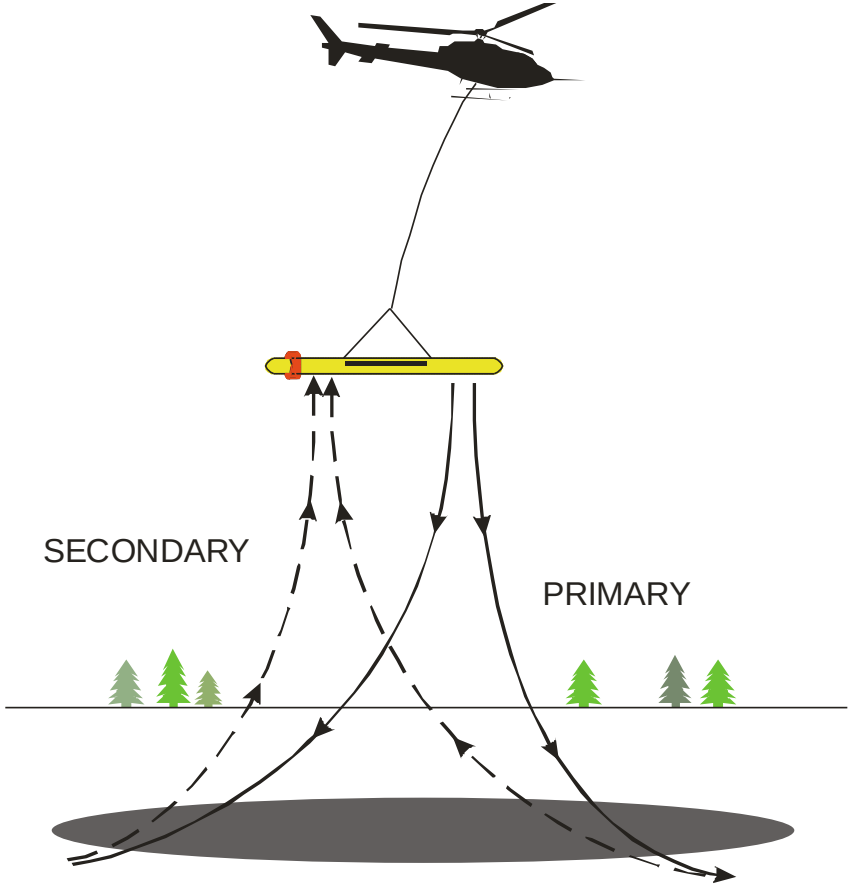
AEM Survey to improve existing Depth to Bedrock Maps

