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# GEOMORPHIC RECLAMATION DESIGN AND CONSTRUCTION OF THE TEACH AML SITE

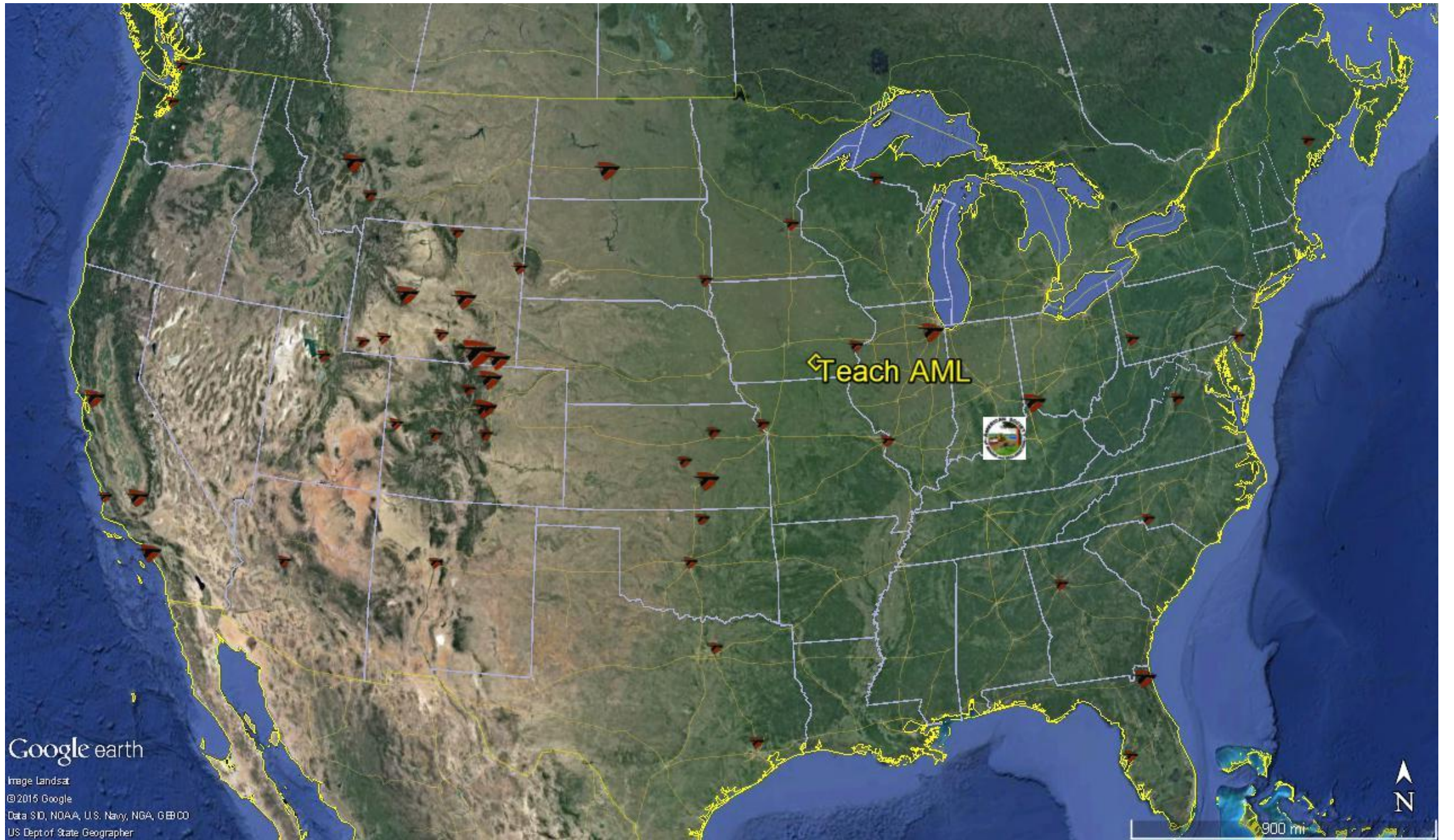
Wapello County, Iowa

Derrick Thompson, P.E – Trihydro Corporation

# Acknowledgements

- Iowa Department of Agriculture and Land Stewardship Division's - AML Program
  - Susan Kozak
  - Randy Cooney
- Project Partners
  - Pathfinders RC&D
  - Wapello SWCD
  - OSM Watershed Co-op
  - NRCS
- Trihydro
  - Mark Donner, P.E.
  - Tyrel Hulet, P.E.





