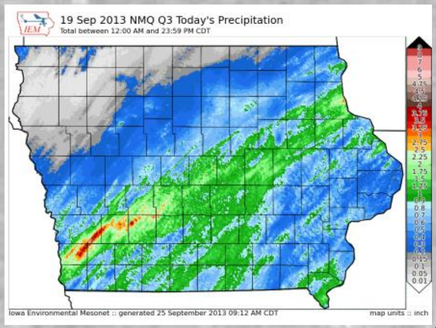
The Daily Erosion Project/Ag Conservation Planning Framework

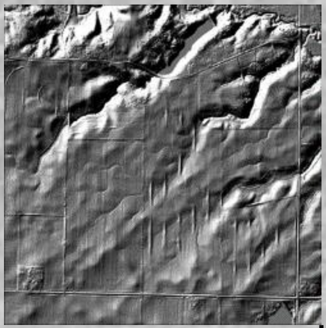
Erosion Webinar Update

Brian Gelder, Rick Cruse, Daryl Herzmann, Claudette Sandoval-Green, John Laflen, and Tim Sklenar, Iowa State University

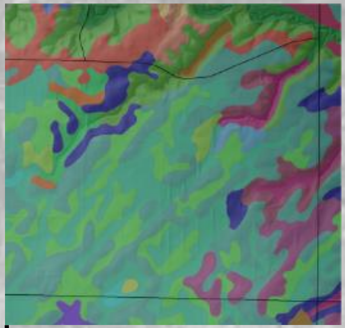
David James, USDA ARS NLAE



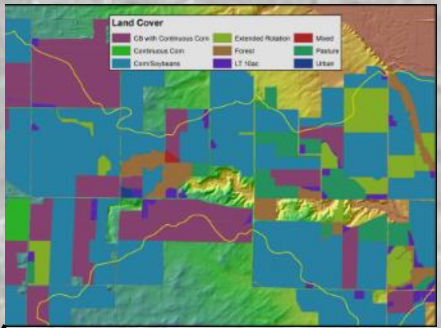
NEXRAD Precipitation



LiDAR Elevation

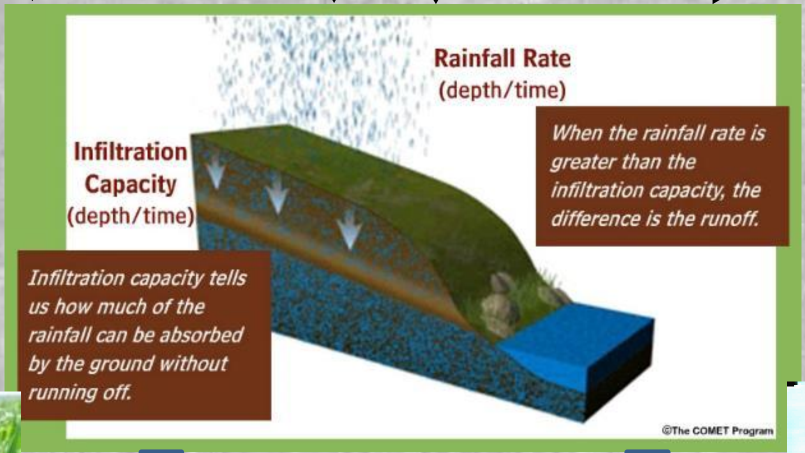


gSSURGO Soils



Field-scale Land-use & Management

WEPP



Runoff

Detachment

Delivery

