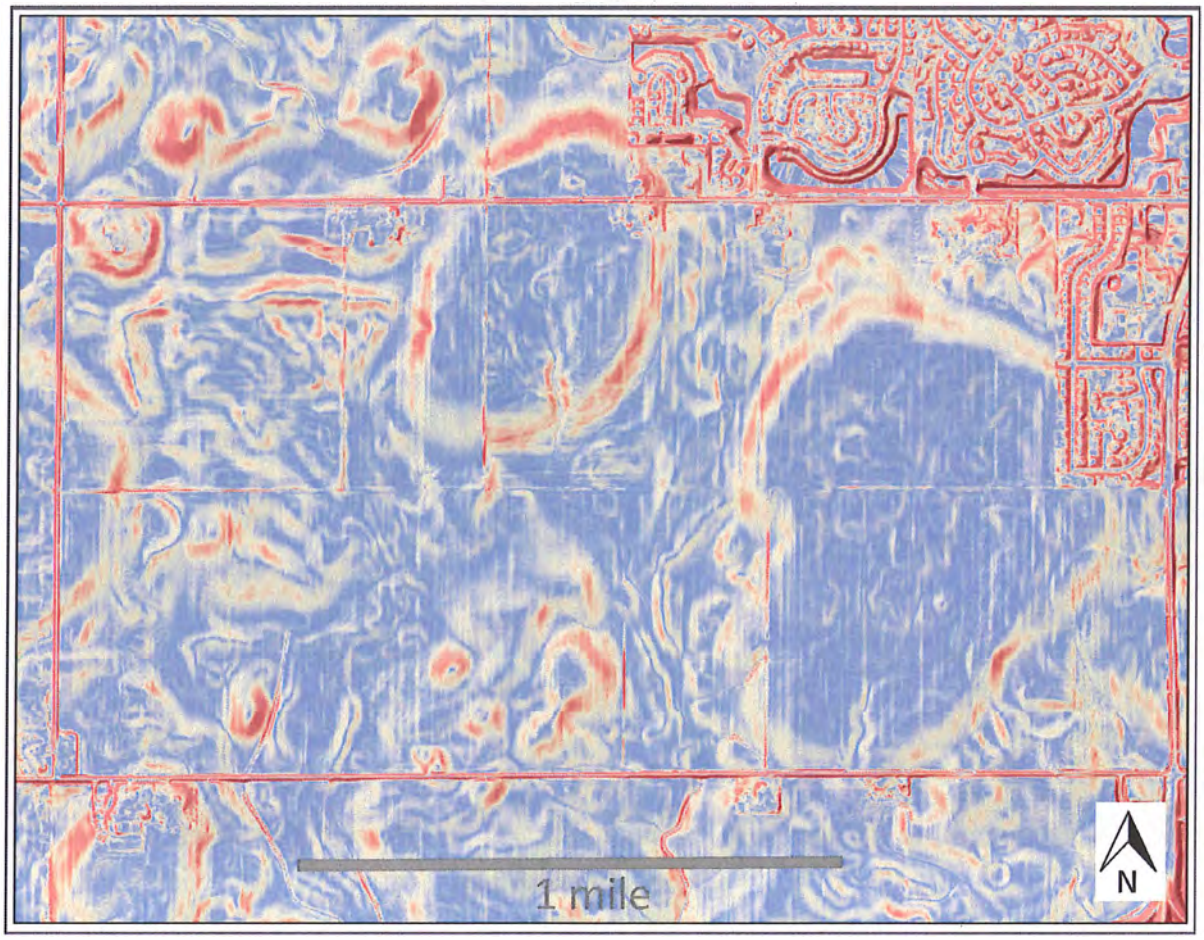
ISCA Fall Trip

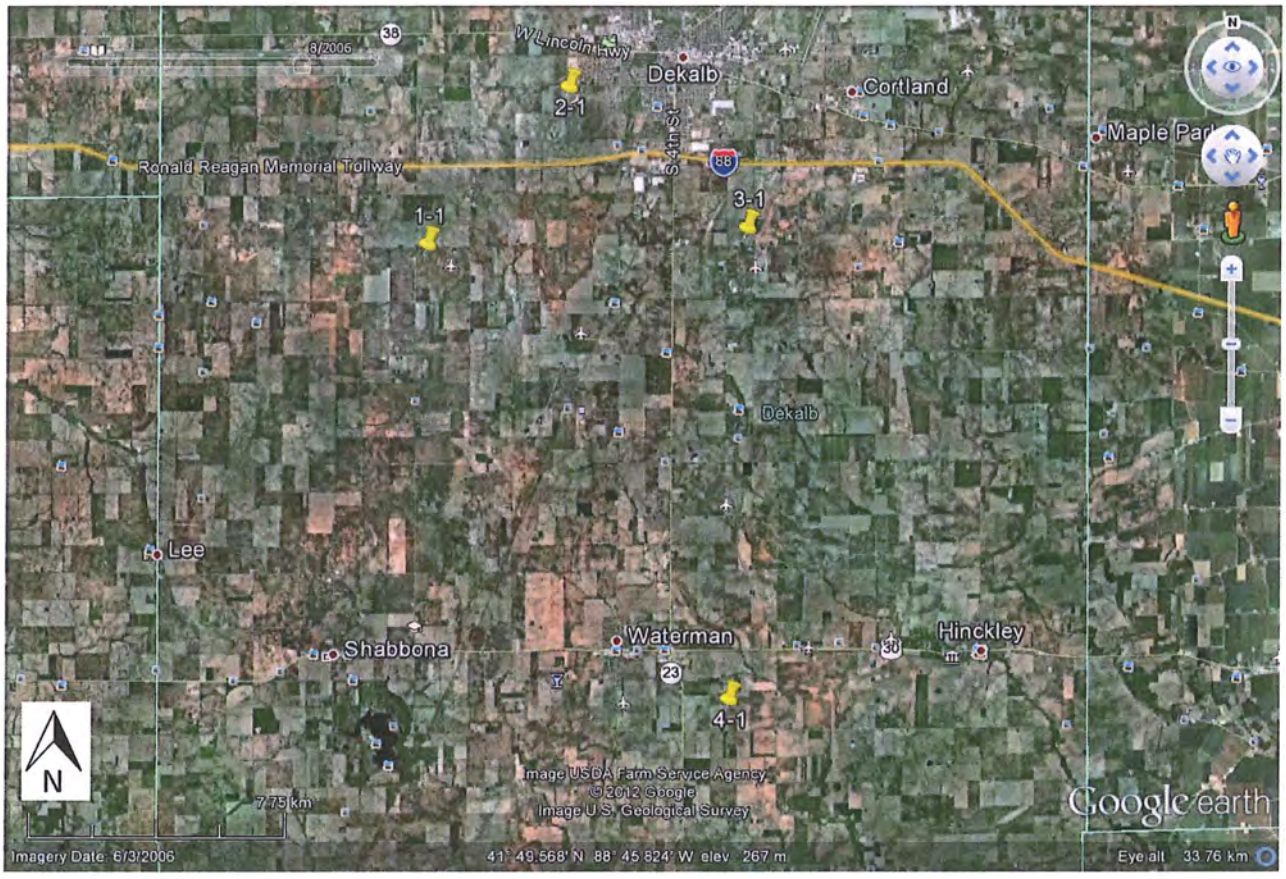
Soil Geomorphic Relationships of Ice-Walled Lake Plains & Relict Ice-Wedge Polygons

DeKalb County, Illinois
11-10-12



Trip Organizers:
Mike Konen – Northern Illinois University
Brandon Curry – Illinois State Geological Survey
Tim Prescott – Natural Resources Conservation Service