Google earth

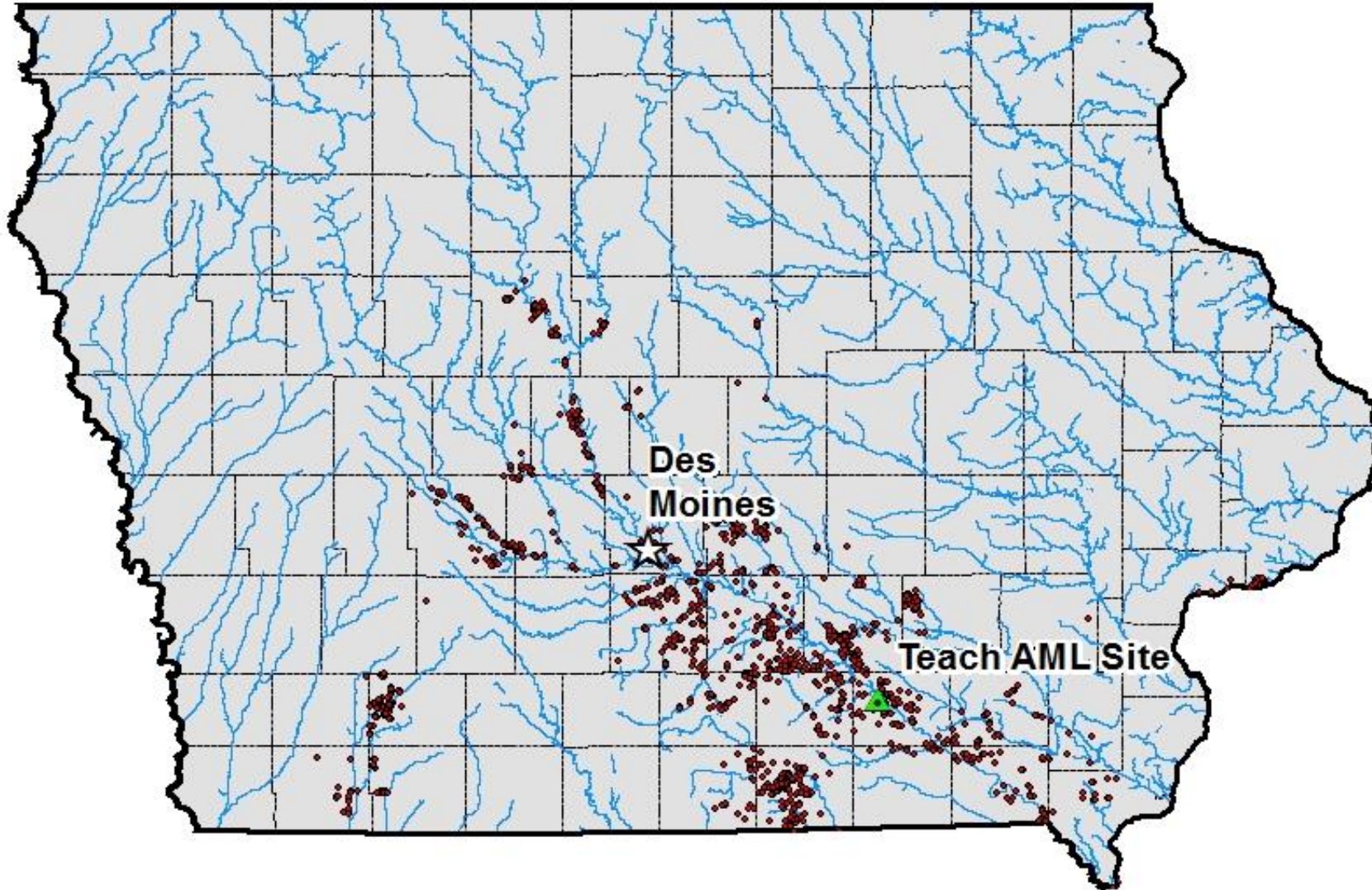
Image Landsat  
© 2015 Google  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
US Dept of State Geographer

