



# Restoring Eastern Redcedar Encroached Watersheds to Prairie or Switchgrass Improves Water Quality and Quantity

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## Introduction

- 1 Redcedar encroachment increases wildfire risk, decreases cattle production, and water quality and quantity.
- 2 Redcedar removal followed by planting switchgrass will prevent redcedar re-infesting and provide opportunity for biomass based bio-economy.
- ? It is unknown how this land use change will affect ecosystem services, particularly soil and water resources.
- ✓ Our **Objective** is to quantify change in water quality and quantity with the land management approach.



Image 1: Redcedar encroachment into grassland



Image 2: Mechanical removal of redcedar in CTER site



Image 3: Producing redcedar chips and mulch on site



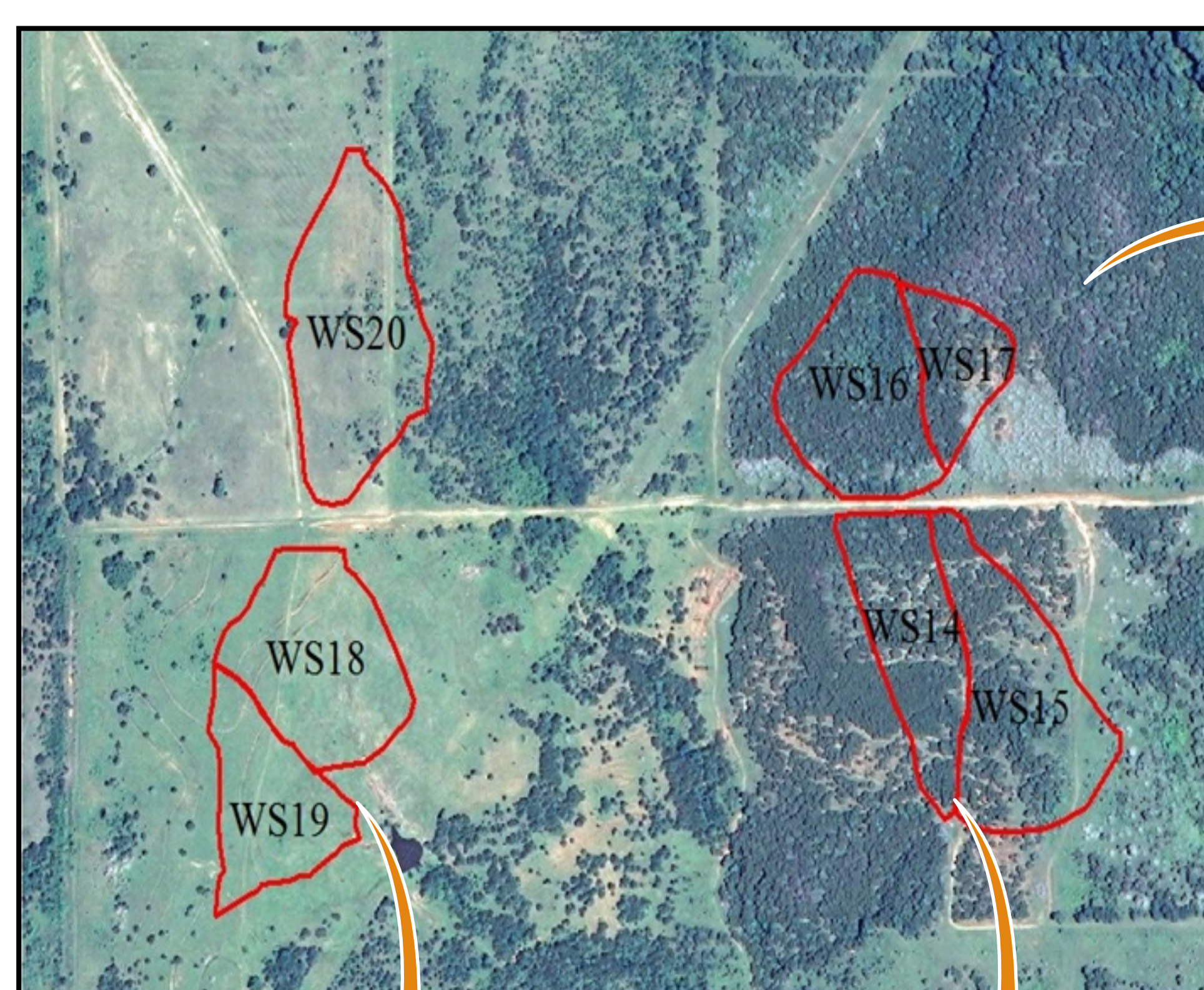
Image 4: Non-till drill of switchgrass seeds



Image 5: Restored switchgrass in the first year

## Methods

Research was conducted in the Oklahoma State University Cross Timbers Experimental Range (CTER) watersheds (WS). WS18, 19, 20 were grassland and WS 14 – 17 were redcedar encroached before treatment.



