

INFLUENCE OF SPOIL TYPE ON HYDROCHEMICAL FUNCTION ON A SURFACE COAL MINE IN EASTERN KENTUCKY

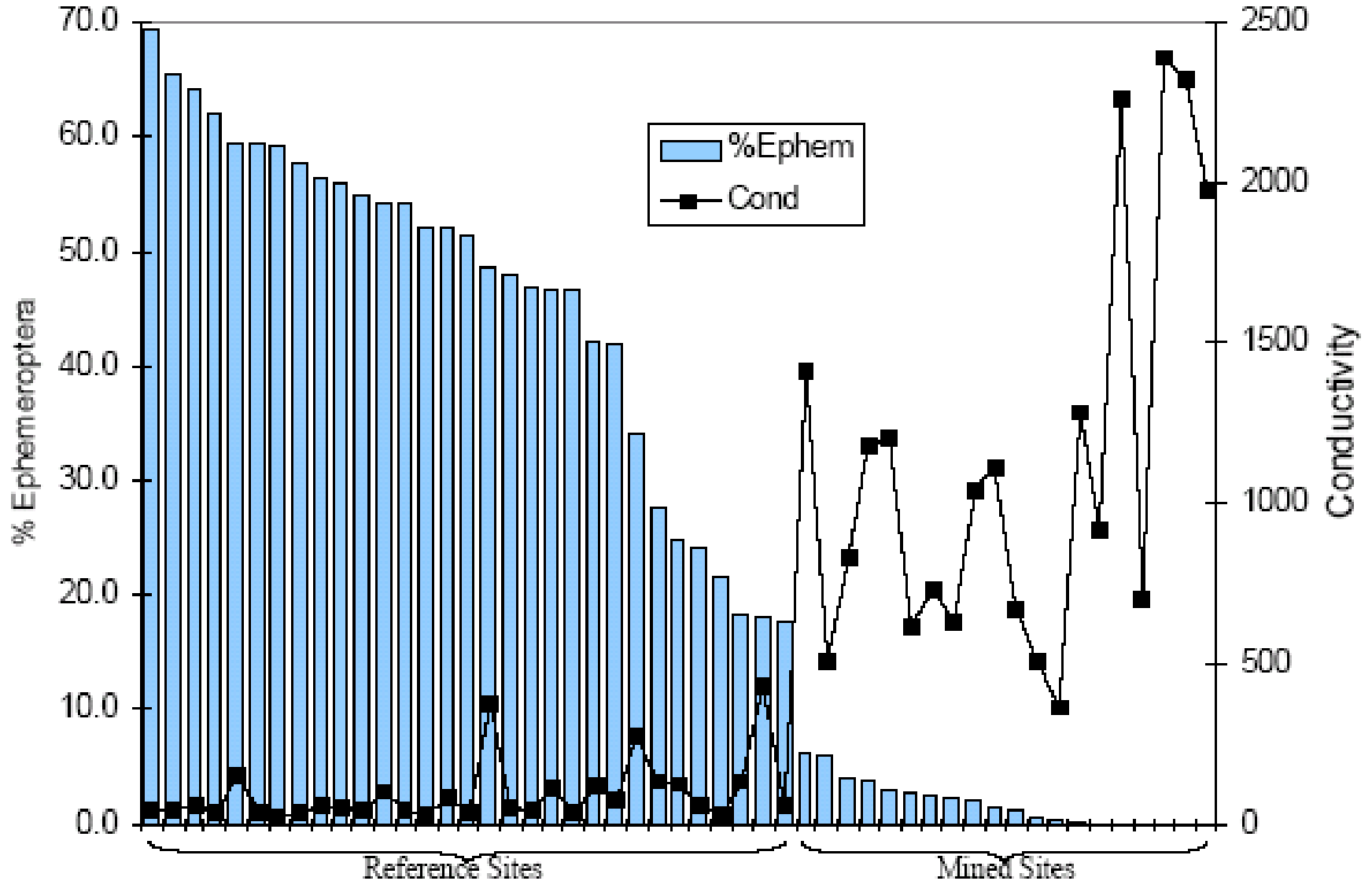
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American Society of Mining and Reclamation