Teach AML



900 mi

# Iowa Coal Mining History



# Teach AML Reclamation Site



# Teach AML Reclamation Site



# Priority Features



Highwall and Pit Lake

Spoil/Overburden Piles





# Priority Features

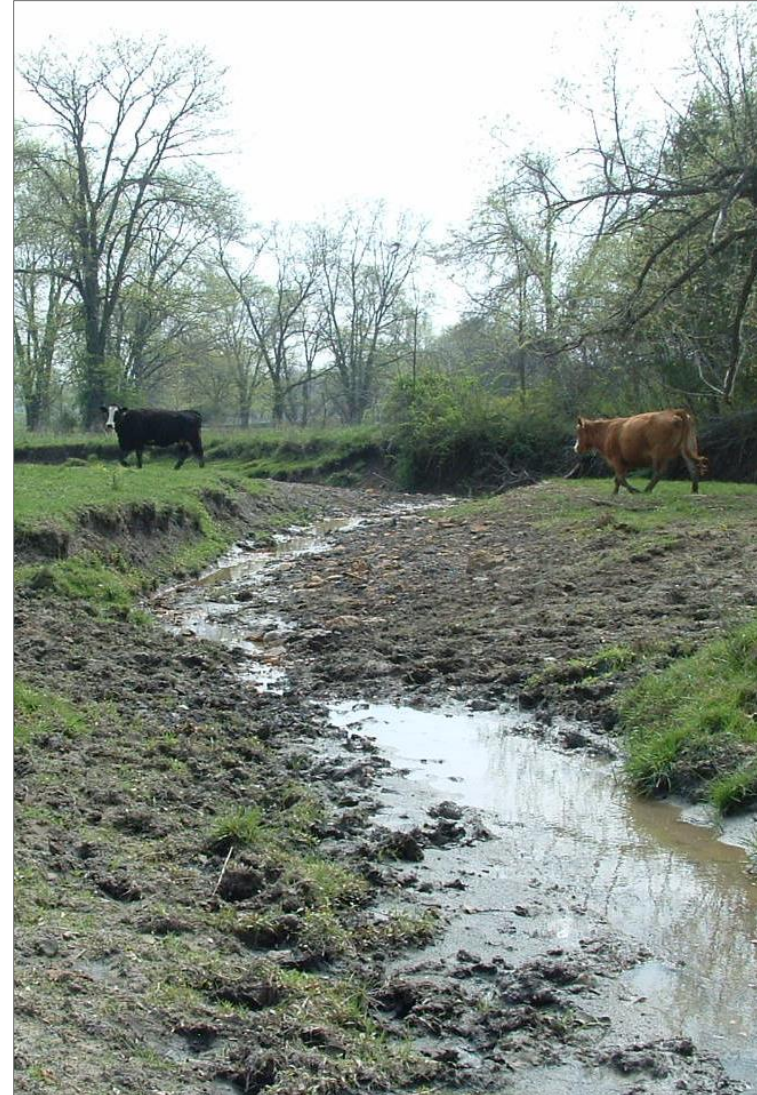
Polluted Water



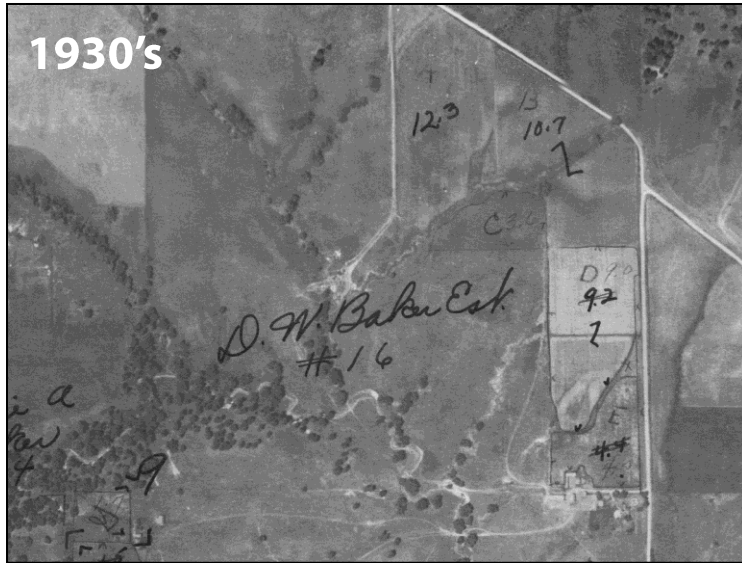
Clogged Stream  
Lands

# Project Goals

- Mitigate physical hazards that are hazardous to human health and safety
- Treat acidic spoils