Site Locations



5 miles

Ice-Walled Lake Formation

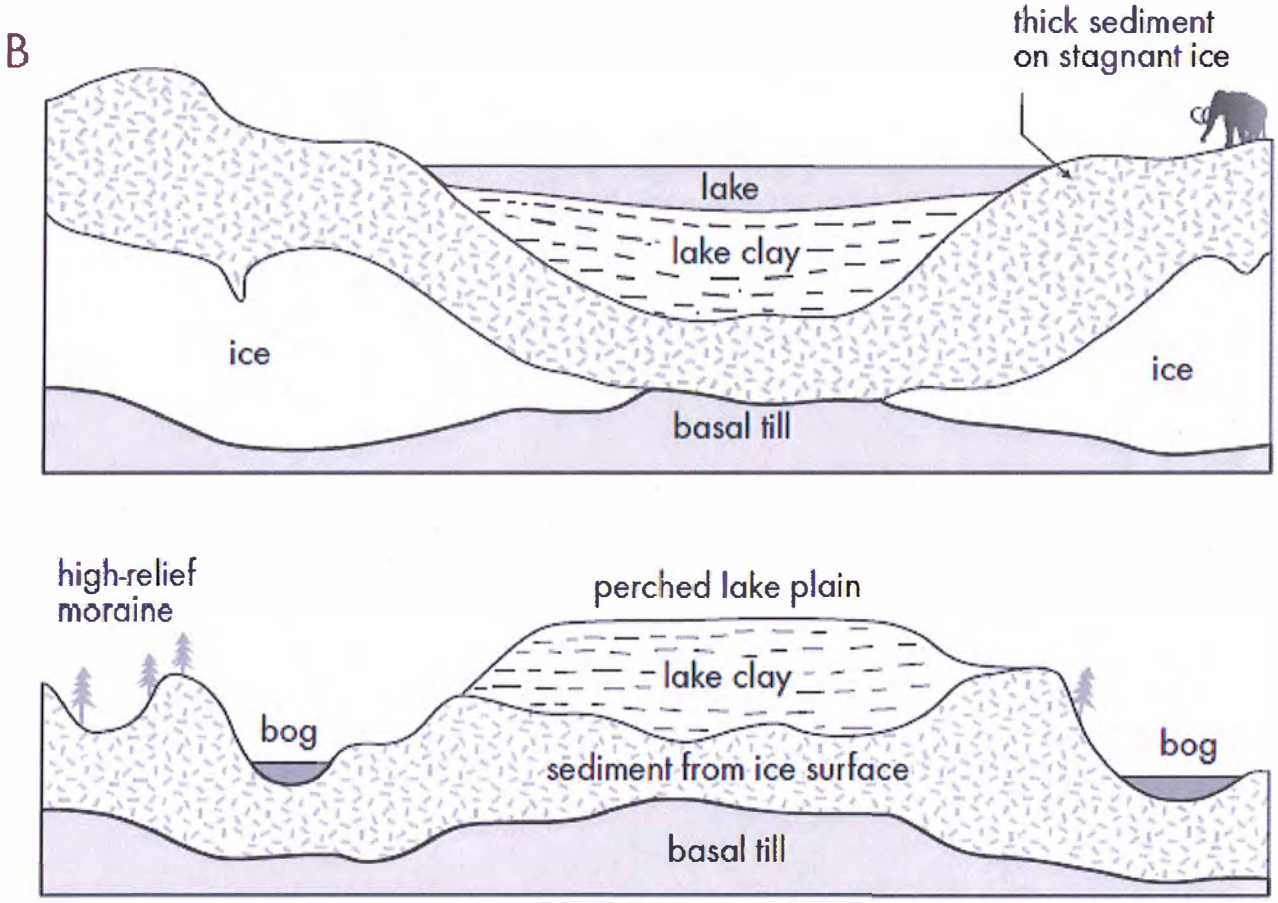
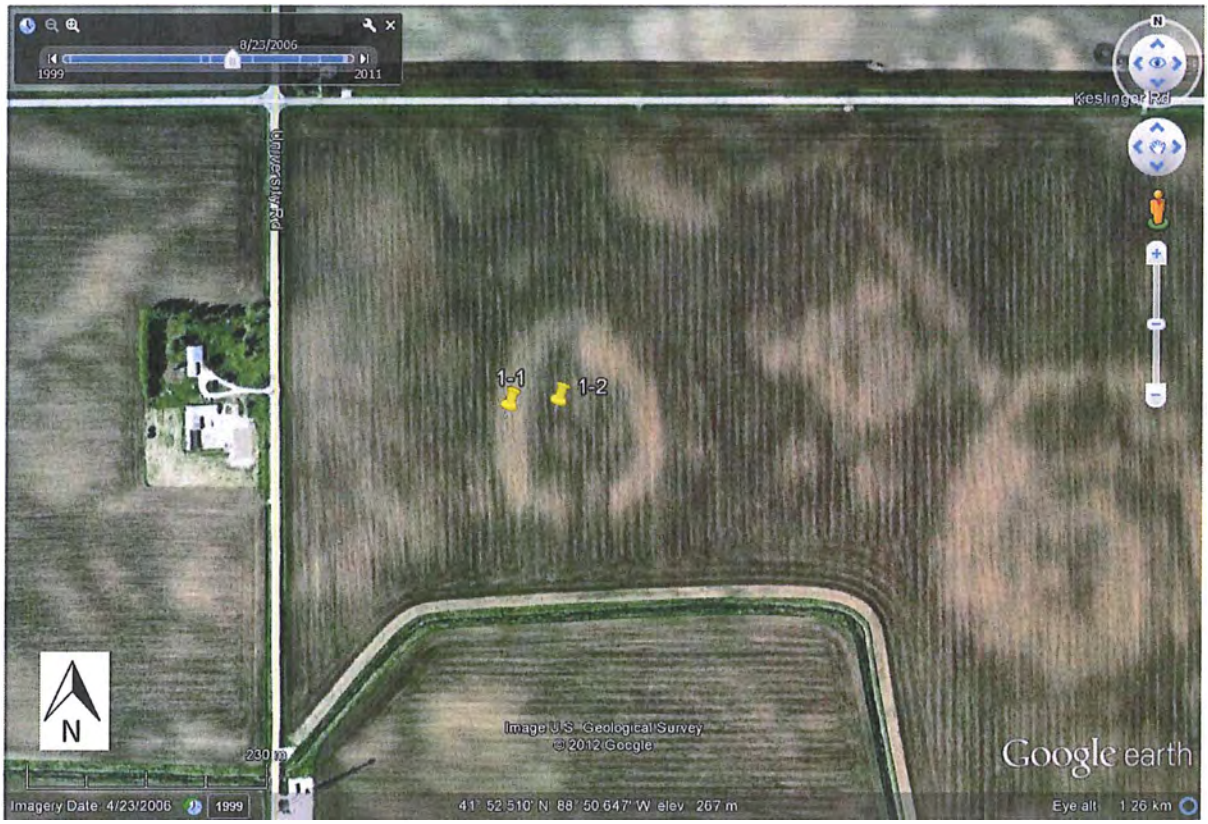


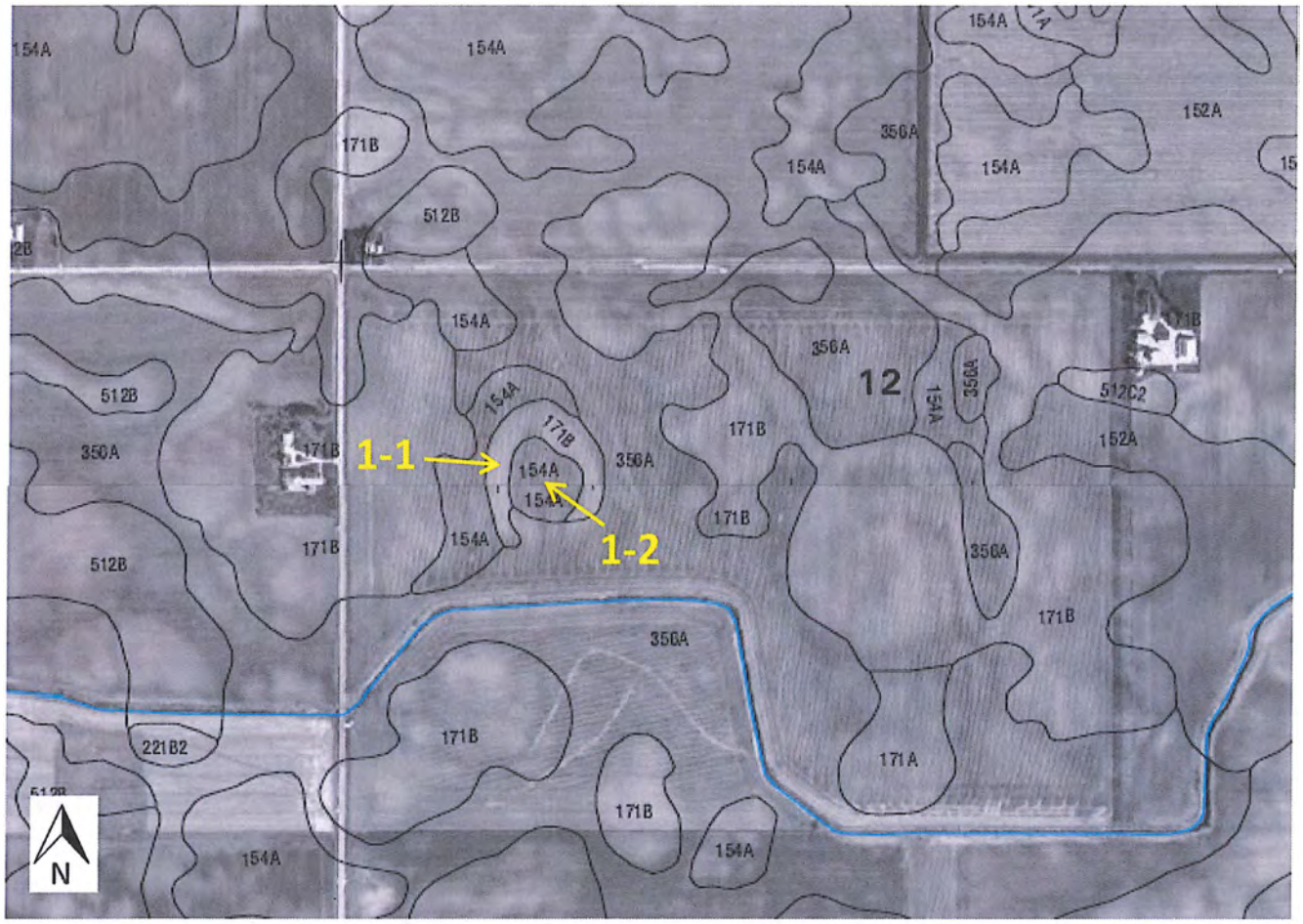
Figure 27 B from Syverson 2007. Pleistocene Geology of Chippewa County, Wisconsin.

