

# Water Use by Managed Saltcedar Area at the Caballo Reservoir, New Mexico



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## Introduction

Saltcedar (*Tamarix* spp.), an invading plant species, has vastly spread throughout the United States, dominating the ecology, consuming a lot of water (1 to 1.5 m/yr; Bawazir et al., 2006), capable of tapping into groundwater of up to 10 m (33ft), and able to tolerate extreme drought and flooding conditions. In addition, it is very difficult and expensive to manage. Evapotranspiration (ET) of saltcedar managed by mowing at a riparian region near Caballo Reservoir in New Mexico was measured during the peak of the growing season in June and July of 2012. Saltcedar was mowed in July of 2011 and allowed to grow in 2012

## Objective and Goals

- ❖ To determine evapotranspiration (ET) depletion of Saltcedar managed by mowing at a riparian region near Caballo Reservoir in New Mexico
- ❖ Long Term Goal:
  - i. reduce ET (water consumption)
  - ii. reduce its spreading nature

## Methodology

Evapotranspiration (ET) was measured using energy budget method utilizing eddy covariance technique. The energy budget is expressed as:

$$LE = Q - G - H$$

where the four main vertical fluxes terms are net radiation (Q), soil heat (G), sensible heat (H) and latent heat (LE). LE (or ET) was determined as a residual from energy budget.

Additional measurements included soil physical and chemical properties, depth to groundwater, and water quality.

## References

Bawazir, Salim, J. Phillip King, Sridhar Kidambi, Brent Tanzy, Fred Nibling, Nyleen H. Stowe and Merry Jo. Fahl. 2006. A Joint Investigation of Evapotranspiration Depletion of Treated and Non-Treated Saltcedar at Elephant Butte Delta, New Mexico. WRR1 Technical Completion Report No. 328, PP. 179.

## Instrumentation Setup and Data Collection

The instrumentation set up for measuring ET is shown in Figure 1. Depth to groundwater was monitored at the locations shown in Figure 2. Water quality sampling is shown in Figure 3. The eddy covariance data was measured at 8 samples per second.