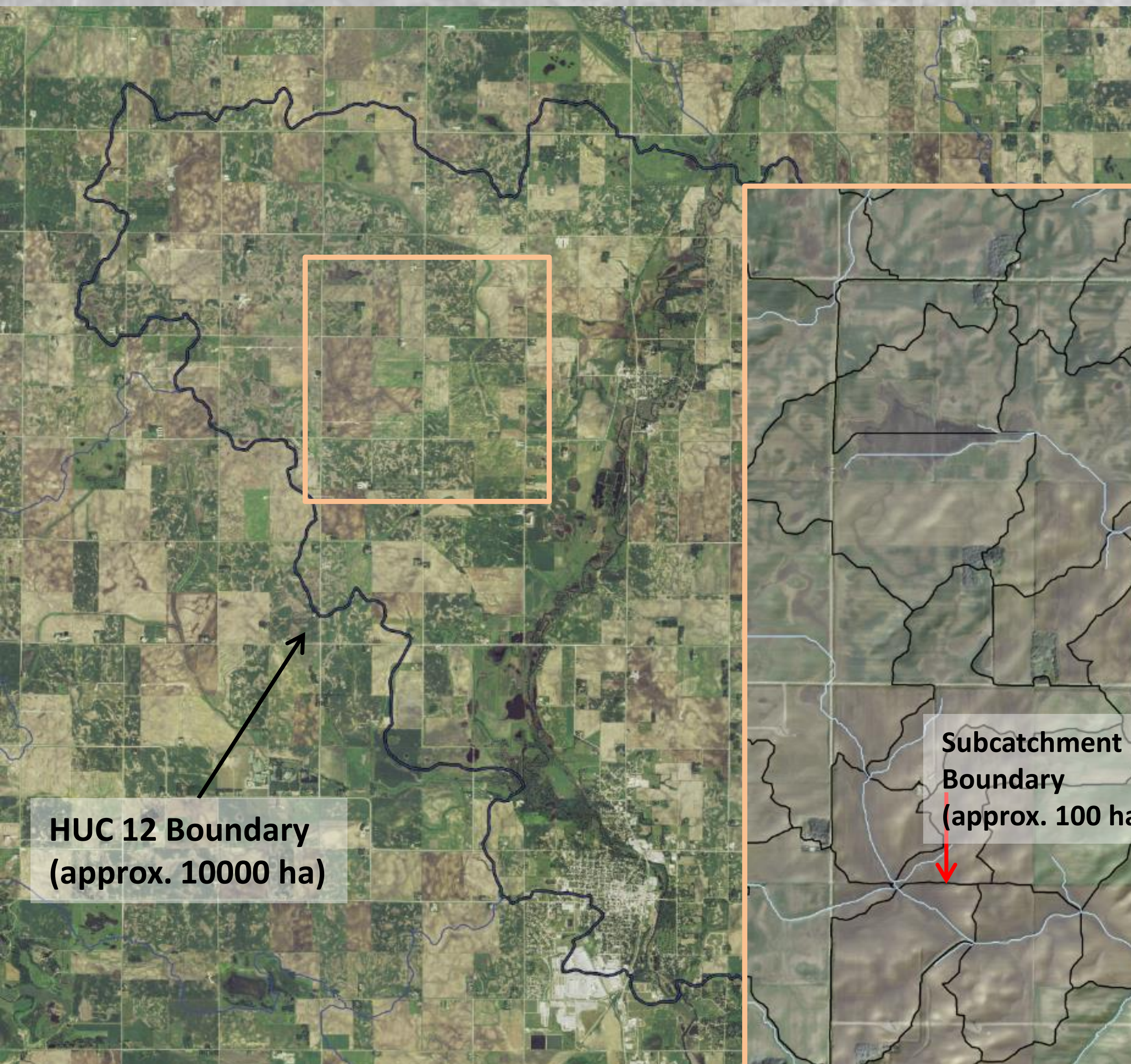
Soil Moisture

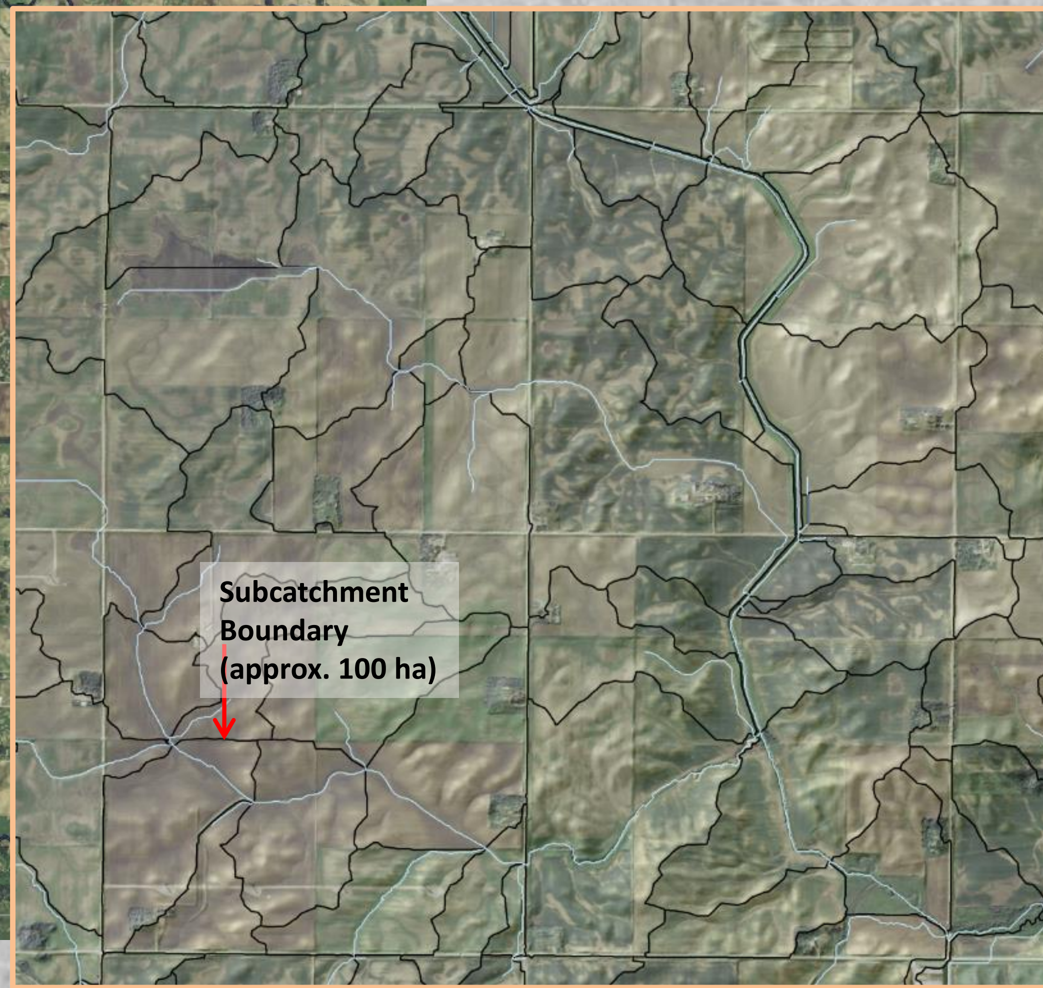
Daily Erosion Project

- Transitioned to high resolution inputs
  - Hillslope profiles: LiDAR-based 3m elevation model
  - Land Use & Management: Current field-scale land use and remotely-sensed residue cover
  - Soils: 10m gSSURGO derived model inputs
  - Rainfall: 1x1 km 5 minute NEXRAD
- Enables watershed monitoring comparisons for estimating model accuracy and precision
  - Eventually include ephemeral gully, classic gully, stream delivery, and channel erosion