Stop 1


8/23/2006
1-1
1-2
University Rd
N
1112 m
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
1999
41° 52' 610" N 88° 50' 532" W elev 267 m
Eye alt 5.08 km


8/23/2006
1999
2011
University Rd
Keslinger Rd
1-1
1-2
N
230 m
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
1999
41° 52' 510" N 88° 50' 647" W elev 267 m
Eye alt 1.26 km

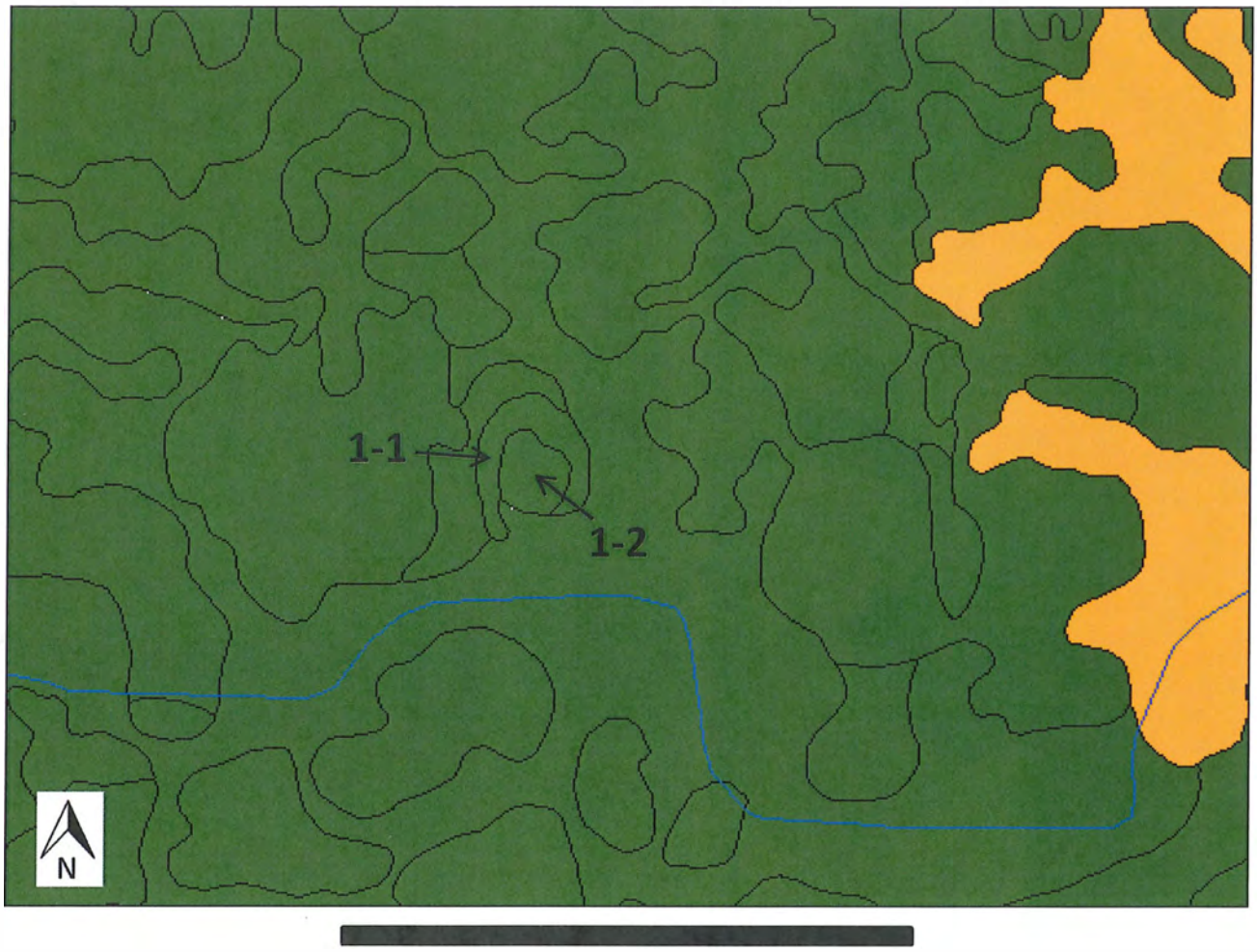
Stop 1 Map Units
Map Sheets 31 & 38
DeKalb County Soil Survey, 2004



0.5 mile

Map Unit	Series	Geology	Family
154A	Flanagan	Loess over till	Fine, smectitic, mesic Aquic Argiudoll
171B	Catlin	Loess over till	Fine-silty, mixed, superactive, mesic Oxyaquic Argiudoll
356A	Elpaso	Loess over till	Fine-silty, mixed, superactive, mesic Typic Endoaquoll