Stilling well containing data logger at every H-flume

## Results

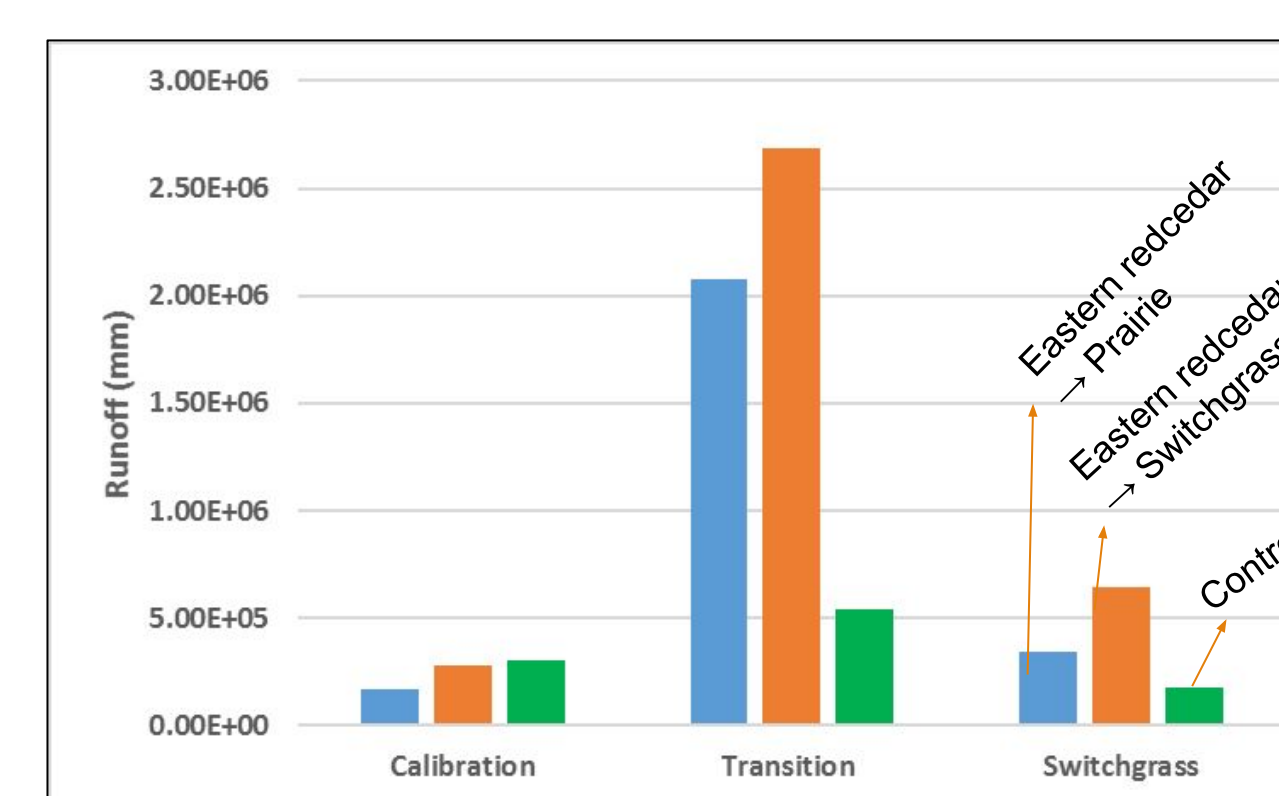
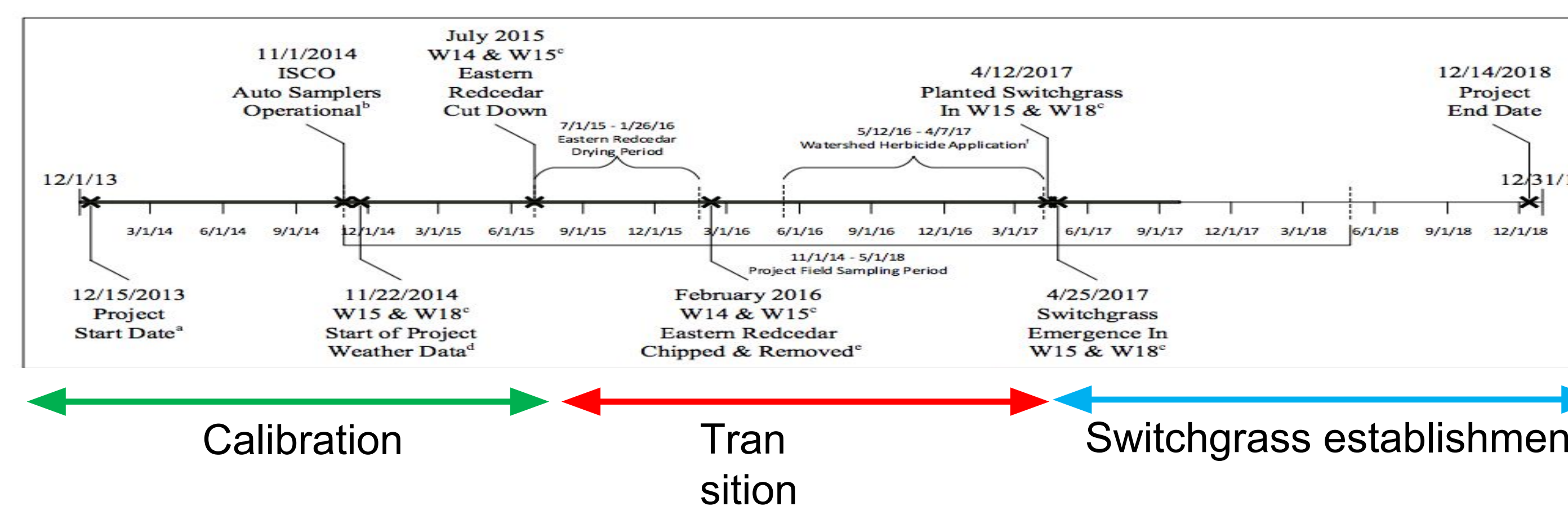