Addressing the NR151 Silurian Bedrock Performance Standard

USGS/WGNHS/DATCP

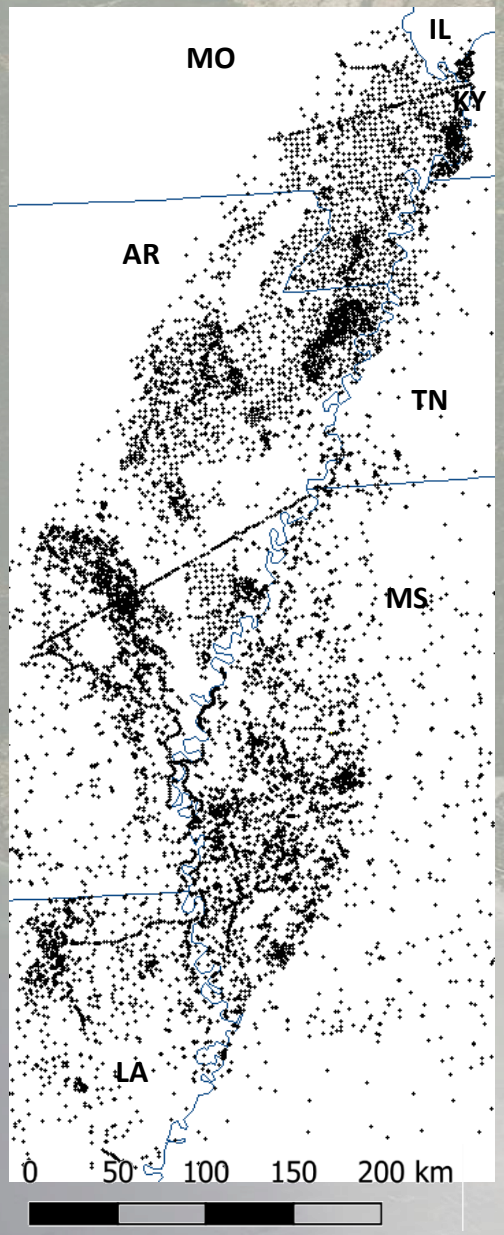
Cooperative Grant Program 2020

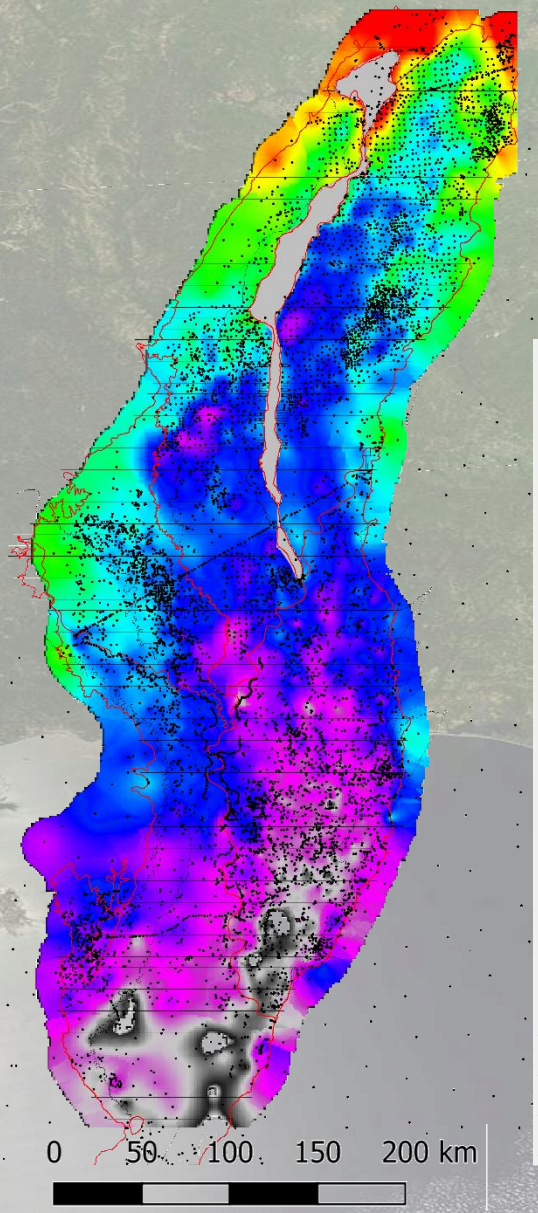
AEM – Aerial Electromagnetic Survey

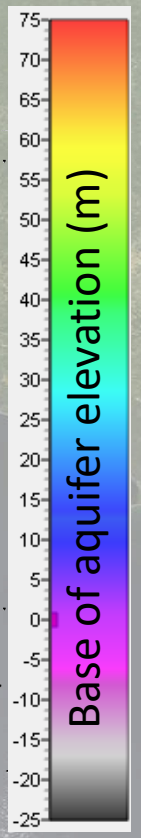


Connecting the dots with airborne geophysics

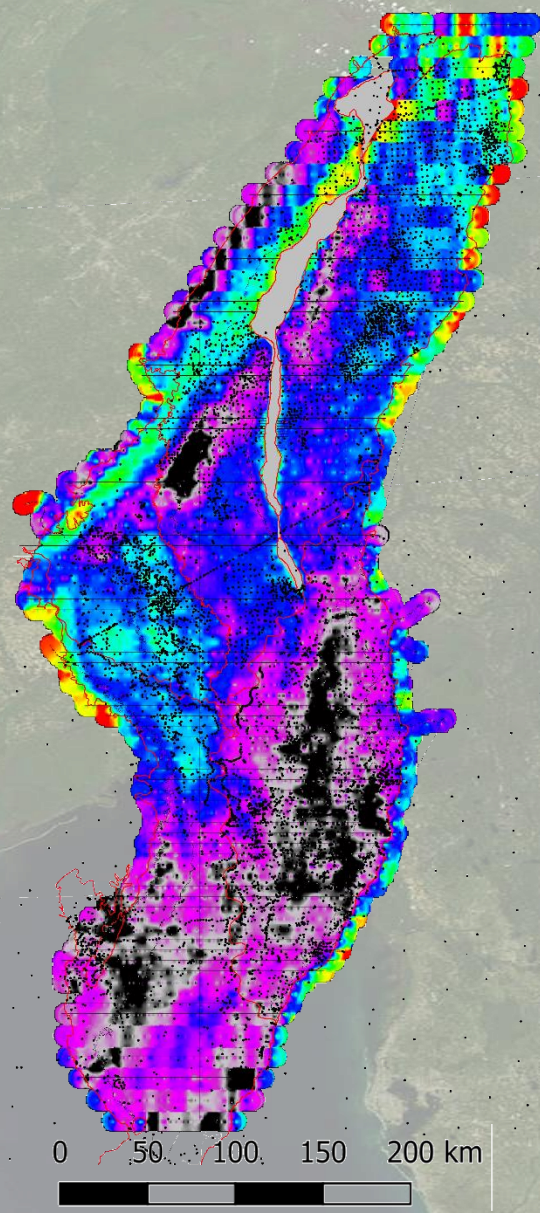
~10,000 boreholes
~ $300M
Years-to-decades