Stop 1 Parent Materials
Map Sheets 31 & 38
DeKalb County Soil Survey, 2004

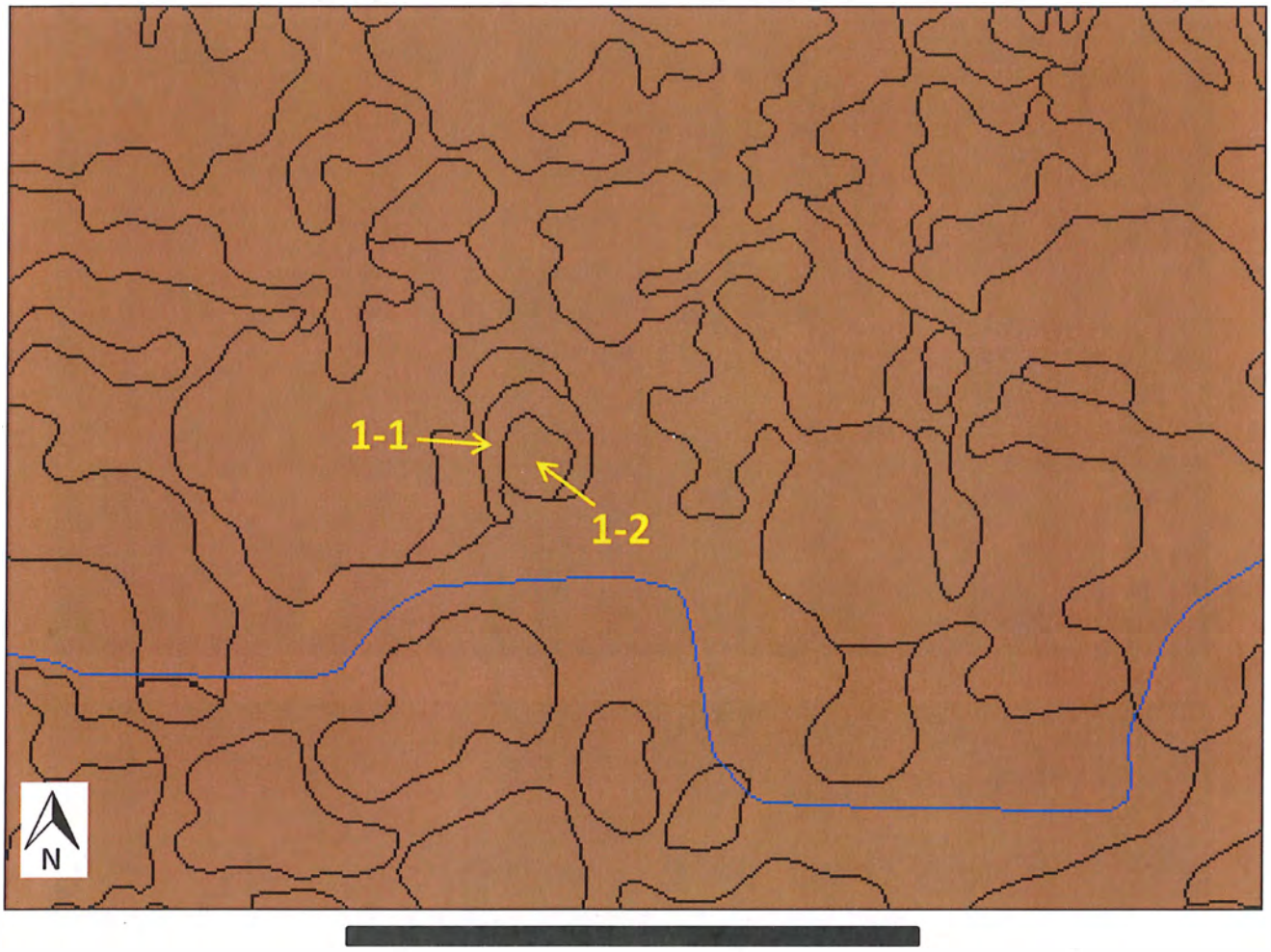


0.5 mile

Loess over till

Loess over outwash

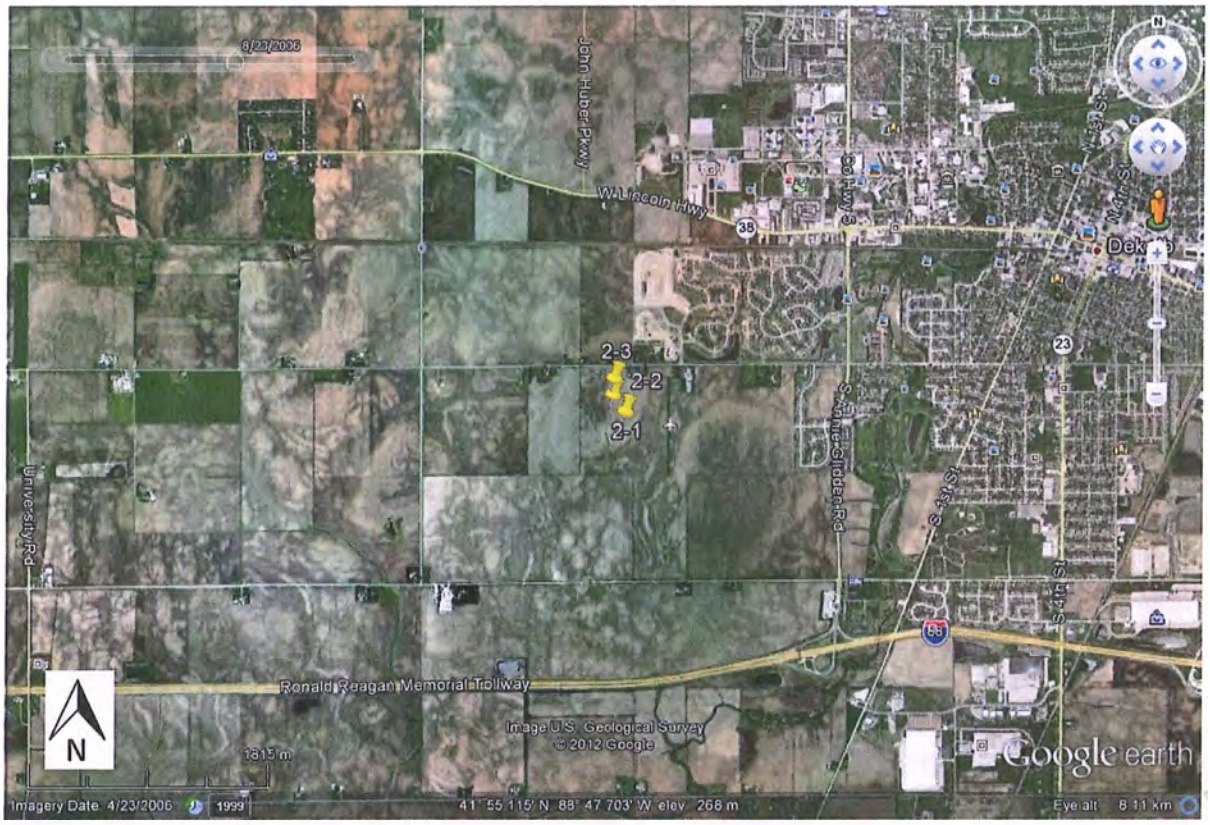
Stop 1 Soil Orders
Map Sheets 31 & 38
DeKalb County Soil Survey, 2004



0.5 mile

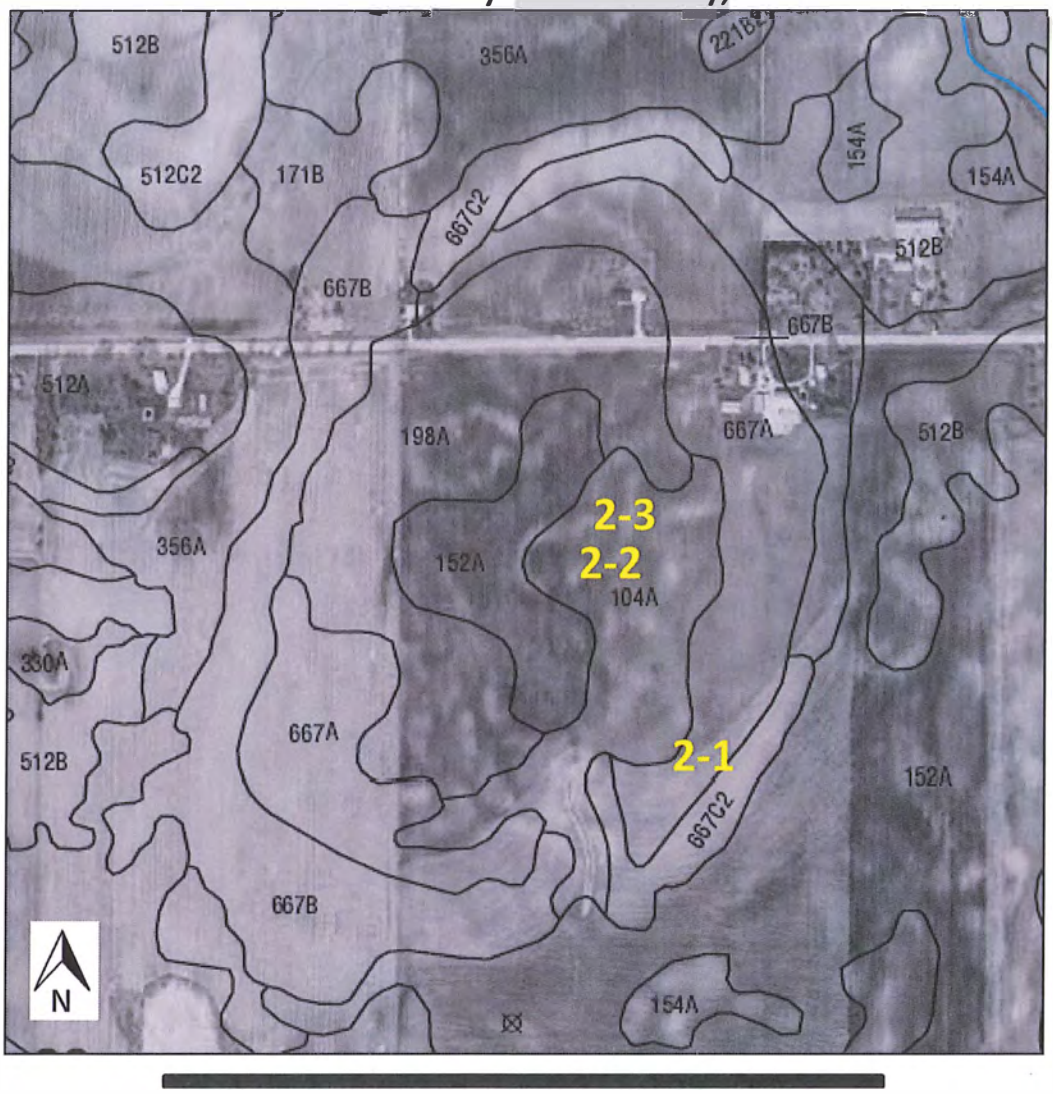
Mollisol

Stop 2


8/23/2006
John Huber Pkwy
W Lincoln Hwy
38
23
2-3
2-2
2-1
University Rd
S Annie Glidden Rd
S 1st St
S 4th St
Ronald Reagan Memorial Tollway
N
1815 m
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
1999
41° 55' 115" N 88° 47' 703" W elev 268 m
Eye alt 8.11 km


8/23/2006
Sunflow Ln
S Malta Rd
2-3
2-2
2-1
N
388 m
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
2001
41° 55' 174" N 88° 47' 691" W elev 270 m
Eye alt 1.86 km