- Develop productive grazing land
- Improve wildlife habitat
- Mitigate jurisdictional wetland disturbance
- Improve stream function

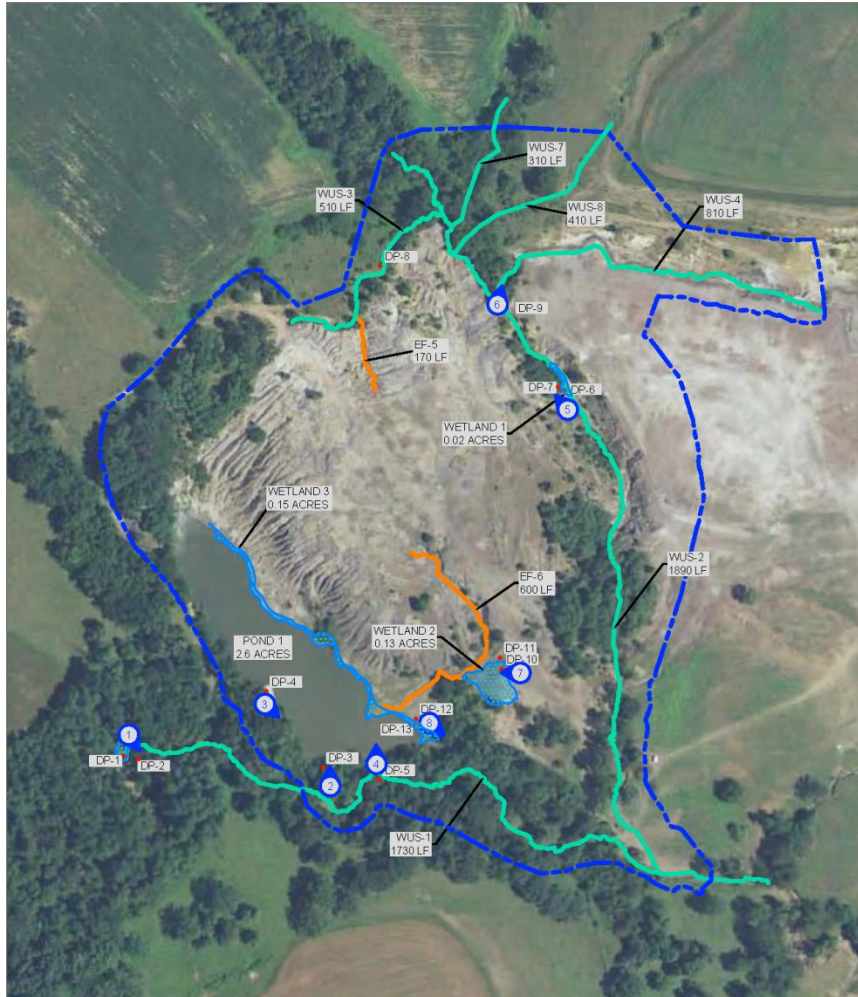


# Design Approach



- Design that mimics the natural surrounding topography
- Design based on criteria derived from nearby reference areas & historic aerial photography
- Landowner review & land use
  - Grazing
  - Mowing
- High-intensity rain events