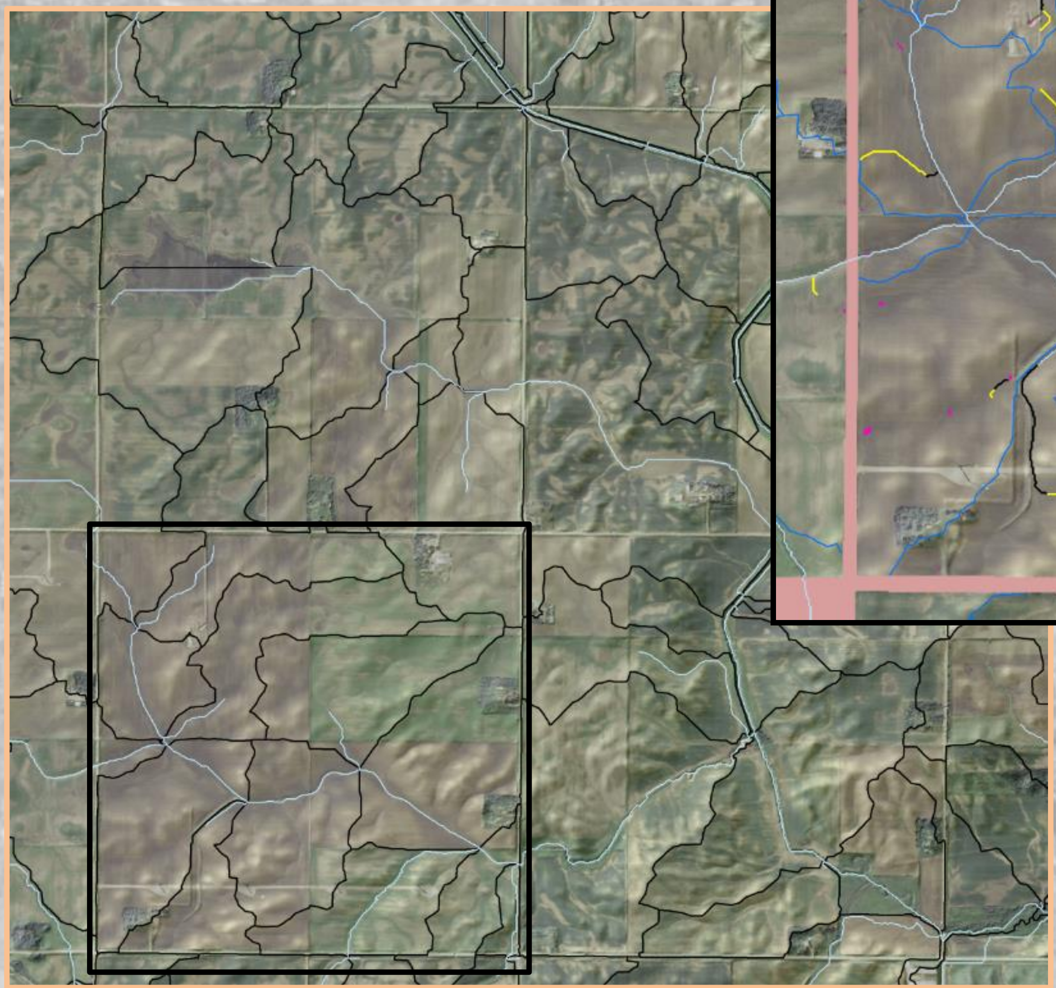
HUC12s & Sub-catchments

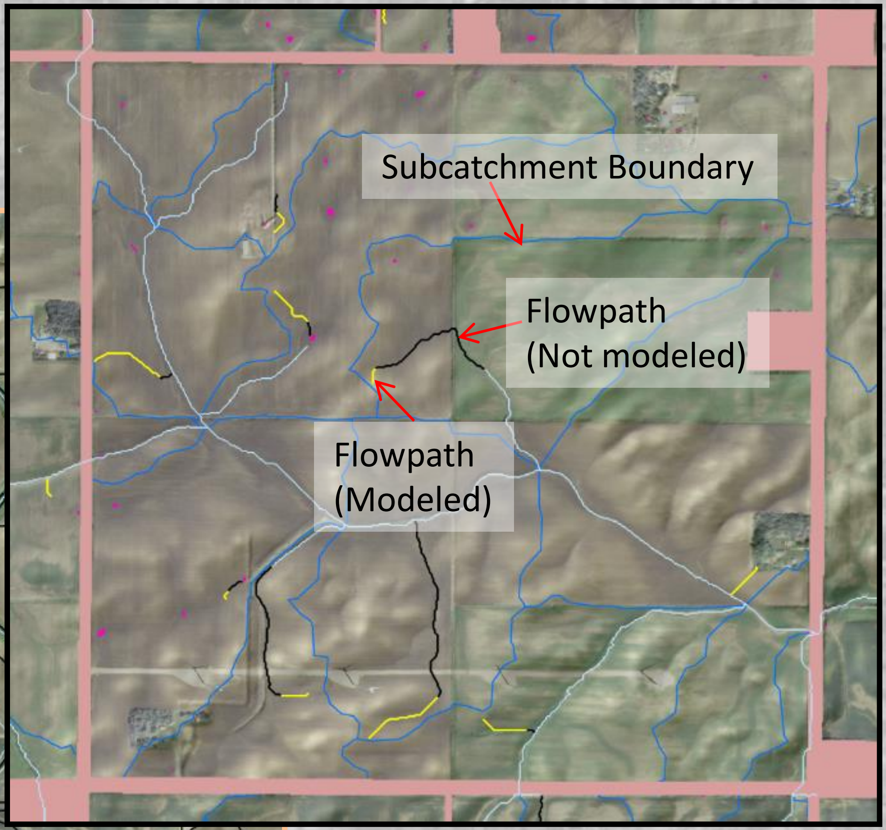
Subcatchments are defined by the Peuker-Douglas constant drop stream Algorithm in TAU-DEM