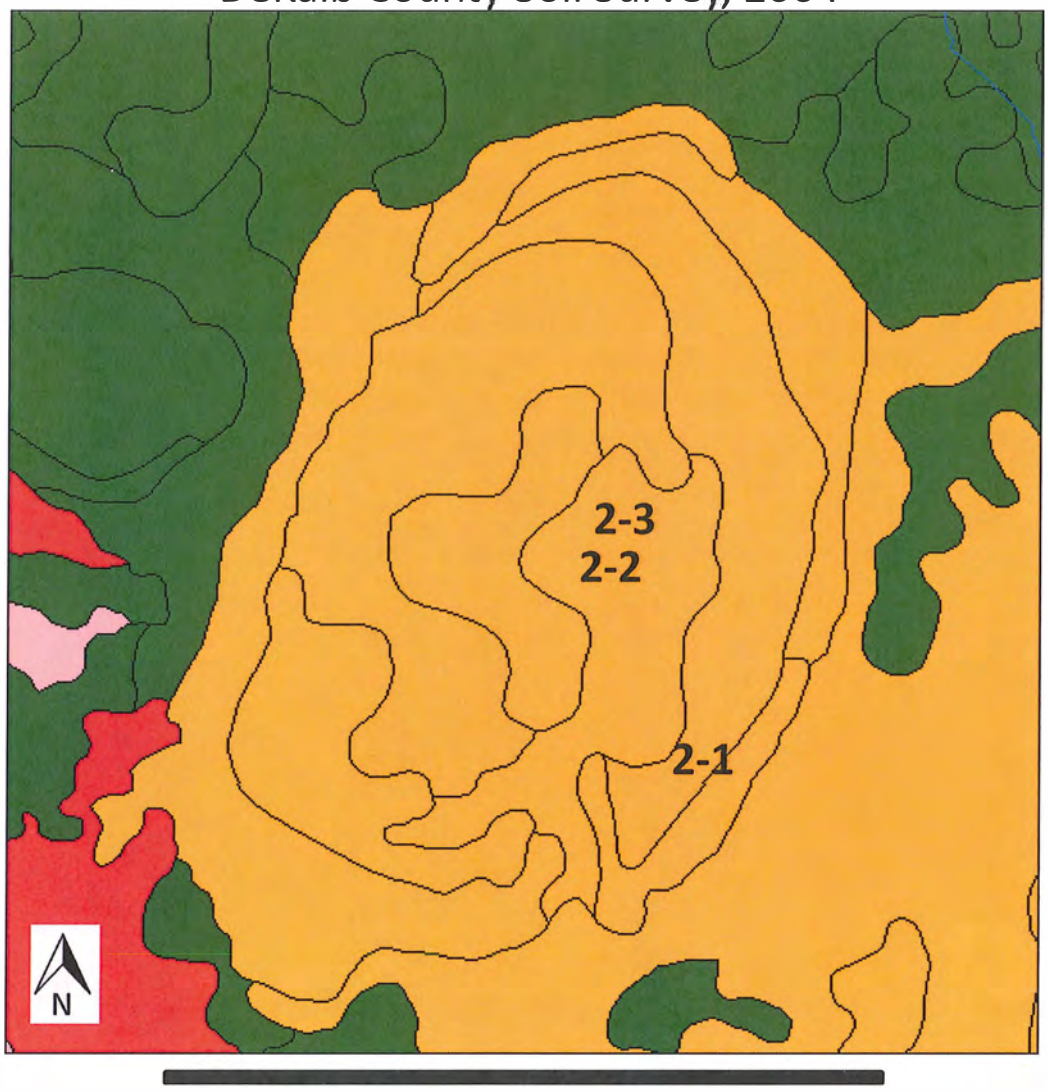
Stop 2 Map Units
Map Sheet 32
DeKalb County Soil Survey, 2004



0.5 mile

Map Unit	Series	Geology	Family
104A	Virgil	Loess over outwash	Fine-silty, mixed, superactive, mesic Udollic Endoaqualf
152A	Drummer	Loess over outwash	Fine-silty, mixed, superactive, mesic Typic Endoaquoll
198A	Elburn	Loess over outwash	Fine-silty, mixed, superactive, mesic Aquic Argiudoll
667A, B, C2	Kaneville	Loess over outwash	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalf

Stop 2 Parent Material
Map Sheet 32
DeKalb County Soil Survey, 2004



0.5 mile

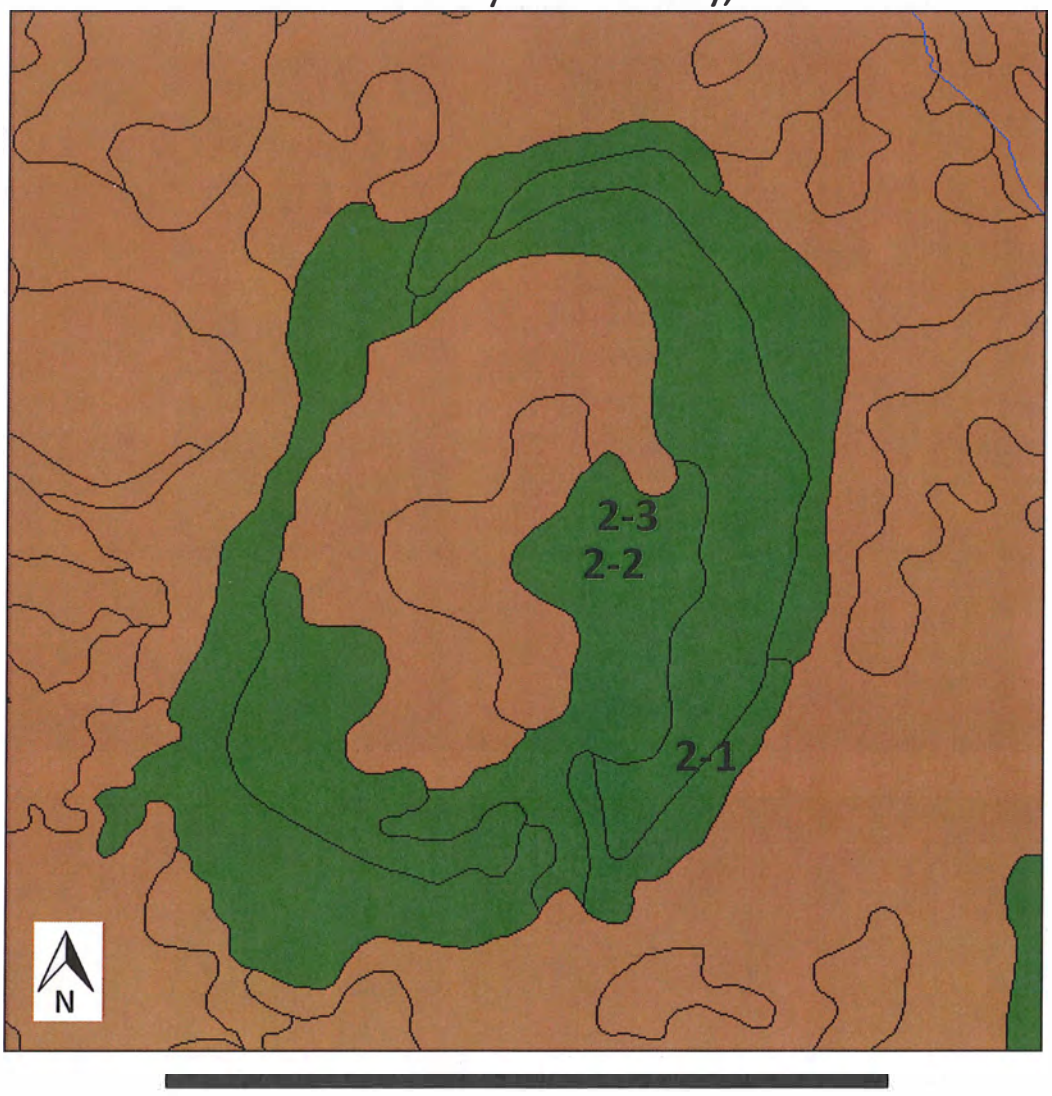
Loess over till

Loess over drift

Loess over outwash

Colluvium

Stop 2 Soil Orders
Map Sheet 32
DeKalb County Soil Survey, 2004

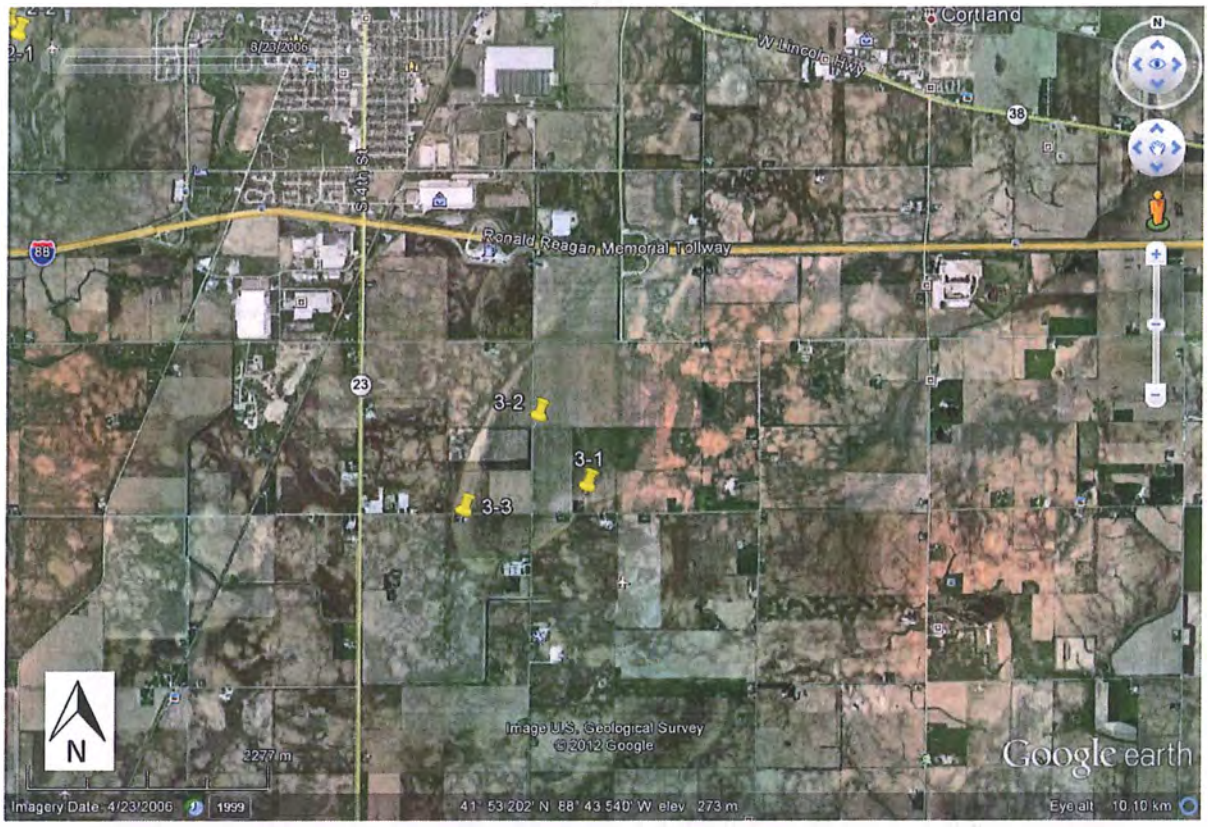


0.5 mile

Alfisol

Mollisol

Stop 3

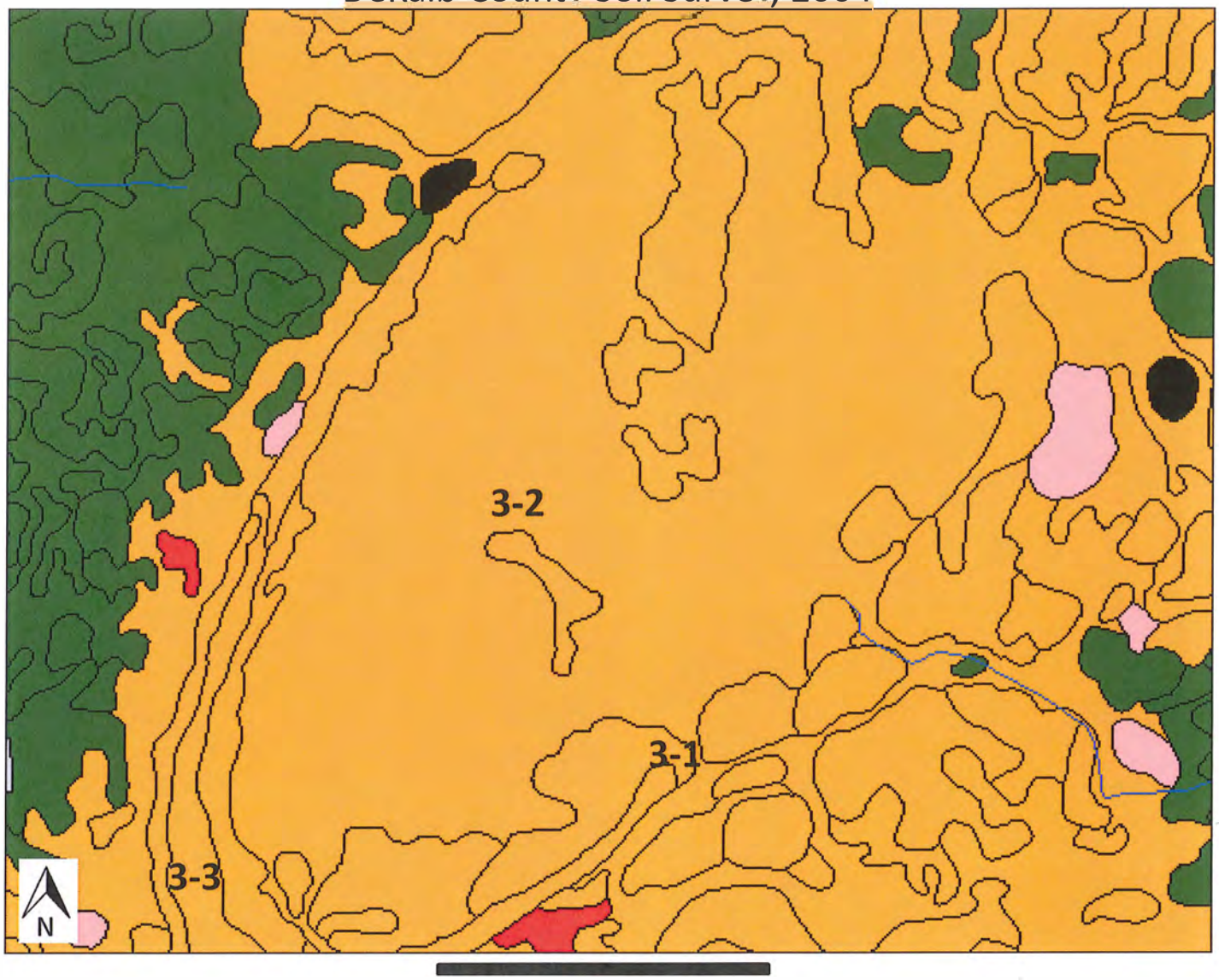

Cortland
W Lincoln Hwy
Ronald Reagan Memorial Tollway
3-2
3-1
3-3
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
41° 53' 202" N 88° 43' 540" W elev 273 m
Eye alt 10.10 km


3-2
3-1
3-3
Image U.S. Geological Survey
© 2012 Google
Google earth
Imagery Date: 4/23/2006
41° 53' 070" N 88° 43' 785" W elev 273 m
Eye alt 4.22 km

Stop 3 Map Units
Map Sheet 33
DeKalb County Soil Survey, 2004

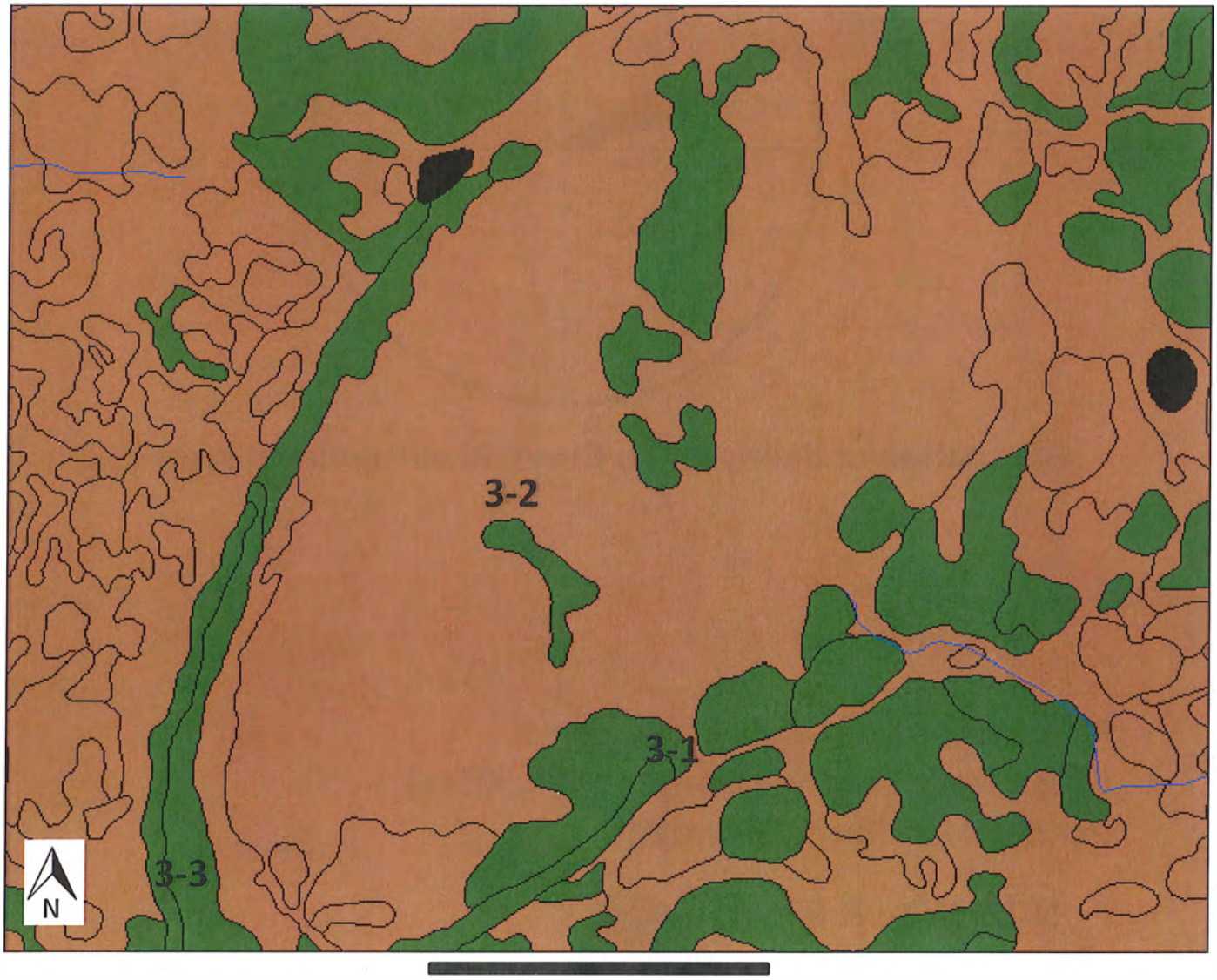
Map Unit	Series	Geology	Family
104A	Virgil	Loess over outwash	Fine-silty, mixed, superactive, mesic Udollic Endoaqualf
152A	Drummer	Loess over outwash	Fine-silty, mixed, superactive, mesic Typic Endoaquoll
198A	Elburn	Loess over outwash	Fine-silty, mixed, superactive, mesic Aquic Argiudoll
667A, B, C2	Kaneville	Loess over outwash	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalf

