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# Do Tile Drains Change the Conversation on BMPs?

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Presentation to Ag Water & Nutrient Professionals

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Canada 

# Why do farmers install tile drains?

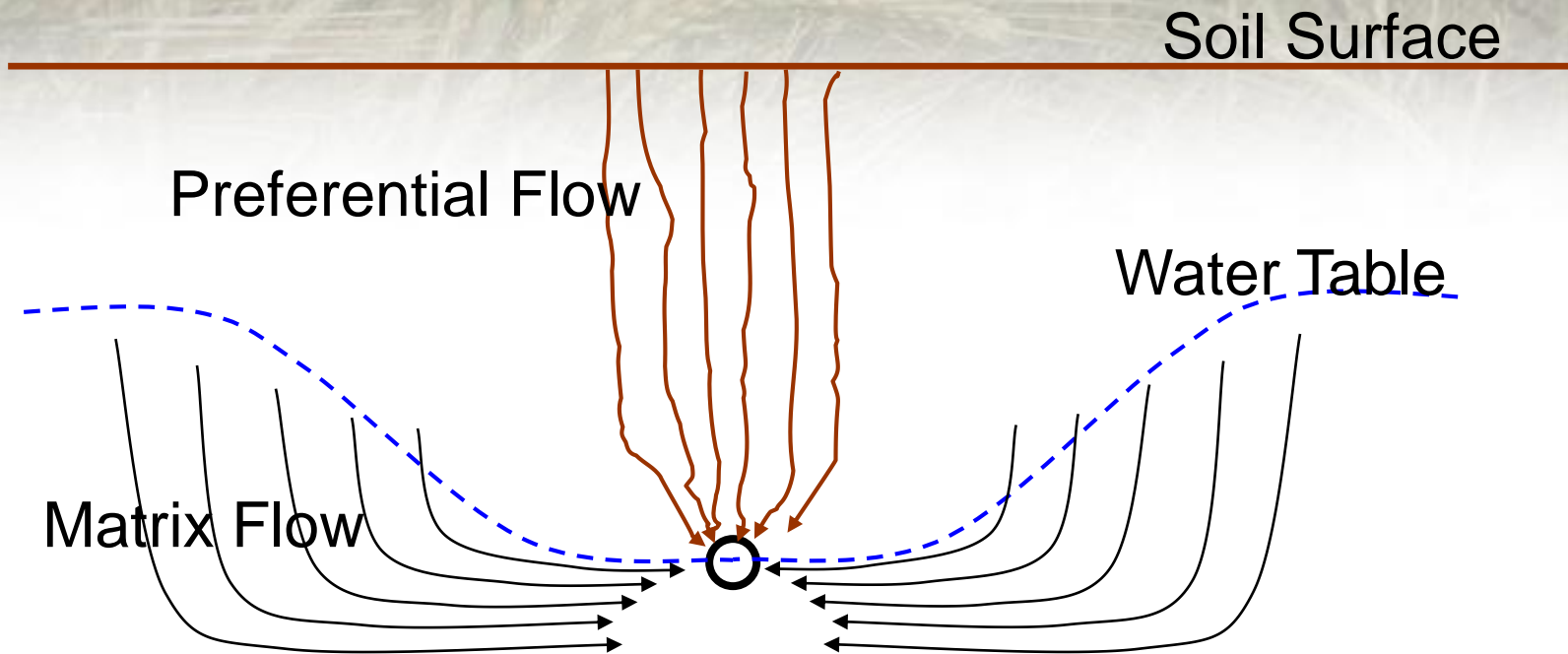
- Remove excess moisture
- Longer effective growing season
- Less surface runoff and erosion
- Less compaction
- Increased available moisture
- Higher crop yields