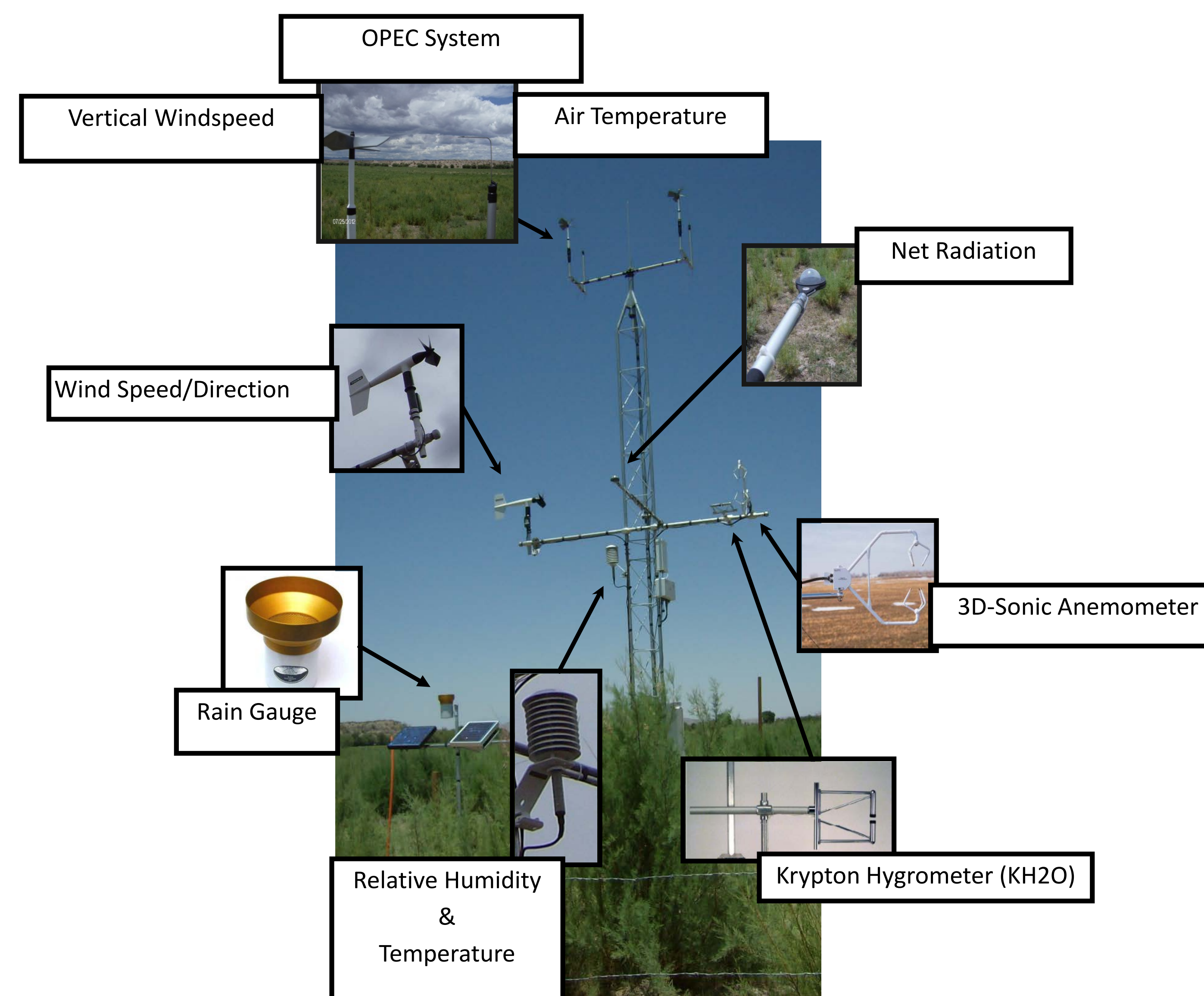


Figure 1. Instrumentation to measure ET

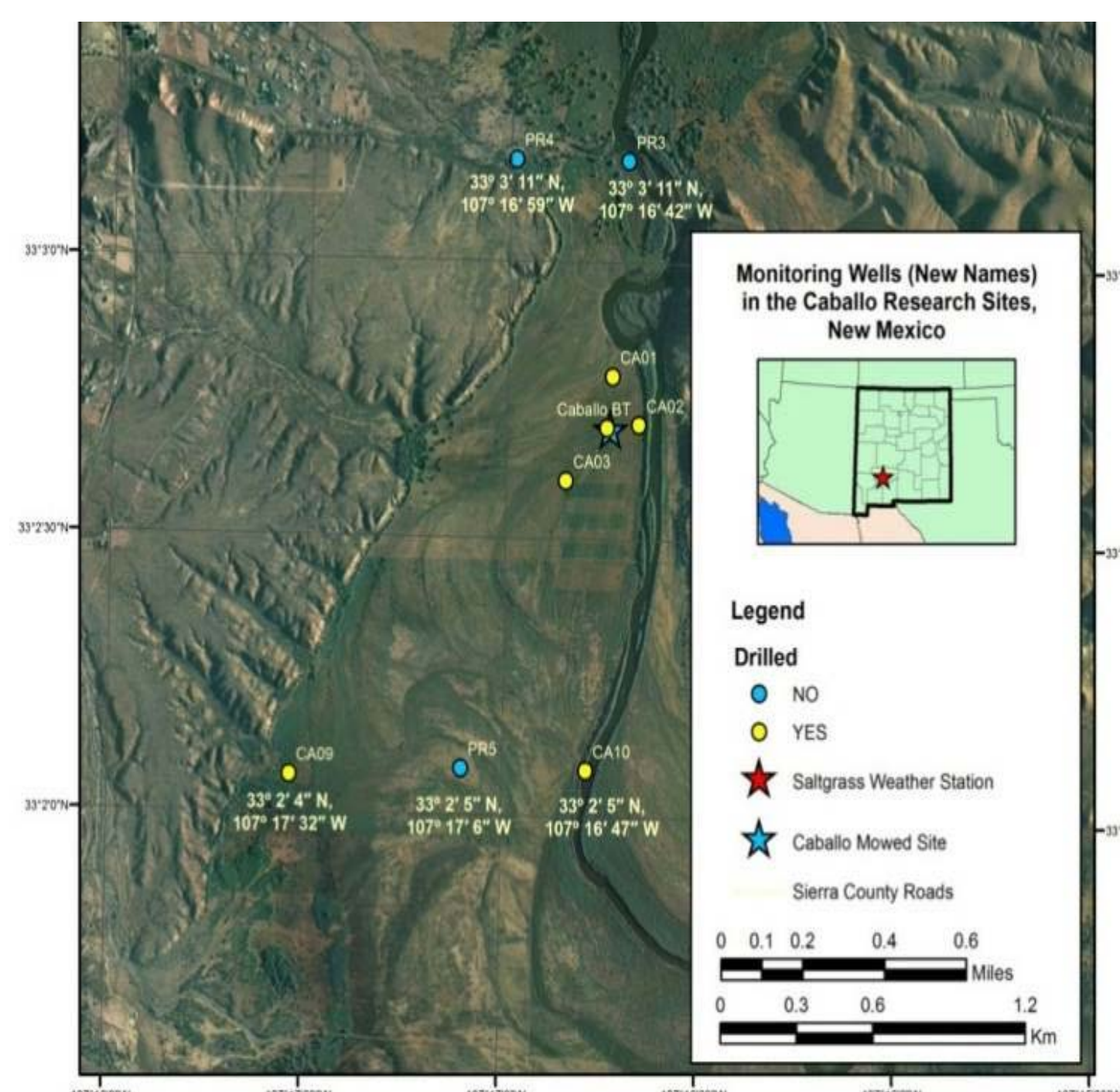


Figure 2. Piezometer locations



Figure 3. Water quality sampling

## Results

The following results were obtained:

- ET for 29 days (6/20/2012 to 7/19/2012) was 150 mm
- Depth to water table average was 1.8m
- Total dissolved solids (TDS) is shown in Figure 4.
- Volumetric moisture content is shown in Figure 5.
- Groundwater TDS is shown in Figure 6.
- Saltcedar grew from 30 cm to 183 cm shown in Figure 7.