17,000 km AEM data
< $1M
3 months



NR151 Silurian Performance Standard

- Manure may not be mechanically applied on croplands or pastures until <u>infield bedrock verification or Silurian bedrock map</u> information is used to identify areas where the Silurian bedrock soil depth is less than 5 feet.

Summary of Proposed NR 151 Runoff Management
Targeted Performance Standards

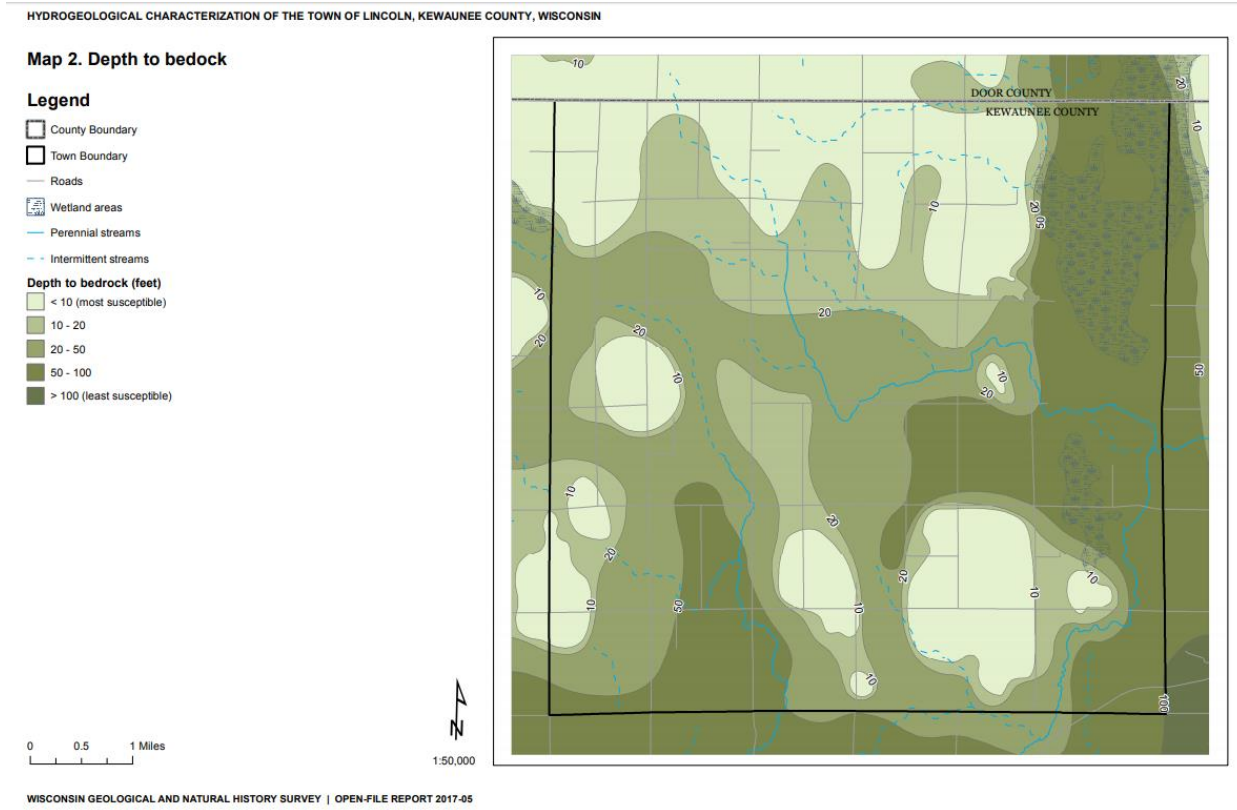
Depth to bedrock	Solid manure conditions	Liquid manure conditions
<2' Verification Required	No mechanical application	No mechanical application
2'-3' Verification Required	Incorporate* within 72 hrs to ≤4" depth and; At least one of the following: a) Rate ≤ 15 T, b) Within 10 d planting or established crop, c) Pathogens ≤ 500,000 CFU	Pre-tillage* and; Inject or incorporate* ≤4"depth within 24hr and; At least one of the following: a) Rate is lesser of **UW A2809** or **Table 1**, b) Within 10 d planting or established crop, c) Pathogens ≤ 500,000 CFU
3'-5' Verification required	Same as above except ≤6" depth	Pre-tillage* and; Inject or incorporate* ≤6"depth within 24hr and; Same as above
5'-20' No Verification required	No new conditions proposed	Pre-tillage* and; Inject or incorporate* ≤8"depth within 24hr and; Same as above