17 June 2014

IMPACTS OF SURFACE MINING

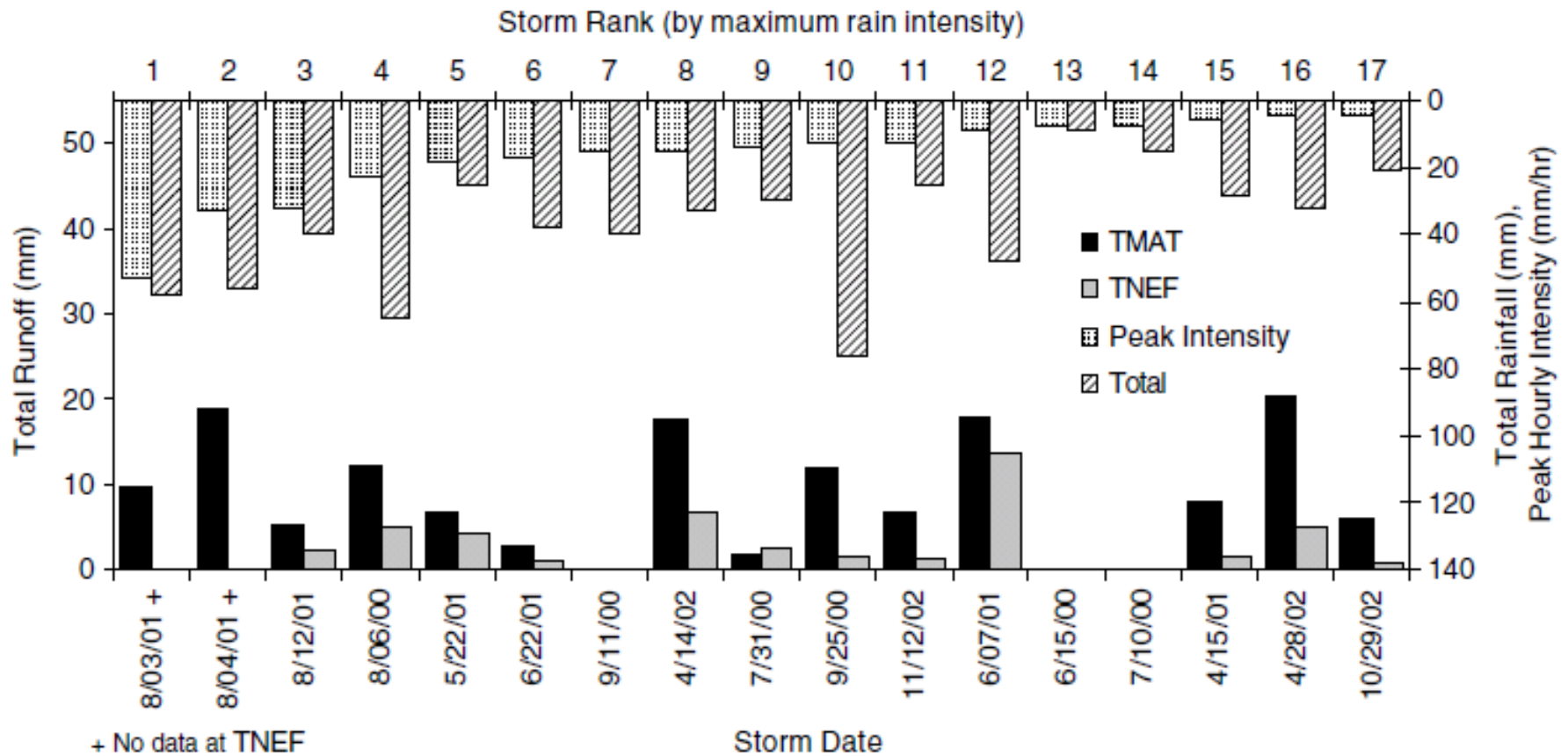


Surface mining effects: EC



(Pond, 2004 and 2007)