Stop 3 Parent Material
Map Sheet 33
DeKalb County Soil Survey, 2004



Loess over till
Loess over drift
Loess over outwash
Organic
Colluvium

Stop 3 Soil Orders
Map Sheet 33
DeKalb County Soil Survey, 2004

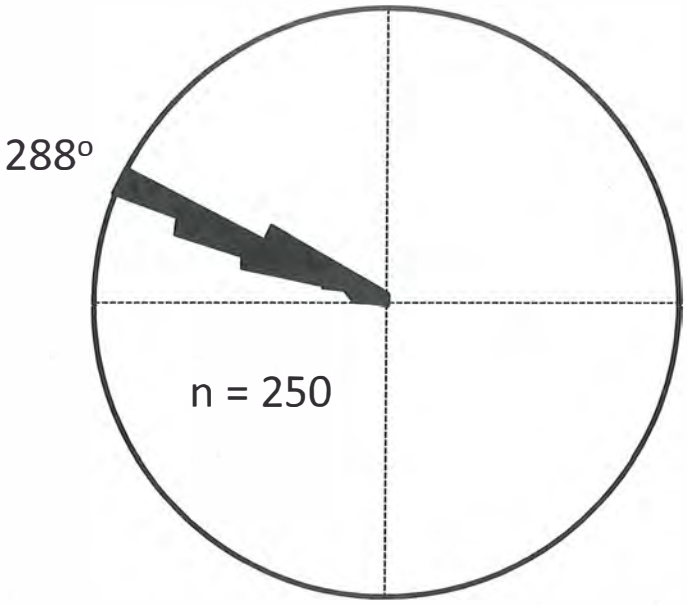


0.5 mile

Alfisol

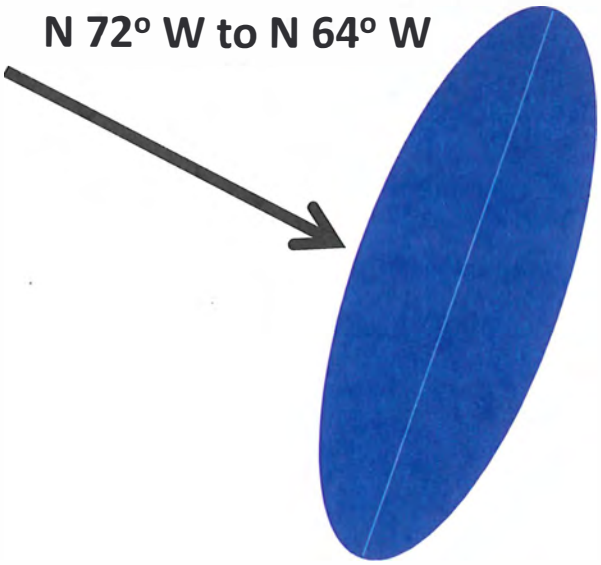
Mollisol

Histosol



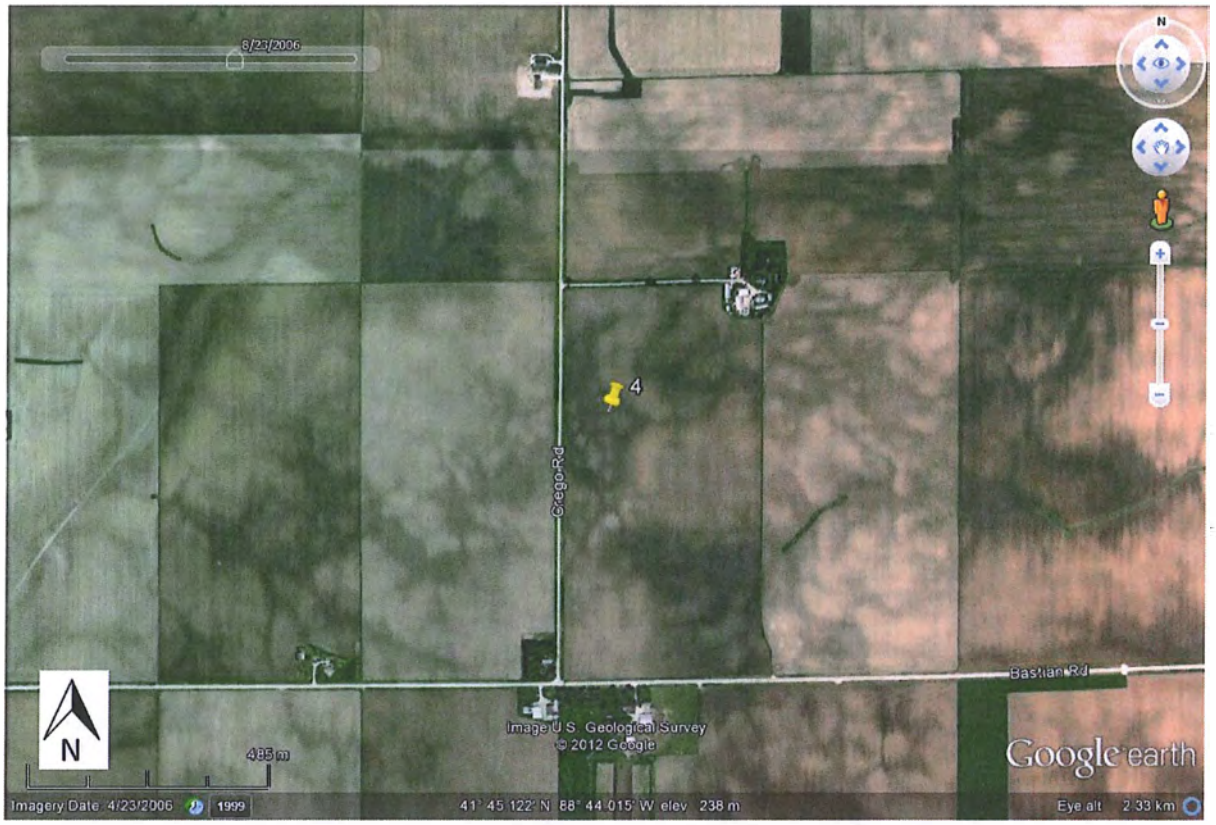
Orientation of dunes in the Green River Lowland, Krieg 2007.