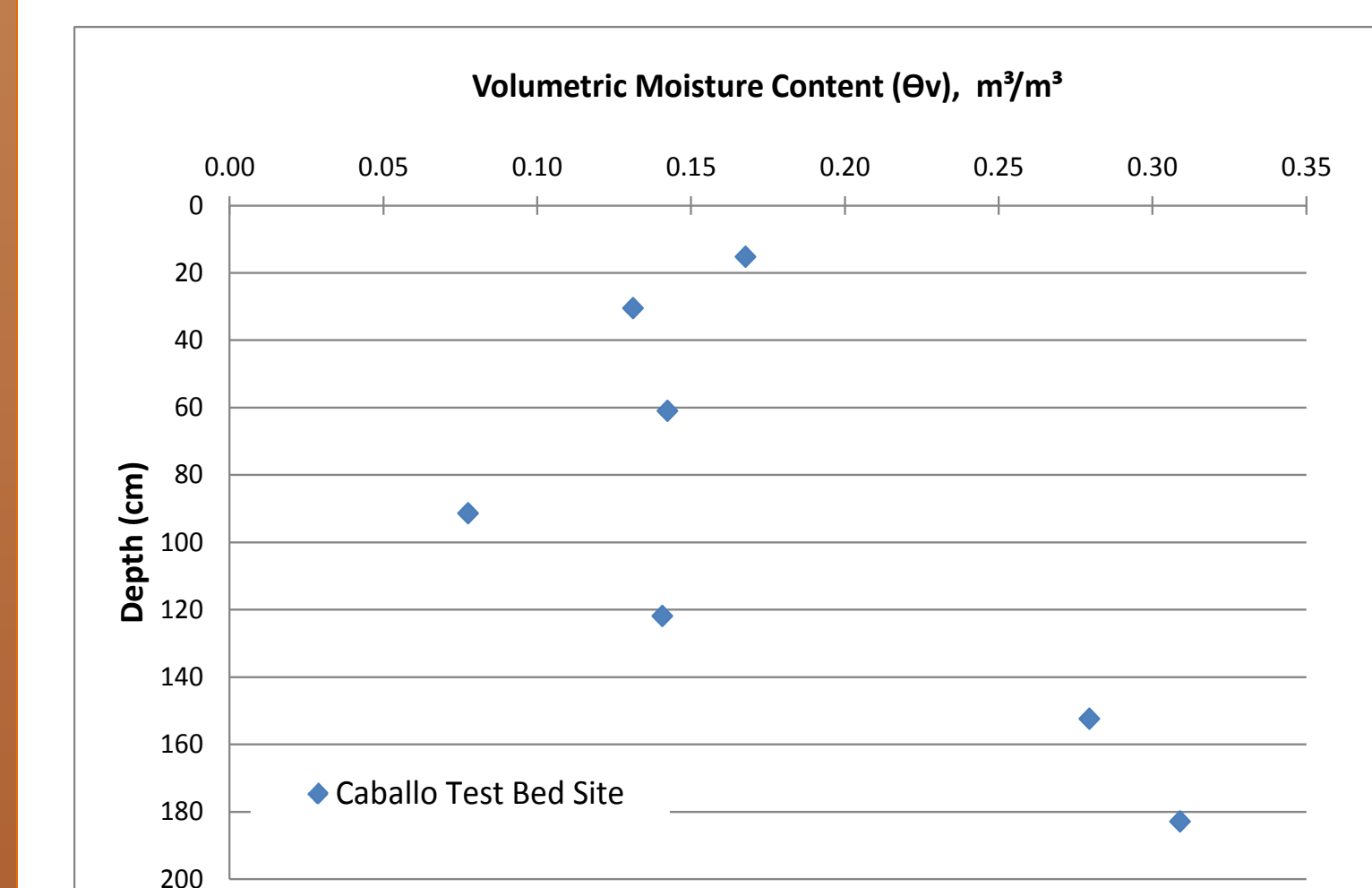
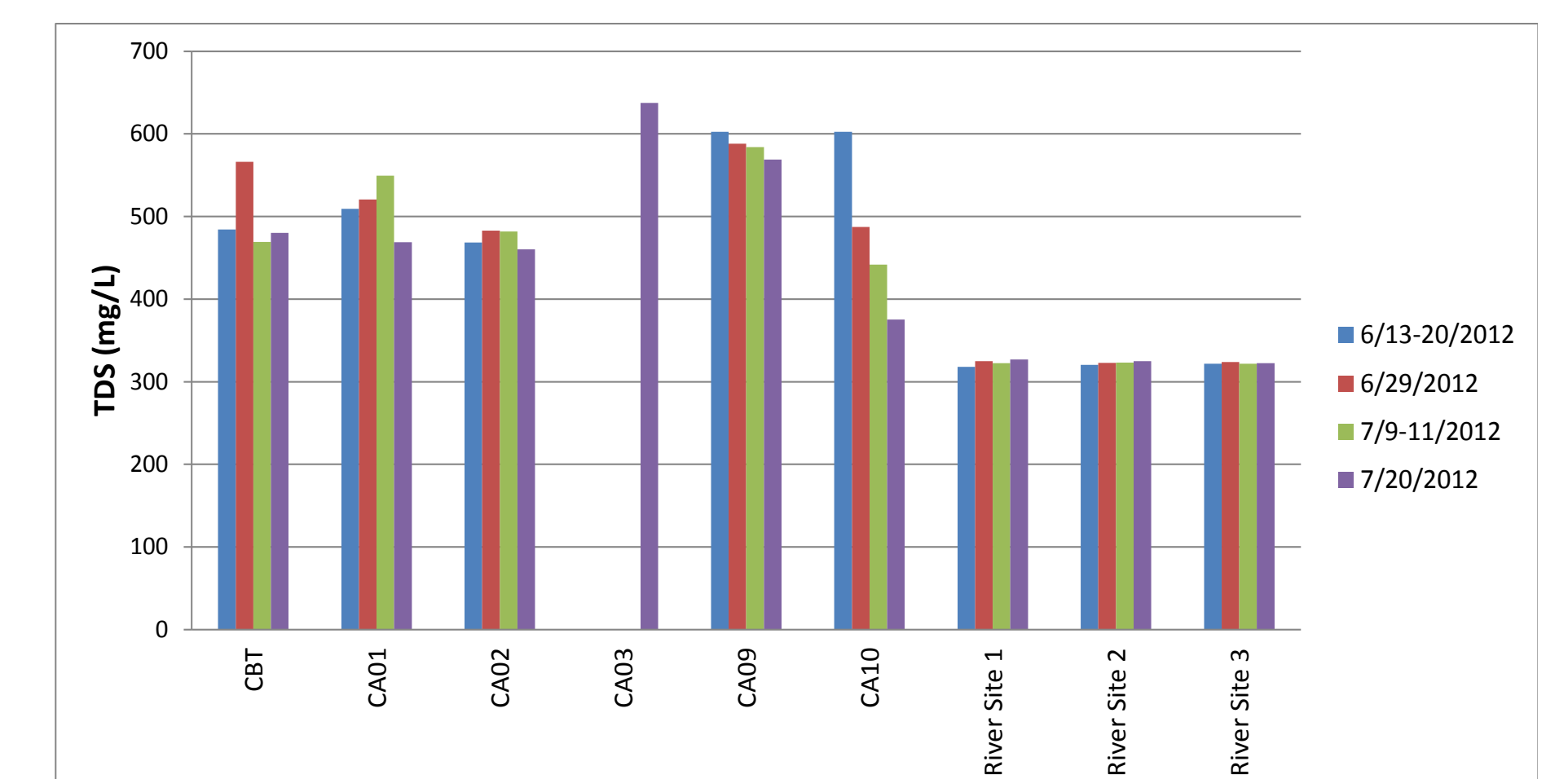