Surface mining effects: Hydrology



STUDY SITE AND METHODS







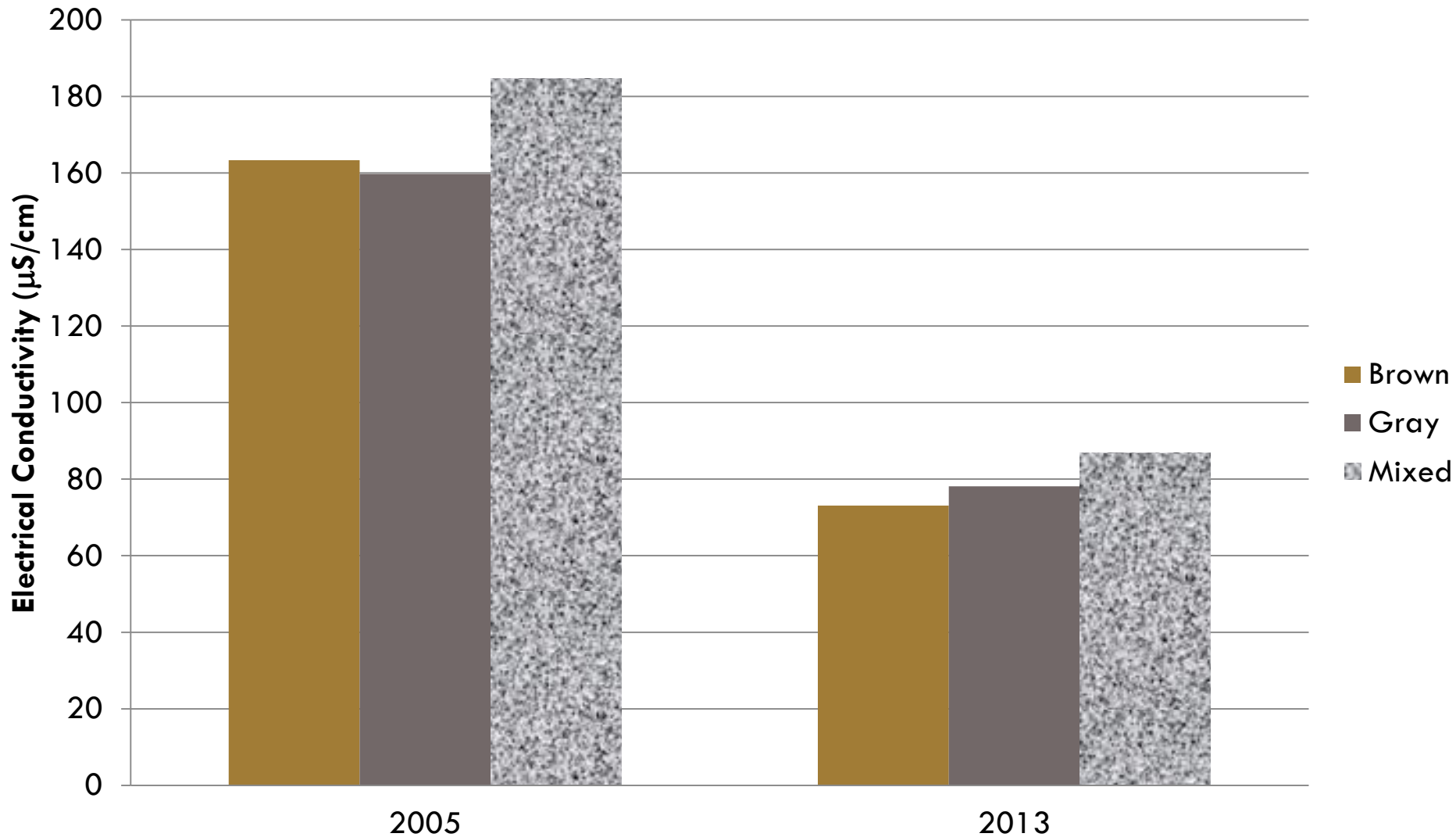




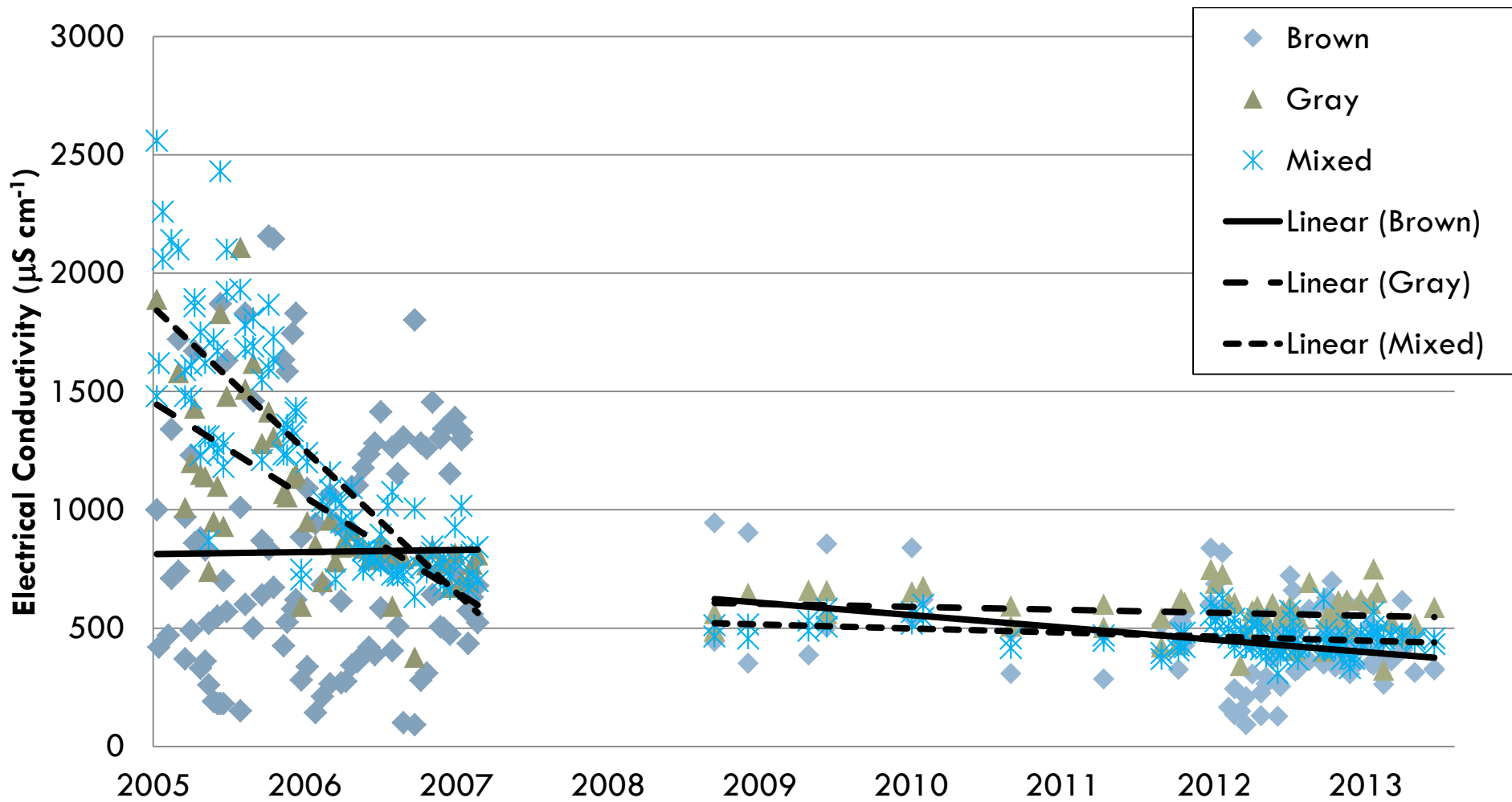
RESULTS: SOIL AND WATER



Soil Electrical Conductivity (EC)