# Environmental Impacts of Tile Drains

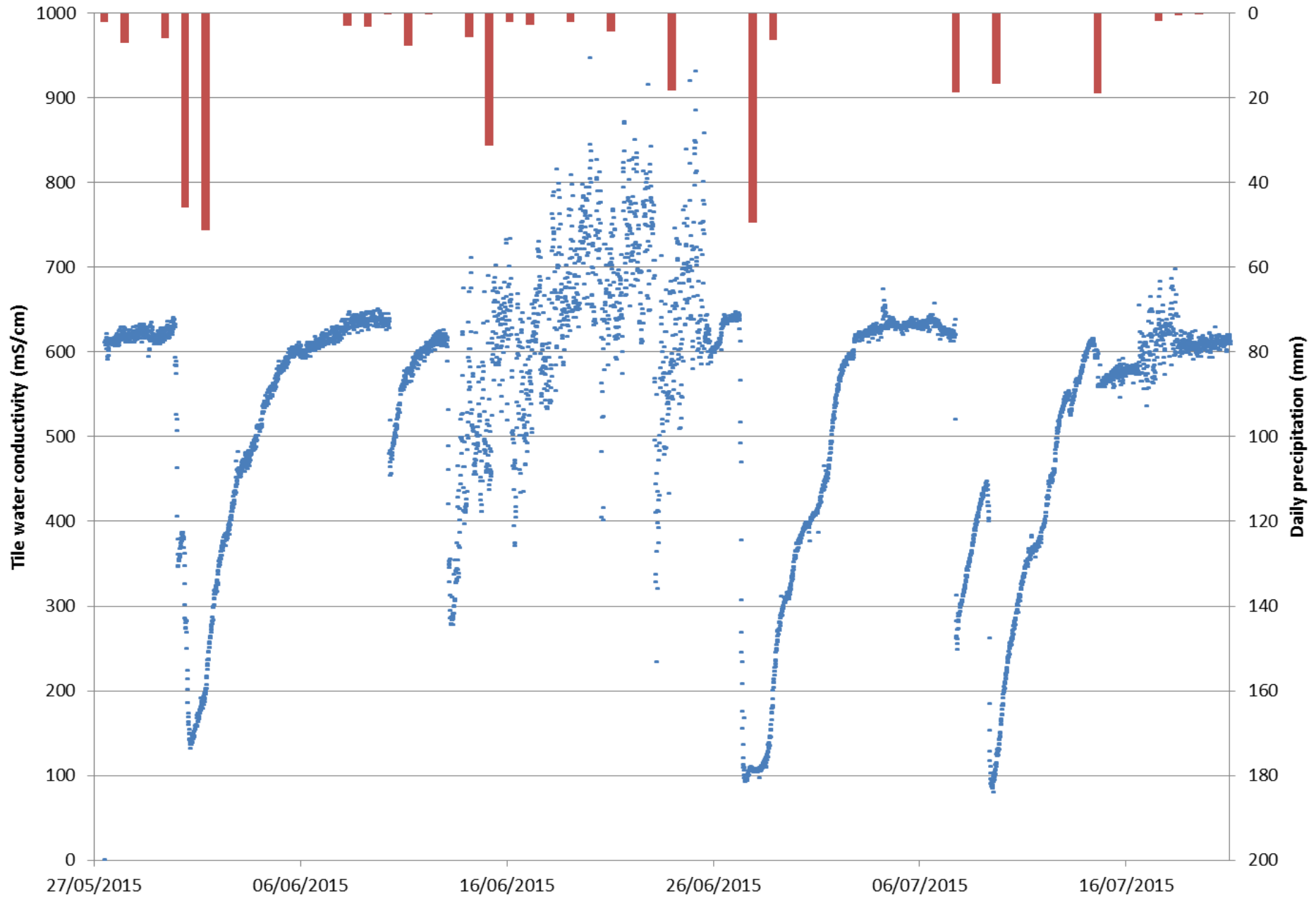
- Changes in patterns of total volume of flow from landscape
  - Net effect not completely clear; will depend on size of storm and antecedent moisture
- Greater connectivity of upland areas to watercourses
  - Increased movement of nitrate to surface water rather than groundwater – “skimming” from top of water table
  - Potential for increased P movement
- Greater evapotranspiration because of more crop growth
- Less denitrification, but perhaps more  $N_2O$ ?