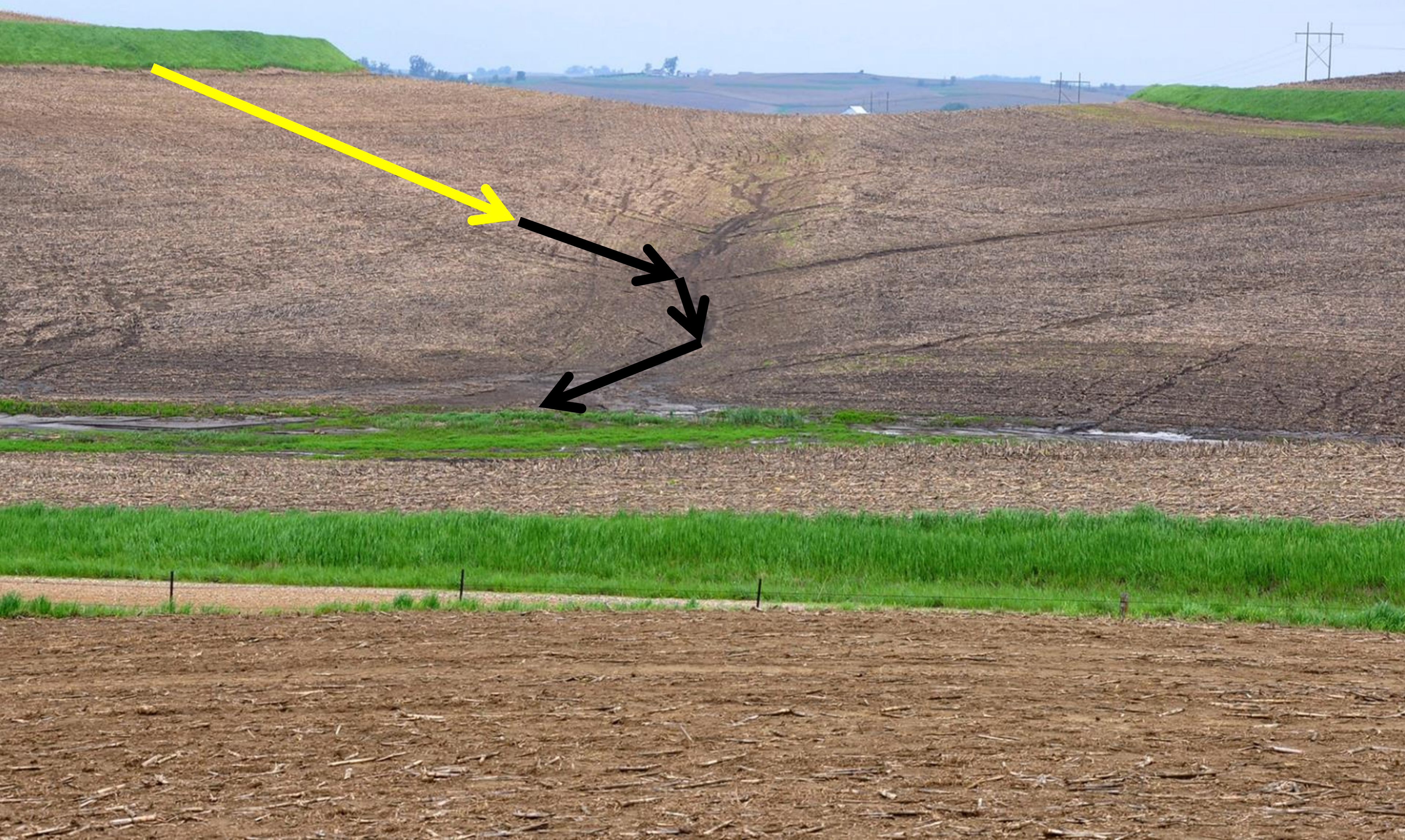
Sub-catchments & Flowpaths





1 random flowpath per subcatchment
Must be on agricultural land
Approximately 10-100 m long
Only modeled in sheet/rill flow

What's It Like In the Field?



USDA/ARS Agricultural Conservation Planning Framework (ACPF) and the Daily Erosion Project

- The DEMs, crop rotation, and soils data used in the Daily Erosion Project are derived from the Agricultural Conservation Planning Framework (ACPF) database
  - Tomer et al., USDA/ARS National Laboratory for Agriculture and the Environment (NLAE)
- ACPF database combines with the ACPF Toolbox to do field-level conservation planning
  - Saturated Buffers
  - Riparian Functional Analysis
  - Nutrient Removal Wetlands
  - WASCOBs
  - Contour Buffer Strips
- The ACPF (part of USA only) is available on the North Central Region Water Network website at http://northcentralwater.org/acpf/