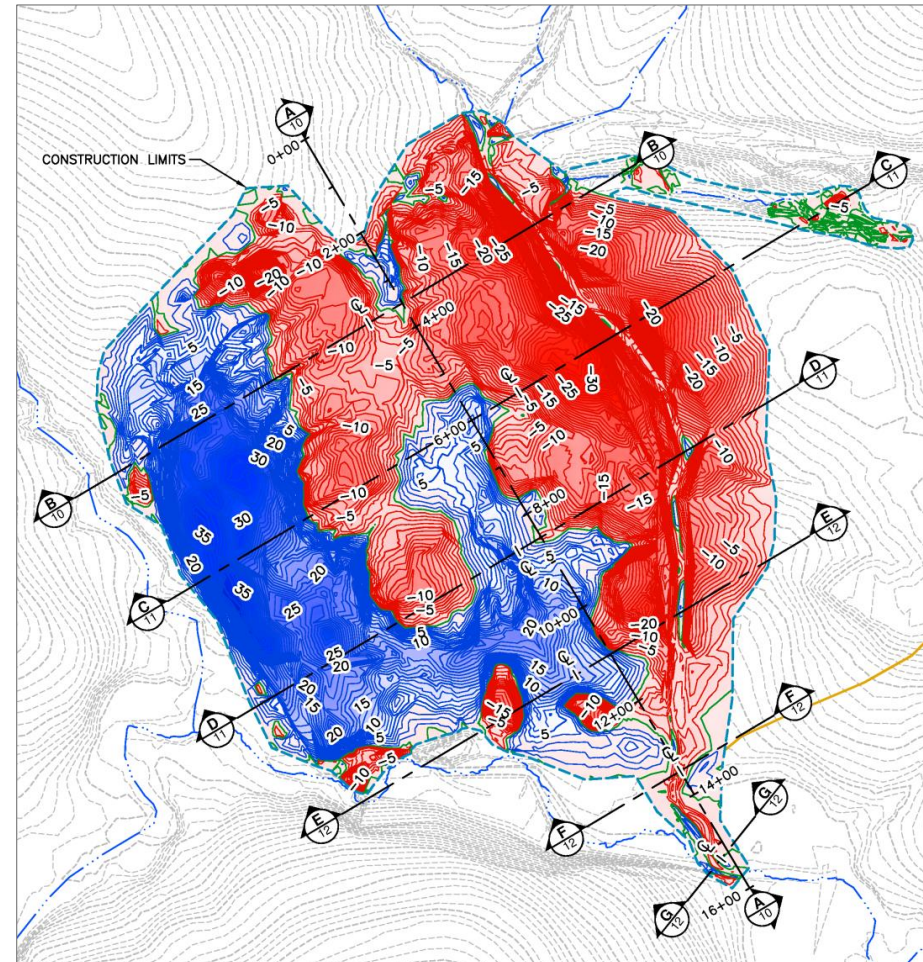
# Design Approach



- Channel construction
- Wetland & Waters of the U.S. survey
- Ability to incorporate wetland mitigation
- Re-vegetation
  - Vegetation/soil survey
  - Soil amendments
  - Seed mixes (wet and upland)

# Design

- Natural Regrade Design using Carlson Civil GeoFluv Software
  - Nearby reference areas
  - Reduce erosion
  - Considerable success on western projects
  - Limited use in mid-west/eastern states
- Software capable of simulating a wide range of site specific conditions & stream channel systems
- Design creates a natural hydraulic balance