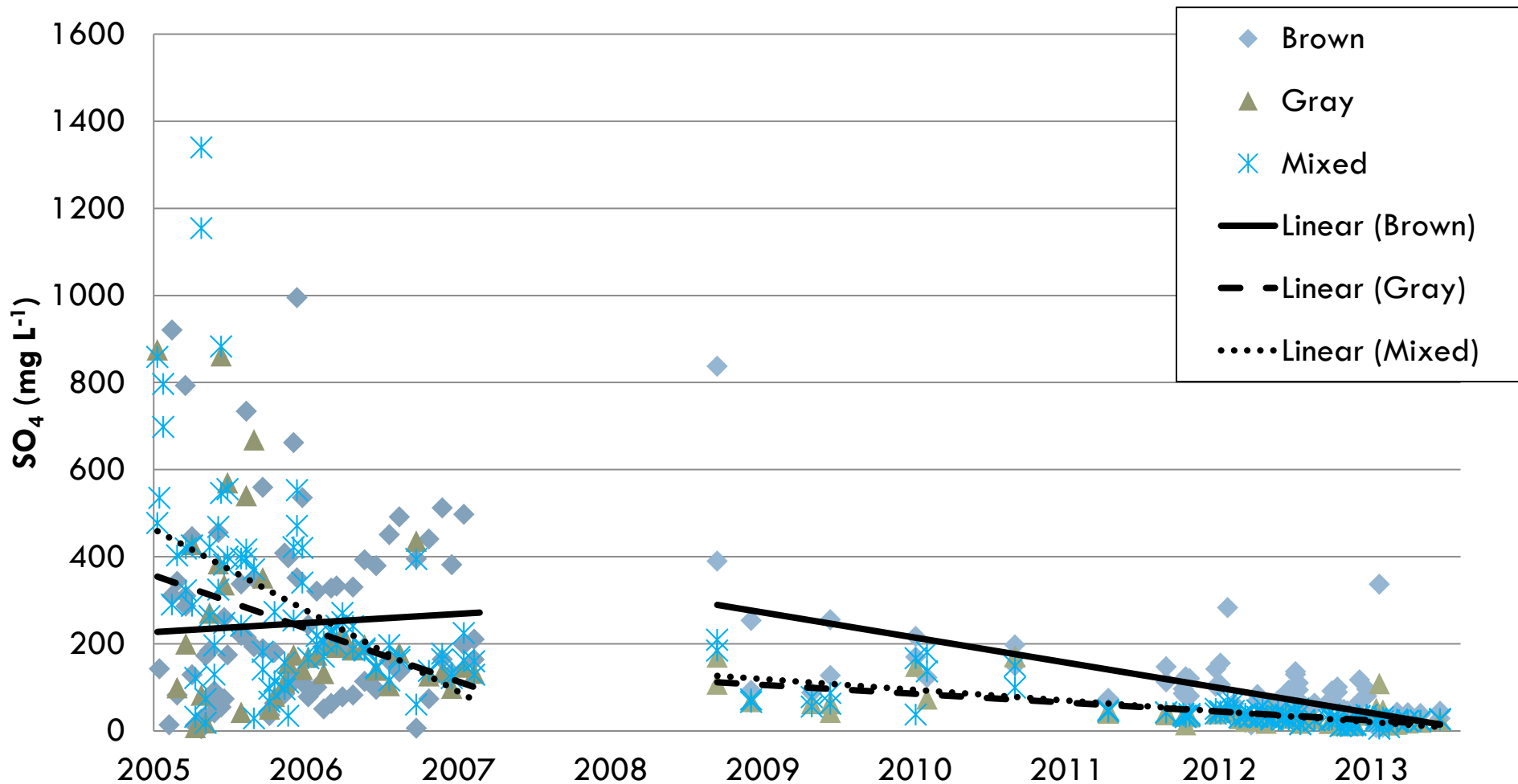


Water Electrical Conductivity

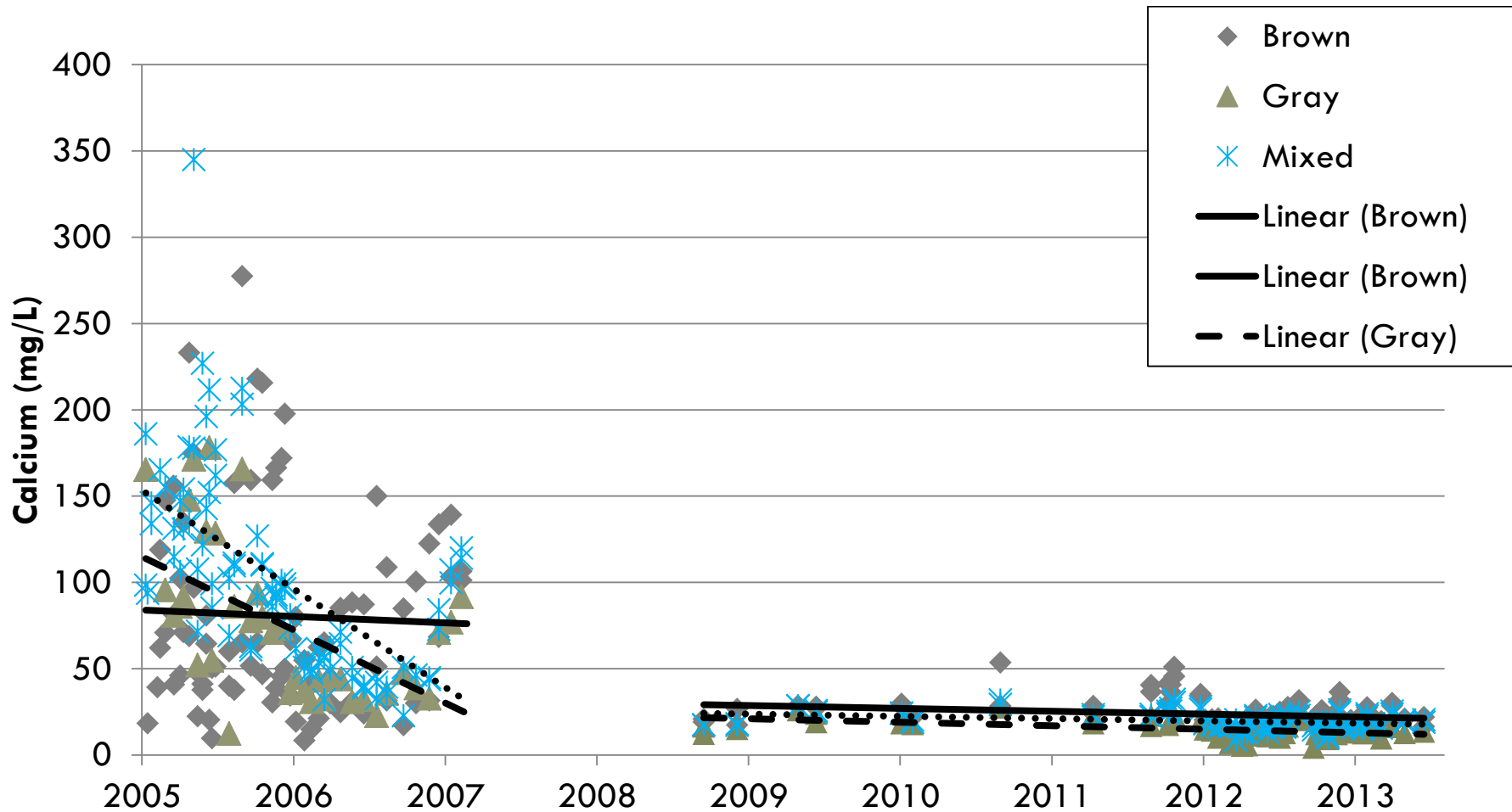


Regression slope (2012-13) no different from zero ($p = 0.05$)