Daily Erosion Project Updates

- A major update is planned for March 2018
  - Transition to 2 meter DEM inputs
    - Improved terrace detection
    - Fix current dropouts due to DEM cutting errors
      - Overall expansion in area to DEM available areas
  - Application of 75 subcatchment minimum
    - Minimum needed for confidence in estimates
      - Will reduce displayed area in non-ag areas
  - Incorporation of 2017 crops and 2018 soils data
  - Expand remotely sensed management beyond Iowa
    - Currently all areas outside of Iowa are the default
      - Medium tillage
      - Default will be locally determined

Daily Erosion Project Updates

- Current work underway
  - Modeling of stacked practices within DEP/WEPP
    - Cover crops
    - Contour buffers
    - Waterways?
  - Addition of WEPS model to DEP estimates
    - Trial area in Minnesota
  - Testing of alternate rainfall and DEM sources

Daily Erosion Project Outputs

- Precipitation
  - An average of the precipitation grid cells (1x1 km) within the HUC12 watershed in rain equivalent
- Water runoff
  - Average of hillslope runoff depth on all within the HUC12 watershed in rain equivalent
    - Snow may not become runoff on the same day

Daily Erosion Project Outputs

- Detachment
  - An average of the soil moved (not always to the end) on all flowpaths within the HUC12
- Hillslope Soil Loss
  - An average of the soil transported to the end of the modeled hillslope (not delivery to stream/channel)
    - Ends where sheet and rill erosion processes transition to gully erosion processes
- We don't do gully erosion (yet)
  - If you can see it, we don't estimate it!