Figure 5. Volumetric moisture content

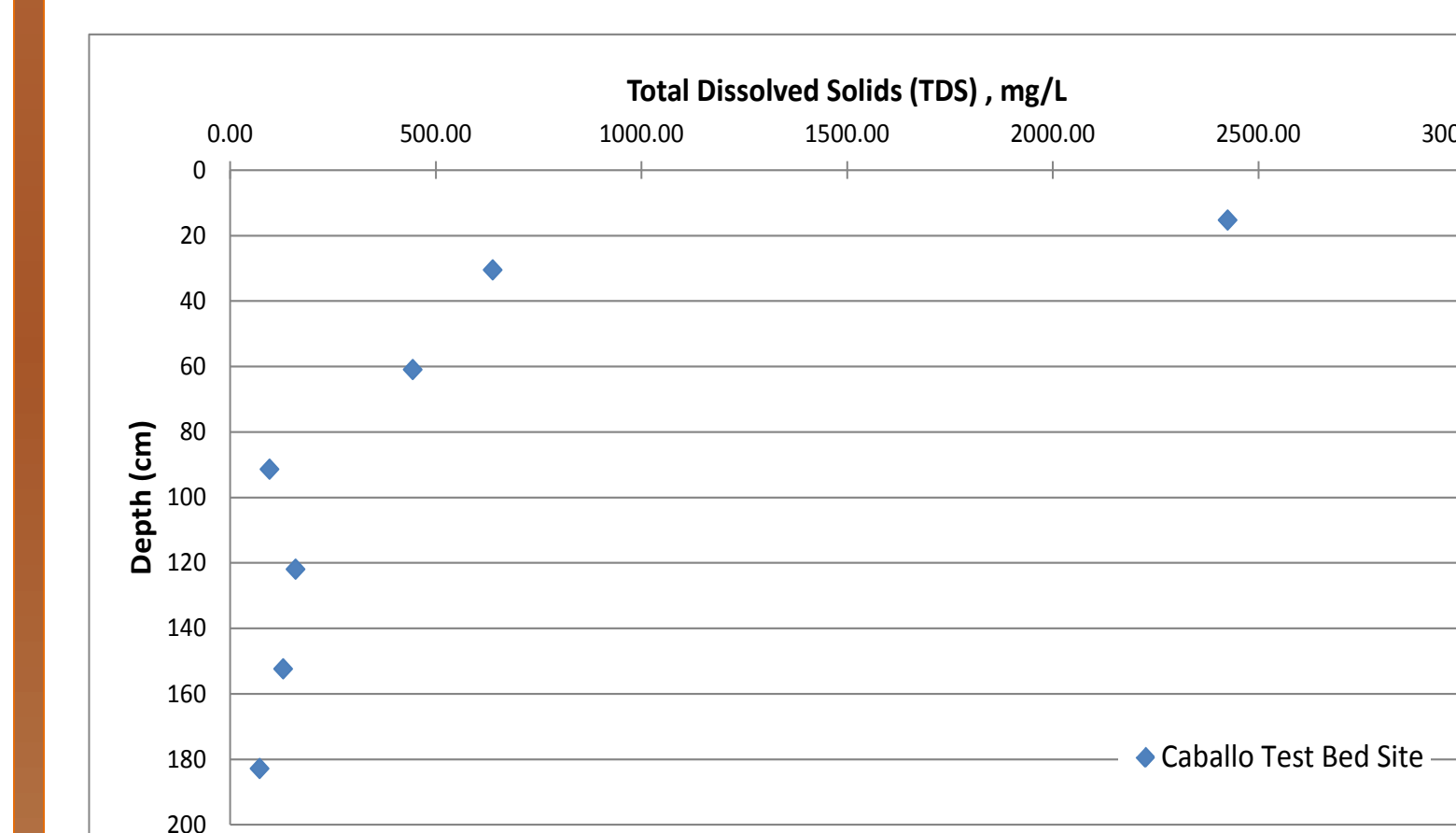


Figure 6. (Top) Groundwater TDS

Date	Plant Height	Saltcedar Picture
8/22/2011	30 cm (1 ft)	
6/20/2012	149 cm (4.9 ft)	
7/09/2012	162 cm (5.3 ft)	
7/20/2012	189 cm (6.2 ft)	

Figure 7. Saltcedar growth

## Conclusion

Saltcedar grew vigorously from 30 cm to 189 cm during the study period (April-July 2012). ET of 150 mm was measured for 29 days during the peak of the season. The results presented are preliminary. This study is still in progress and further results will be presented in the future.

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