# Pit De-watering



# Wetland Mitigation





# Channel Construction



- Storm Events
  - 2-year, 1-hour
  - 50-year, 6-hour
- Geometry based on bankfull discharge

- Main channel constructed at its current location & alignment
- Base level elevation



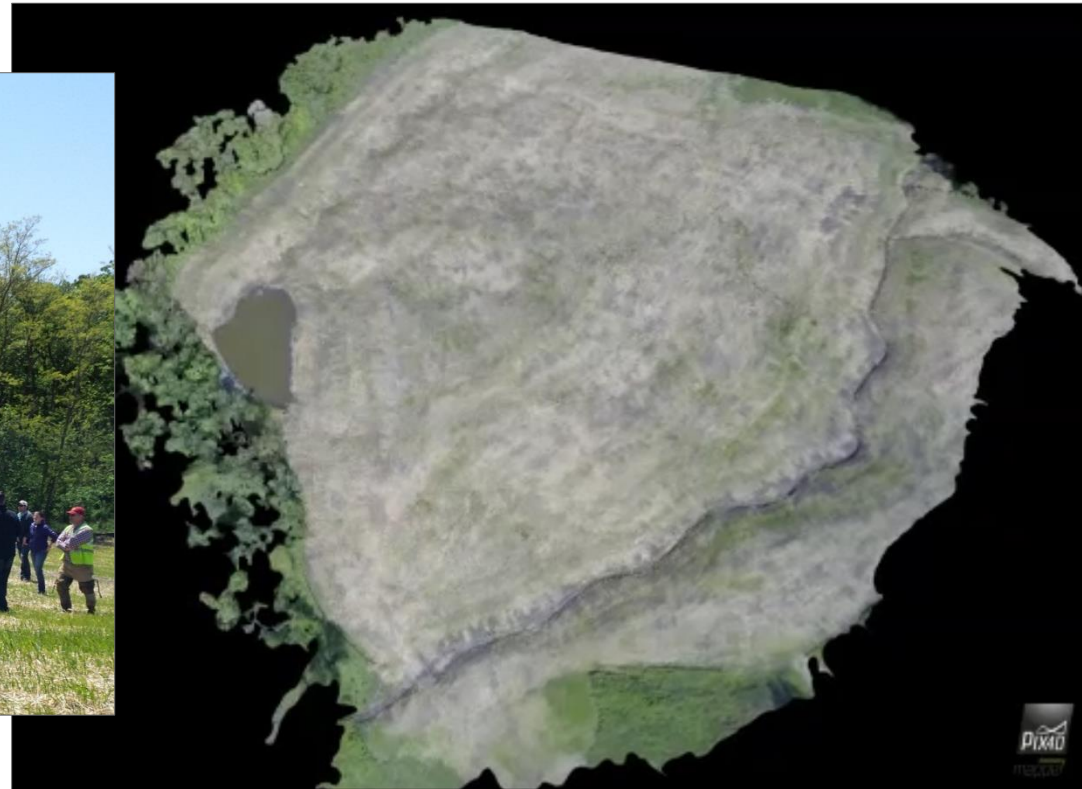
# Earthwork



# Coversoil Amendments

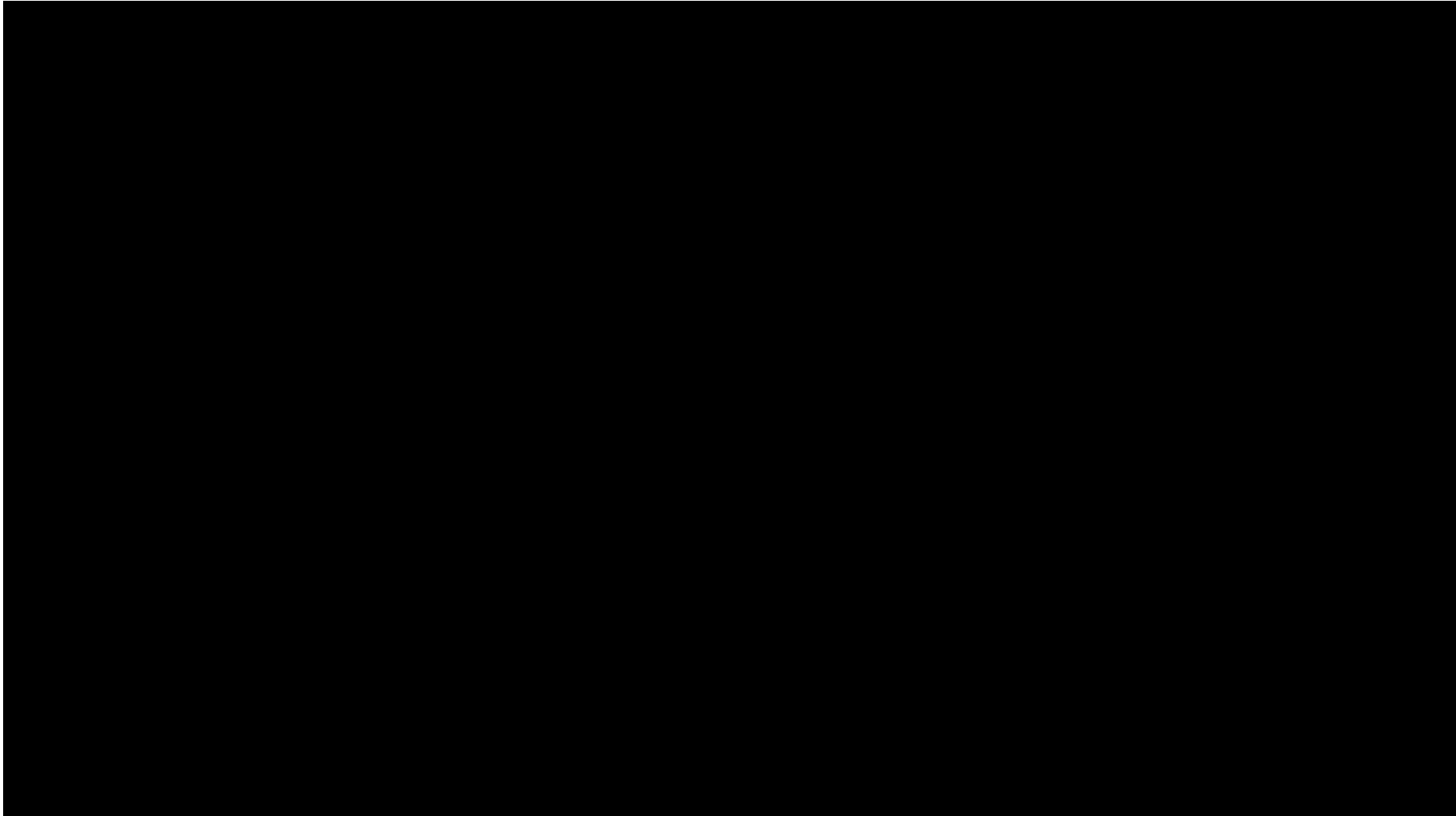


# UAV - Photogrammetry



May 21, 2014 UAV Flight

# UAV - Photogrammetry



# Contractor and Landowner Remarks

- GPS mounted equipment is necessary
- Cut/Fill was easily understood
- Less ridges and valleys
  - From a design standpoint more ridges/valleys were needed
- Post reclamation management is crucial
- Design will work in Iowa



# Conclusion

- First fully constructed landform grading design in Iowa
- Mitigated two (2) jurisdictional wetlands and 2,300 feet of Waters of the U.S.
- Regraded surface to blend with native areas
- Returned the land to productive use



# Concluding Remarks



- Pleased with the results and ability to handle large storm events
- Applicable to a range of sites
- Design has the ability to provide mitigation for disturbed wetlands and Waters of the U.S. that are acceptable to the U.S. Army Corps of Engineers
- Takes time to get comfortable with this approach/interpret grading plans



# Questions or Comments?



# Contacts



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