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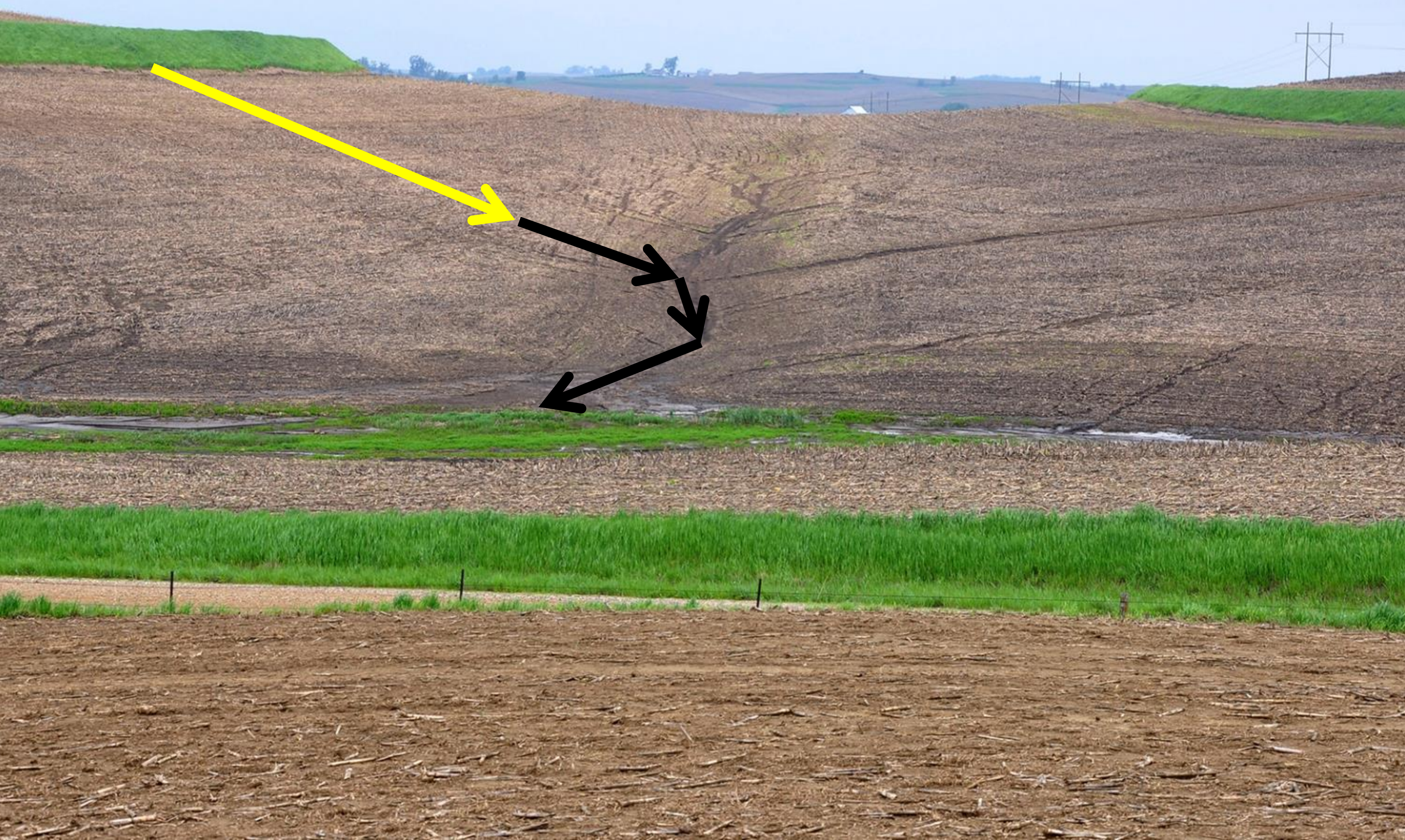