Water SO₄ Concentration



Water Calcium

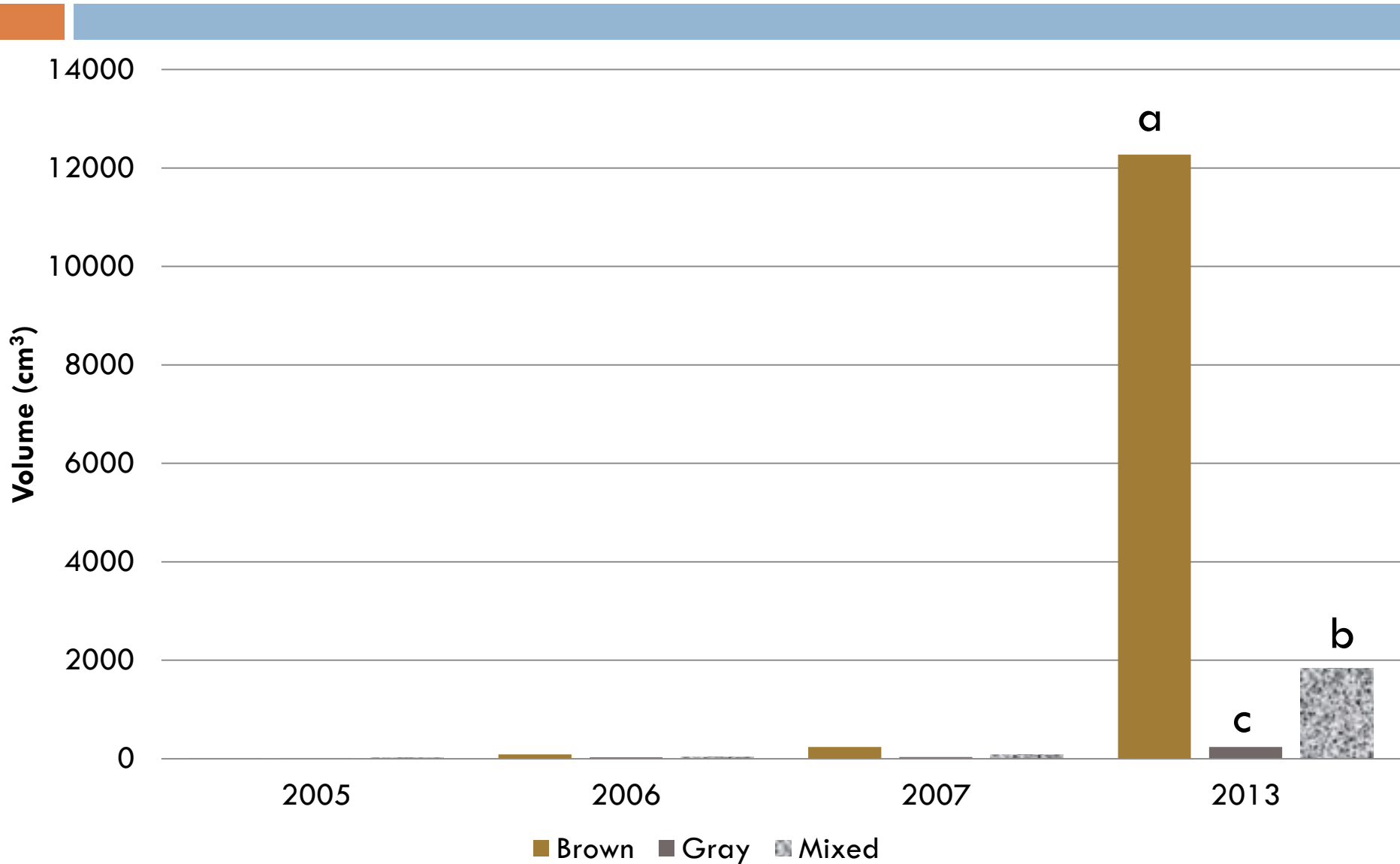


Regression slope (2012-13) no different from zero ($p = 0.05$)

HYDROLOGIC INFLUENCE



Tree Volume



BROWN 1

BROWN 3

Naturally Regenerating Vegetation



MIXED 4

MIXED 5



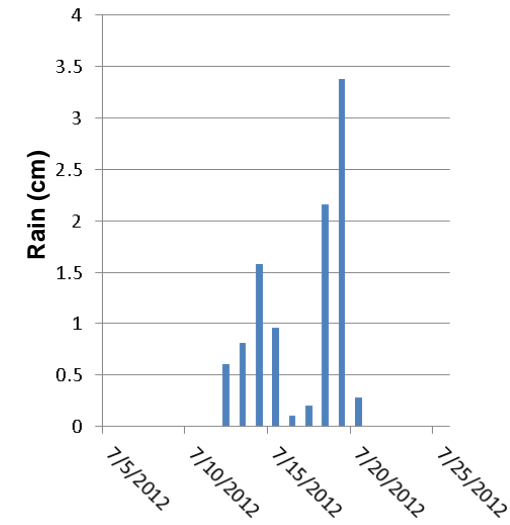
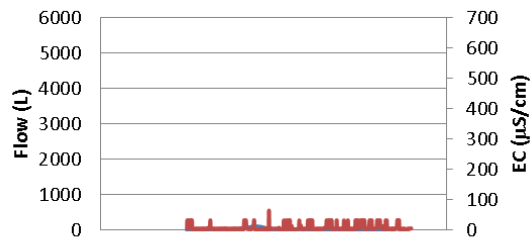
GRAY 2

GRAY 6

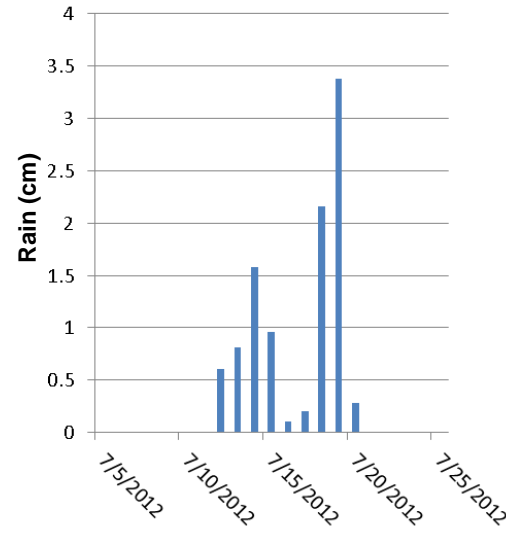
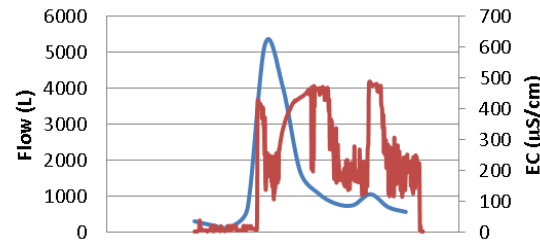