# P Pathways to Tile

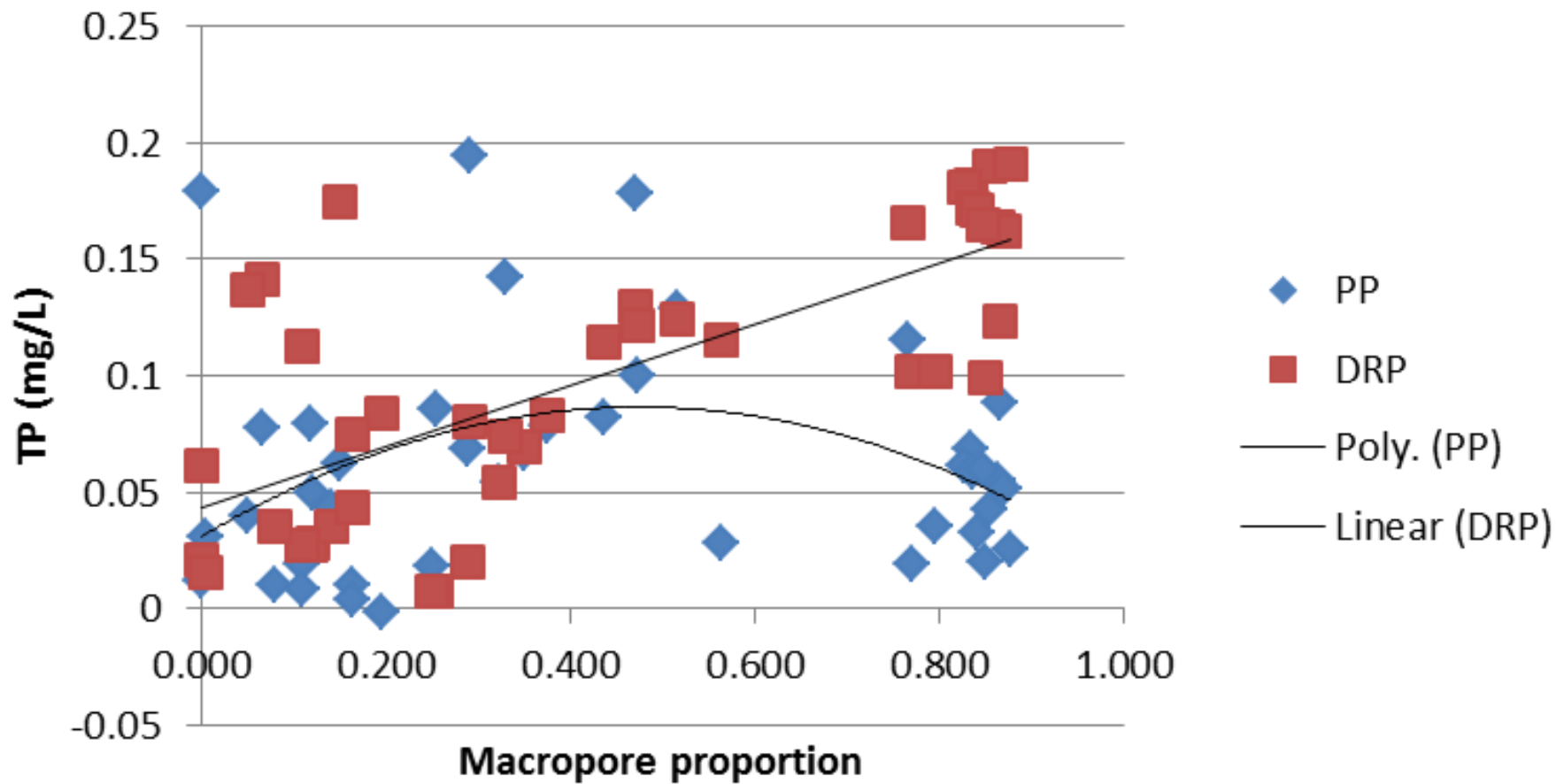


Pathways for P movement to sub-surface drains. Water moves to tiles both through the soil matrix, and preferentially in cracks and bio-pores. This preferential flow by-passes the mechanisms that would bind the P, so carries similar concentrations of dissolved and particulate P as surface runoff.

# Essex 2015/07/21 - EC



# Correlation between P concentration in tile water and macropore flow - Chk 1



# Complications...

- Surface Inlets (unrestricted) – direct connections to watercourses
  - Should we treat each inlet as a point-sized watercourse on the landscape?
- Erosion control structures
  - Often include connections to tile drains
  - Are they doing anything beyond controlling gully erosion?
- Grassed waterways and terraces
  - Tile drains are frequently necessary for stability
- Controlled drainage



# Impact on BMPs

- We need to account for tile drains in our decisions about BMPs
  - Great Lakes basin is most intensively drained area in the world
- In field management becomes more important than edge of field treatment
- Good management for surface runoff = Good management for tile drains.







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