Paleowinds from eolian landforms
Green River Lowland Dunes (Miao, Krieg)
Pahoidal landforms (Flemal)



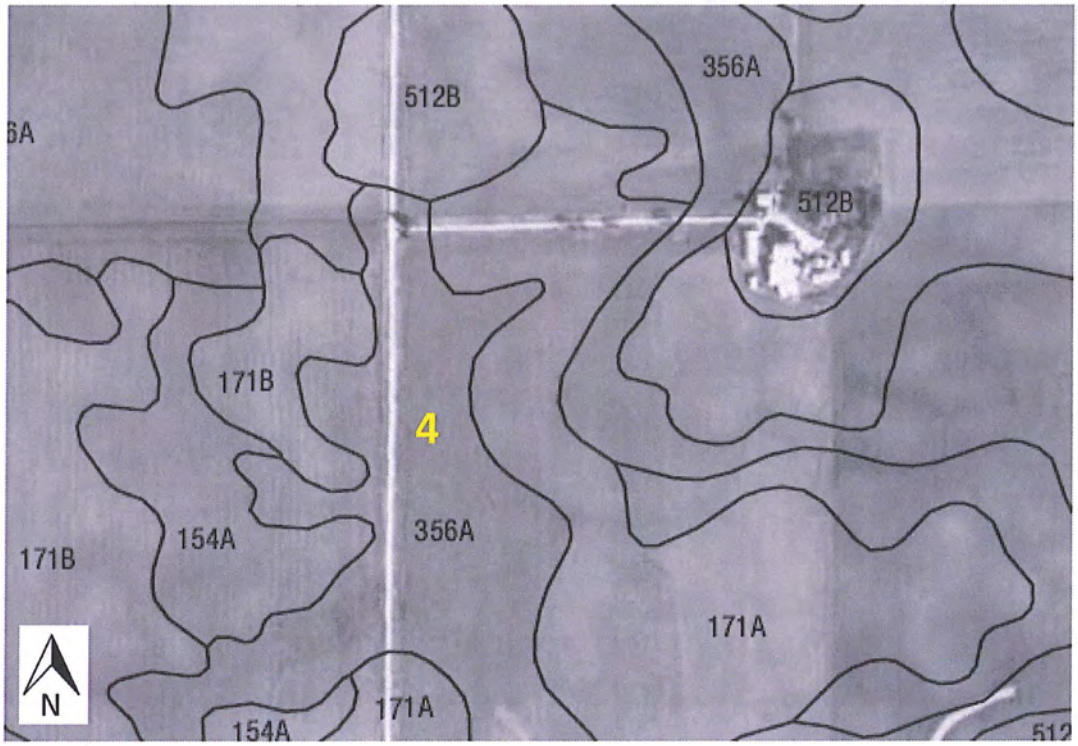
Large IWLP in DeKalb area
N 29° E to N 16°E

Stop 4


8/23/2006
4
Gregor Rd
Bastian Rd
N
485 m
Image U S Geological Survey
© 2012 Google
Google earth
Imagery Date 4/23/2006 1999
41° 45' 122" N 88° 44' 015" W elev 238 m
Eye alt 2 33 km


8/23/2006
1999
2011
4-1
4-2
4-3
4-4
Gregor Rd
N
78 m
Image U S Geological Survey
© 2012 Google
Google earth
Imagery Date 4/23/2006 1999
41° 45 090" N 88° 44 026" W elev 238 m
Eye alt 575 m

Stop 4 Map Units
Map Sheet 47
DeKalb County Soil Survey, 2004

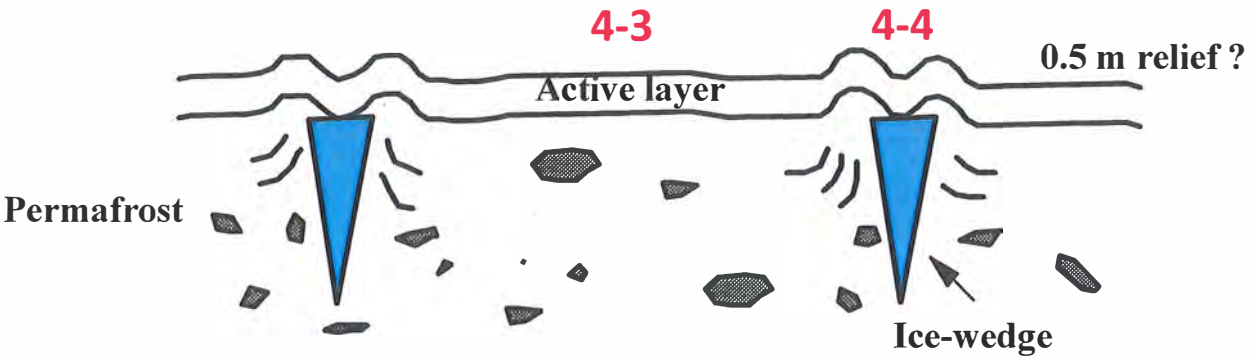


0.5 mile

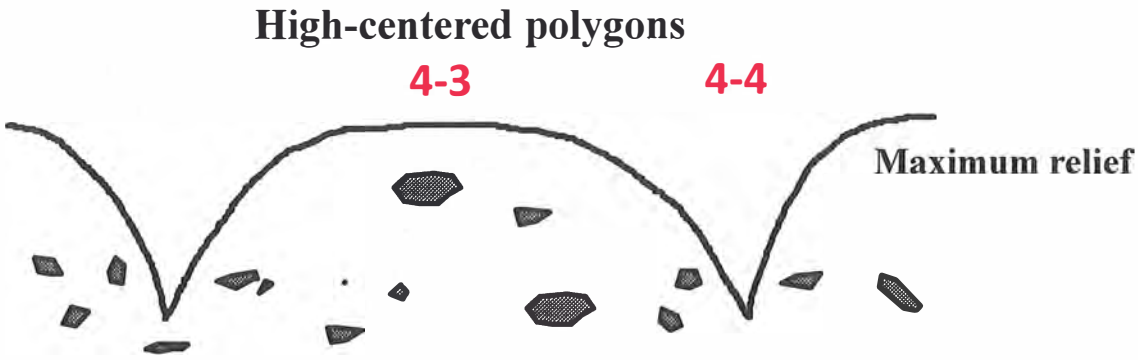
Map Unit	Series	Geology	Family
154A	Flanagan	Loess over till	Fine, smectitic, mesic Aquic Argiudoll
171A	Catlin	Loess over till	Fine-silty, mixed, superactive, mesic Oxyaquic Argiudoll
356A	Elpaso	Loess over till	Fine-silty, mixed, superactive, mesic Typic Endoaquoll

Ice-Wedge Polygon Formation and Degradation

A) Development of permafrost and ice-wedge polygons during Wisconsin Episode.



B) Degradation of permafrost and ice-wedge polygons.

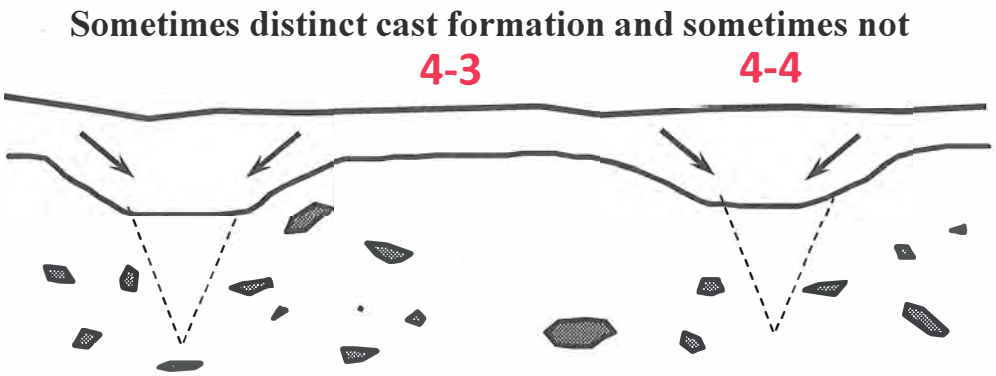


Ice-Wedge Polygons

Permafrost Degradation
Slumping of Host Material Into Polygon Borders
Peoria Silt Accumulation in Troughs

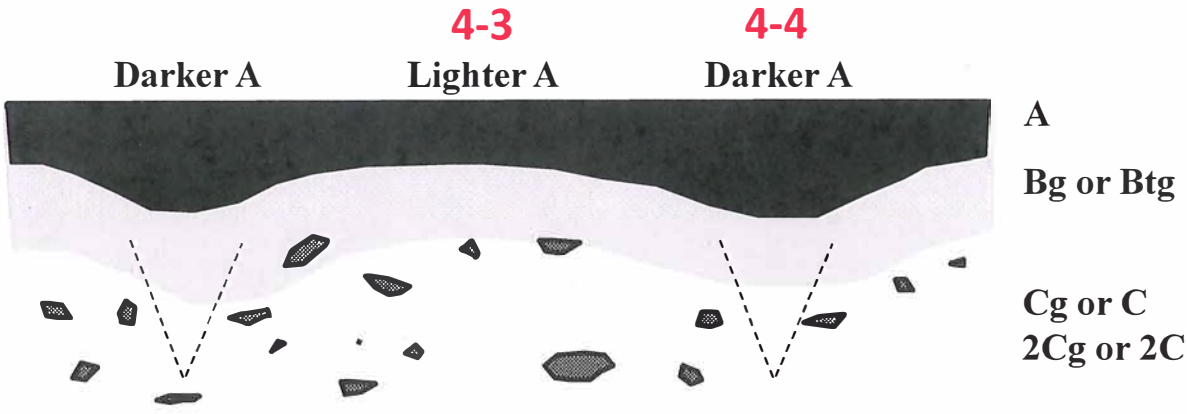
C) Widening of trough and lowering of polygon interiors during late-Pleistocene and Holocene.

Peoria Silt fills troughs along with slumping and slopewash.



D) Agricultural tillage and intensified slopewash and tillage erosion, loss of relief.

Erosion and truncation of A horizons on micro-highs.



Modified from Johnson (1991) and Konen (1995)
Not to scale