Hydrologic Response to a Rain Event

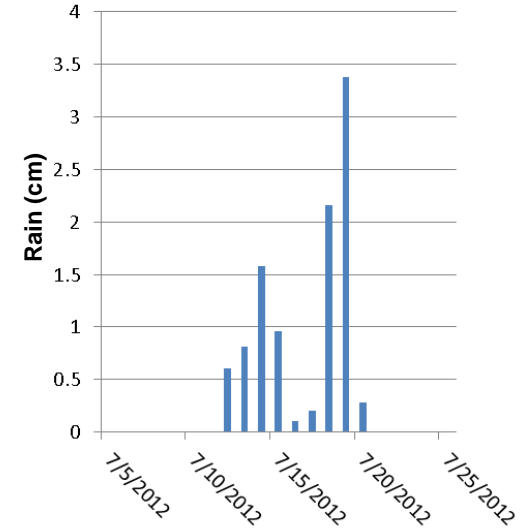
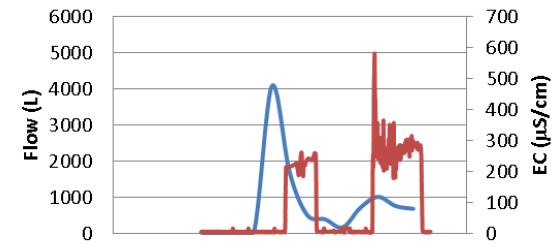
BROWN