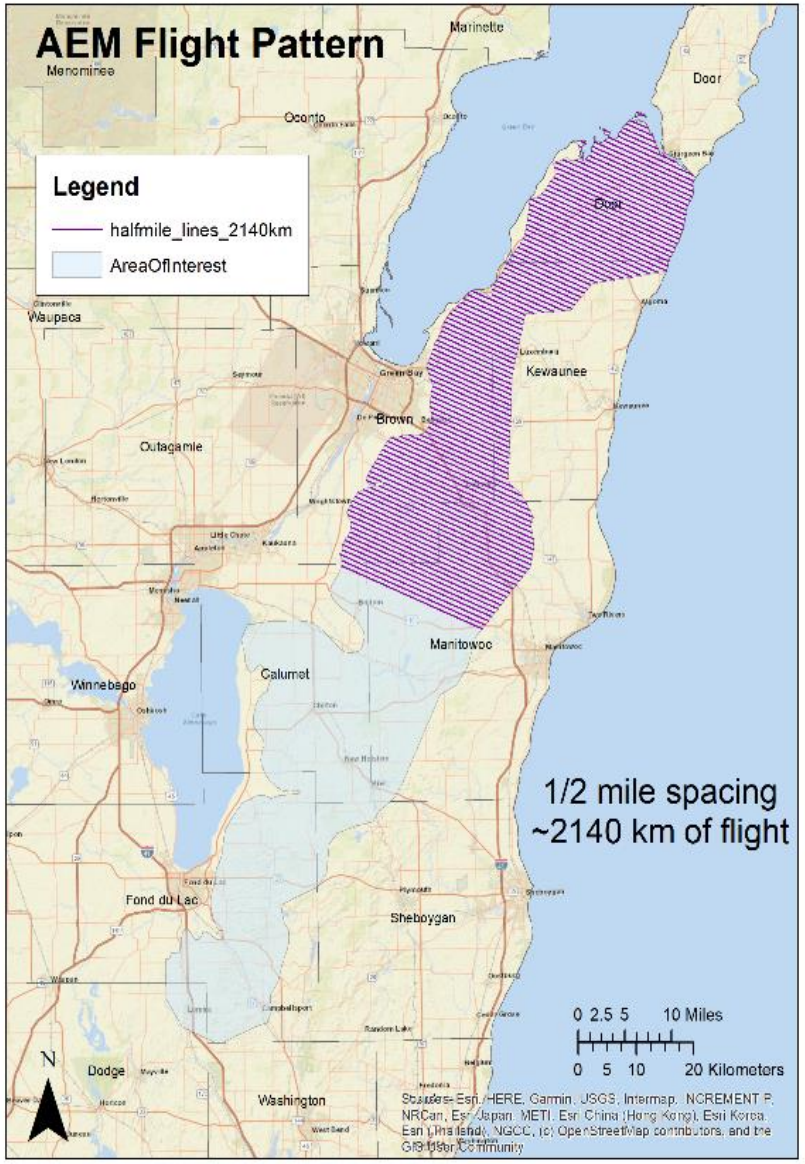
*Not applicable if long-term pasture, perennial crop, or no-till system