Fig. 1: Runoff at different phase for redcedar watershed

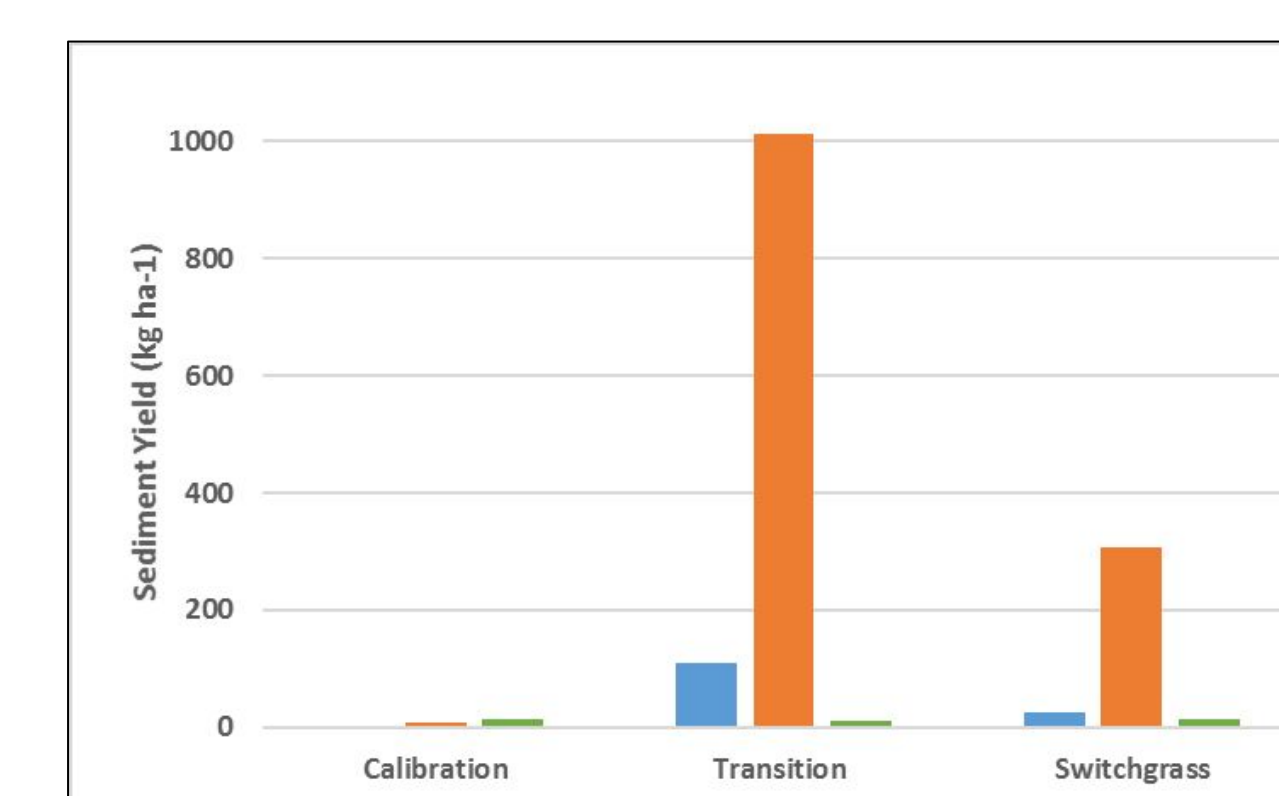


Fig. 2: Sediment yield at different phase for redcedar watershed

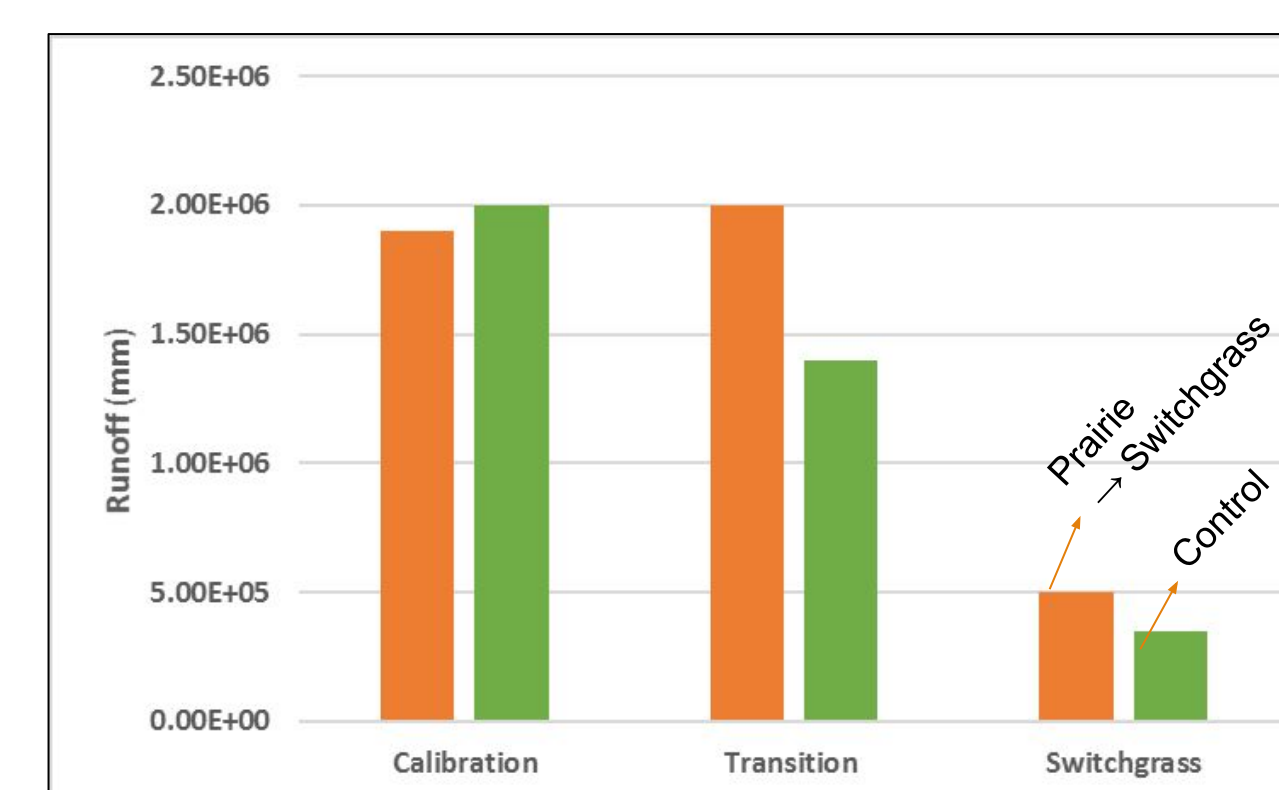


Fig. 3: Runoff at different phase for prairie

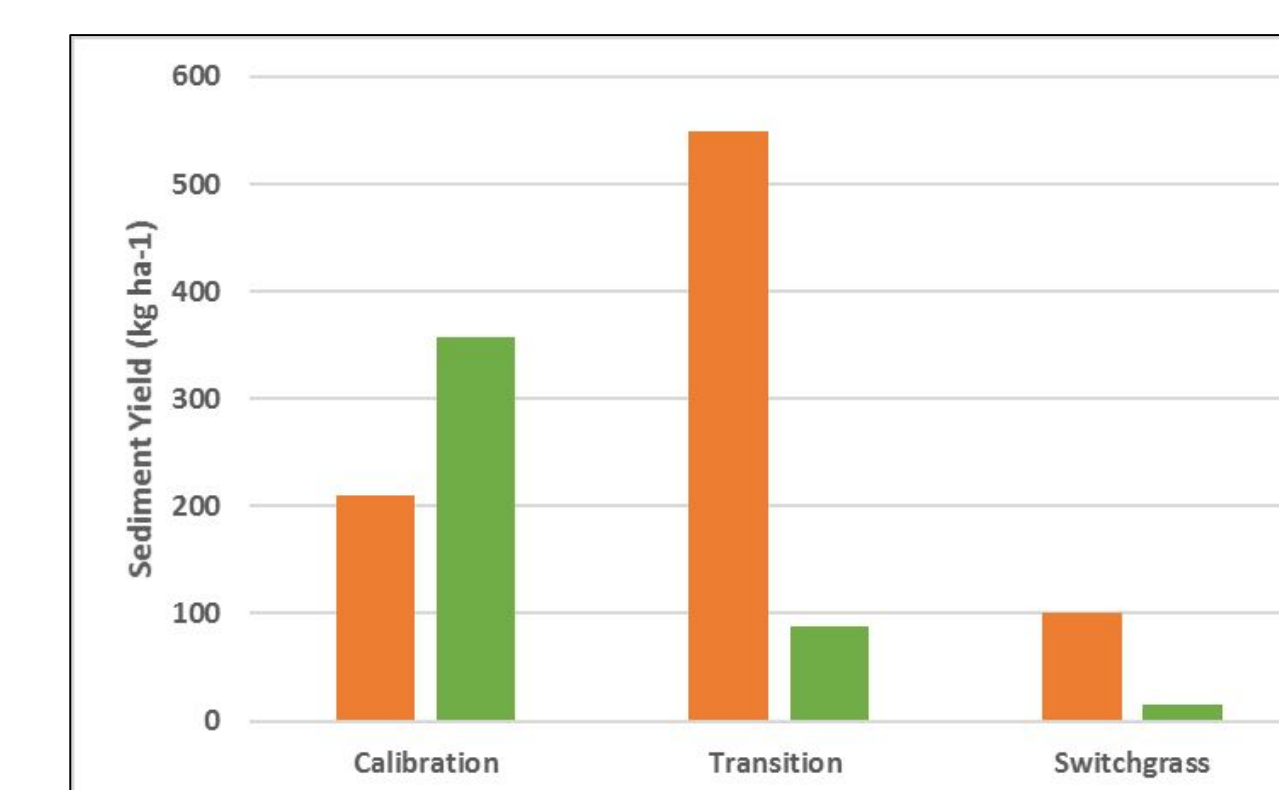


Fig. 4: Sediment yield at different phase for prairie

## Social Impact

- Switchgrass based biomass production system will provide an alternative land use preventing redcedar from re-infesting grassland;
- Restoration of redcedar encroached watershed will increase runoff but reduce sediment yield;
- It will support biomass-based bio-economy;
- Restoring redcedar encroached watersheds and potential biofuel production system will improve environmental quality and potentially the livelihood of rural communities in Oklahoma.

## Acknowledgements

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