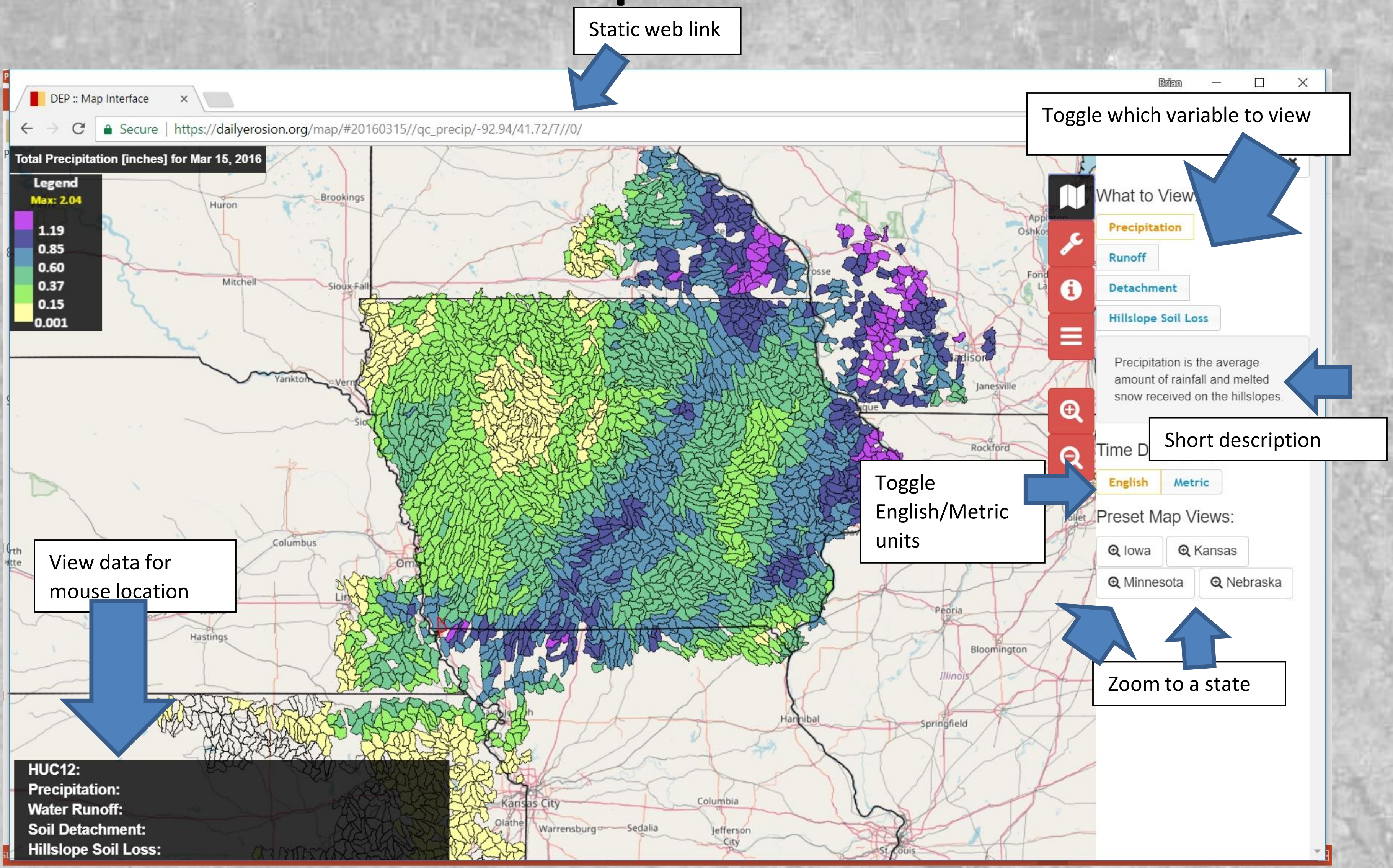
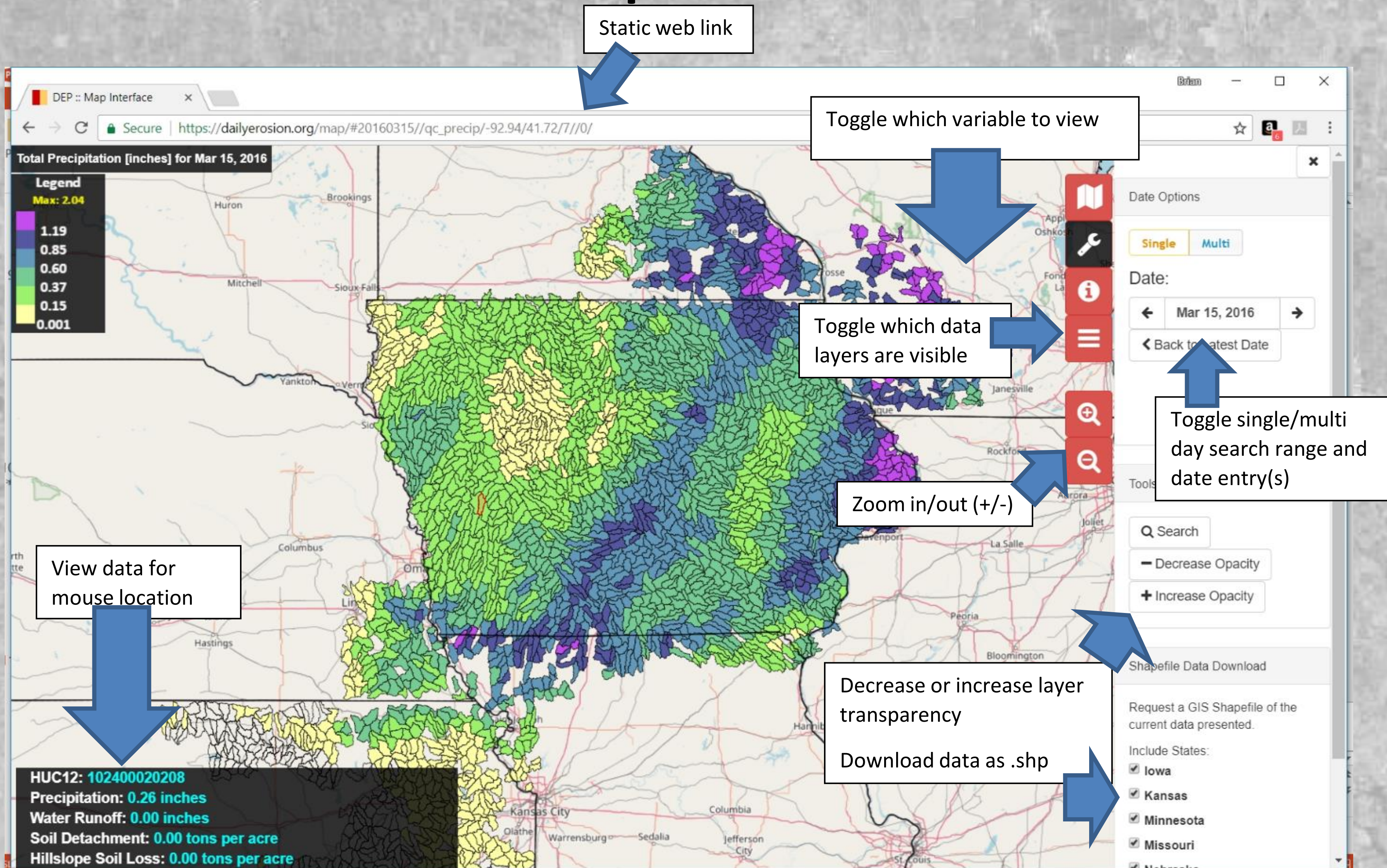


DEP Map Interface



DEP Map Interface



DEP Map Interface