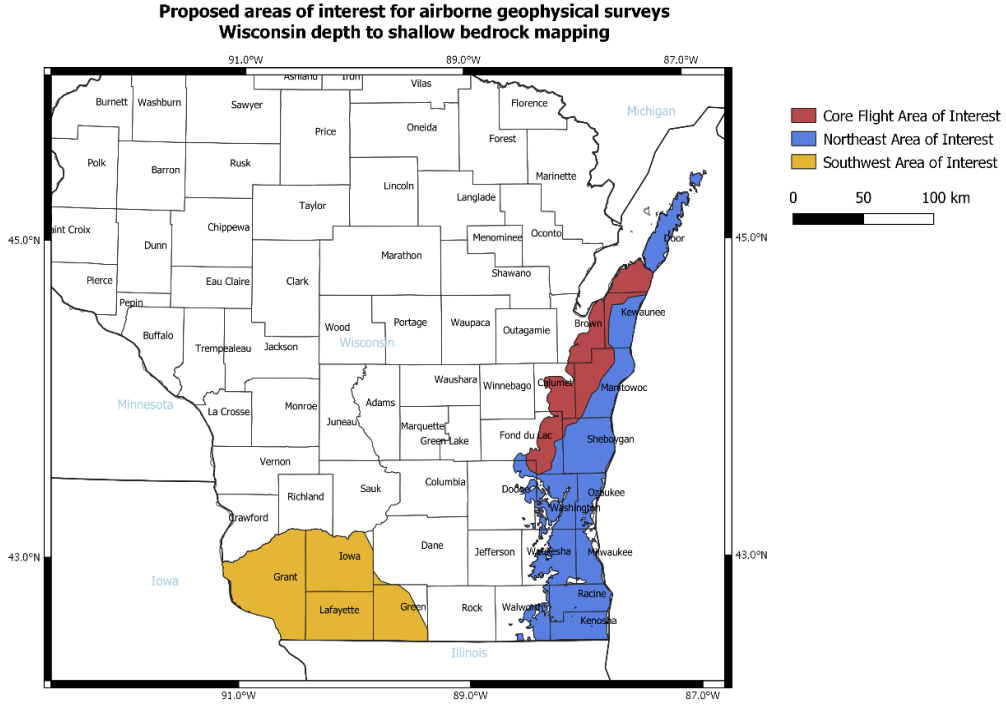
Mapping Needs

- Limitations on existing maps:
  - Data based on well and construction reports
  - Limited data density in rural areas
  - Existing maps have boundary effects
  - Maps will change based on new data

- Current Standard puts the burden on Private Funding to improve existing maps if verification is desired







Proposed AEM Survey

- Over 1300 miles of coverage
- Providing ½ mile spacing between flight lines
- Defining data points to ~100ft along the flight lines
- Focus on defining depth to bedrock at 5 and 20ft contours

Phase 1 Tasks		Grant Funding to USGS	Grant Funding to WGNHS	USGS Match	WGNHS Match	Total Funding
1	AEM Contract solicitation	$5,000		$5,000		$10,000
2	AEM Contract selection	$5,000		$5,000		$10,000
3	WGNHS - site investigations		$26,000		$6,000	$32,000
4	AEM survey	$165,000		$165,000		$330,000
5	AEM Data Assessment	$20,000	$9,000	$20,000	$3,000	$52,000
6	Preliminary Data Presentation	$20,000		$20,000		$40,000
	Total	$215,000	$35,000	$215,000	$9,000	$474,000

Funding

- AEM survey costs are based on procurement process and subject to change
- Costs are based on initial funding (the more initial flight distance procured the cheaper the cost per distance)
- Mobilization costs can be $40-50K

Phase 1 Tasks		Anticipated Completion	Accomplishment
1	AEM Contract solicitation	Feb 2020	Contract has been develop and distributed for solicitation. The statement of work is complete, including MAP of phase 1 study area.
2	AEM Contract selection	Apr 2020	Contract has been awarded. The coordination of outreach and solicitation for additional funds are conducted.
3	WGNHS - site investigations	June 2020	Additional geo-probe and geophysical analysis is complete in selected areas and along flight test line of proposed MAP
4	AEM survey	Aug-Sept 2020	Flight has been conducted and paymet for contract is complete on phase 1
5	AEM Data Assessment	Nov-Dec 2020	A review of the flight data as produced by the AEM contractor and reviewed with partners
6	Preliminary Data Presentation	Dec-Feb 2020-21	A presentation of the preliminary data assesment of AEM will be completed and provided to the cooperators.

Timeline

- Aggressive outreach effort
- Solicitating funds to extend flight coverage for initial area of interest

Questions?