MIXED



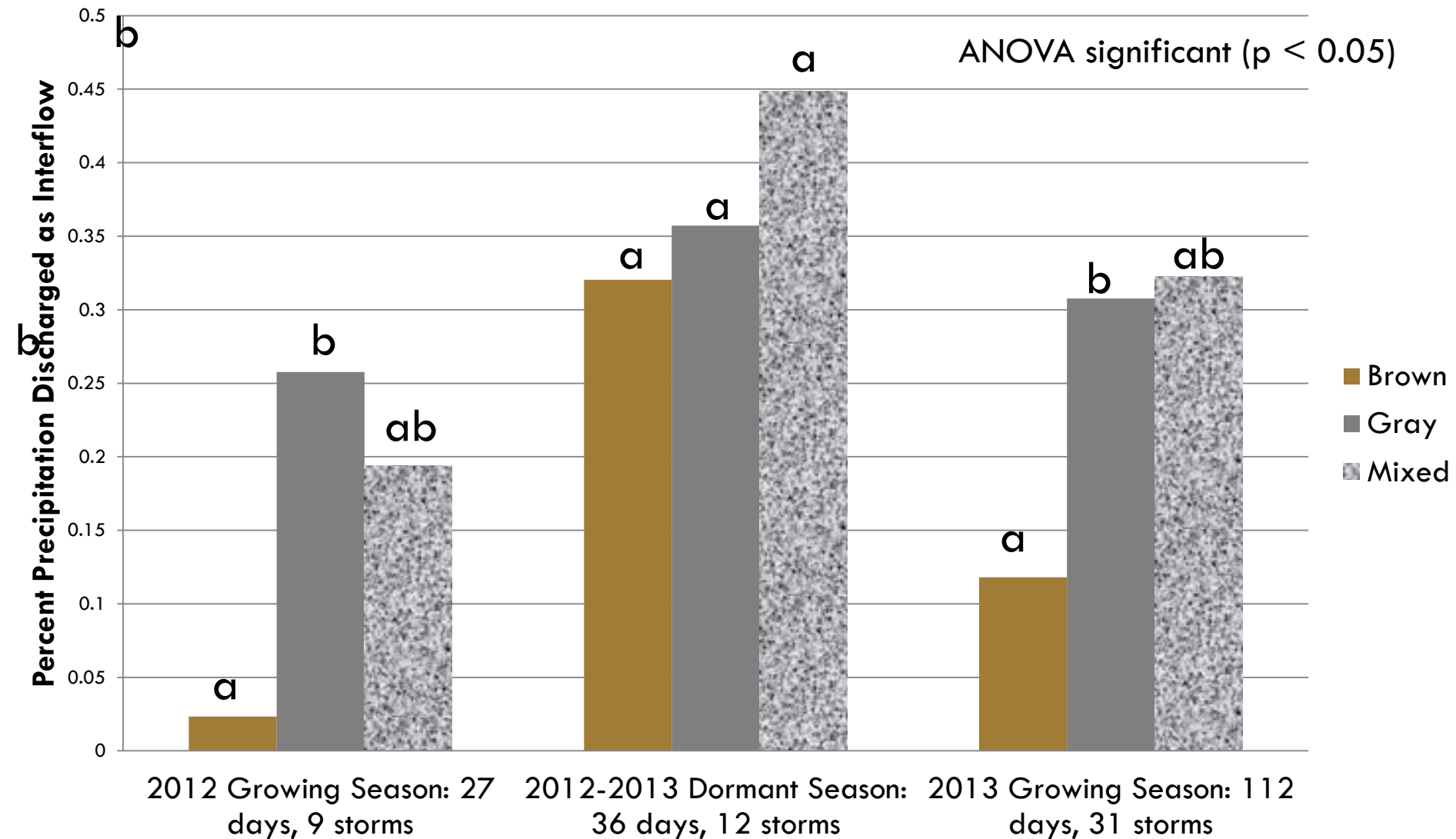
GRAY



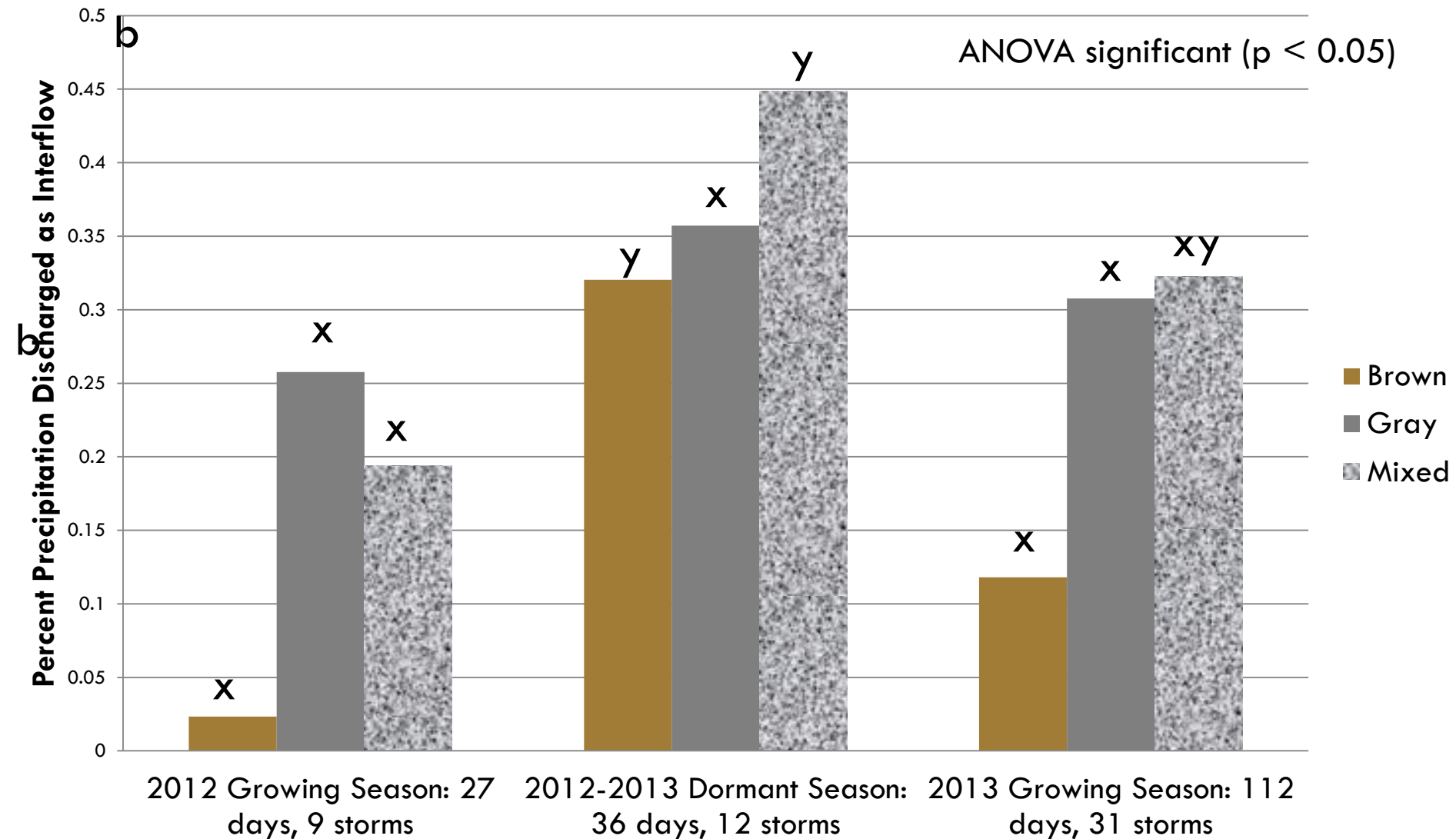
Flow
EC

RAIN

Hydrologic Function: Differences within season



Hydrologic Function: Differences within spoil type



CONCLUSIONS AND RECOMMENDATIONS



Conclusions

- Spoils placed using FRA techniques may reach a geochemical “equilibrium” by nine growing seasons
 - ▣ Mitigation of downstream aquatic impacts
- Continued forest development will restore normal transpiration influence on water budgeting

Recommendations

- Use weathered spoils when native soil is unavailable
- Use FRA techniques to maximize native tree growth and restore hydrologic benefits
- Further Research:
 - ▣ Hydrology impacts on watershed scale reclamation project

Acknowledgments

- M. S. Thesis committee: Drs. Barton, Agouridis, and Lhotka
- Help with Sampling: Patrick Angel, Mary Weatherford, Beth Hansen, Nic Williamson
- Help with Analysis: Millie Hamilton, Kristen McQuerry, Sarah Hall, Rob Paratley
- Funding: Appalachian Regional Initiative for Environmental Science (ARIES)

References

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QUESTIONS?