

# OCCURRENCE AND SEVERITY OF SUSPENDED SEDIMENT LOADING IN THE CARICOOS REGION UTILIZING SATELLITE-BORNE MERIS IMAGERY



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Sedimentation is one of the most pressing water quality issues in Puerto Rico's (PR) coastal region and represents a particular threat to coastal benthic communities

- Studies indicate that corals may be lethally affected by total suspended sediment concentration (TSS) above 10 mg l<sup>-1</sup> and deposition rates greater than 10 mg cm<sup>-2</sup> day<sup>-1</sup> (Flores et al., 2012) as well as by chronic exposure to lower concentrations
- Sediment concentrations are typically linked to riverine discharge
- TSS are exacerbated by disturbances of drainage basins ( agriculture, deforestation, and urban development).

In this study, TSS were quantified at eleven stations around PR (Fig.1) using 215 Medium Resolution Imaging Spectrometer (MERIS) images at 300 m resolution collected from 2005 to 2009.

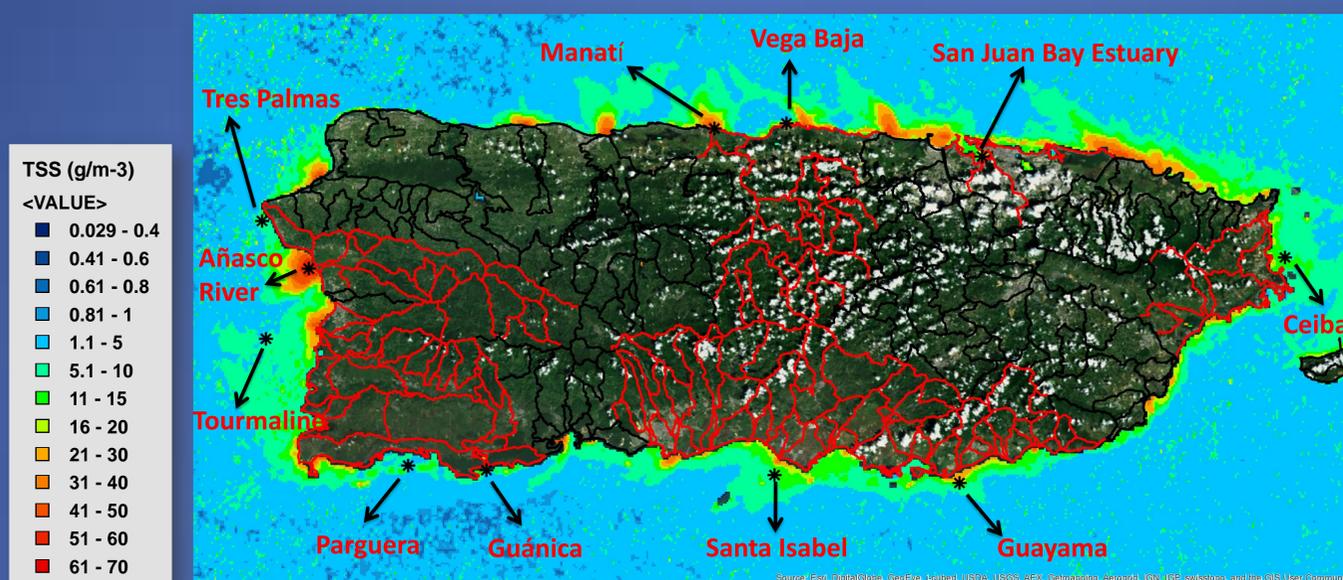


Figure 1. Selected stations around Puerto Rico. Image represents the maximum TSS between 2005 - 2009 and red lines indicate corresponding watersheds boundaries.

Suspended sediments were found at detectable concentrations at all stations. Evaluated sites were grouped into three classes: 1) not significant levels ( TSS less than 5 g/m<sup>-3</sup>), 2) near critical levels (TSS between 5 to 9.99 g/m<sup>-3</sup>) and 3) critical levels (TSS greater than 10 g/m<sup>-3</sup>) for coral reef (Fig.2).

**Not significant levels**

- Parguera
- Tres Palmas
- Tourmaline

**Near critical levels**

- Guánica
- Santa Isabel

**Critical levels**

- Ceiba
- Guayama
- Vega Baja
- Añasco River
- Manatí

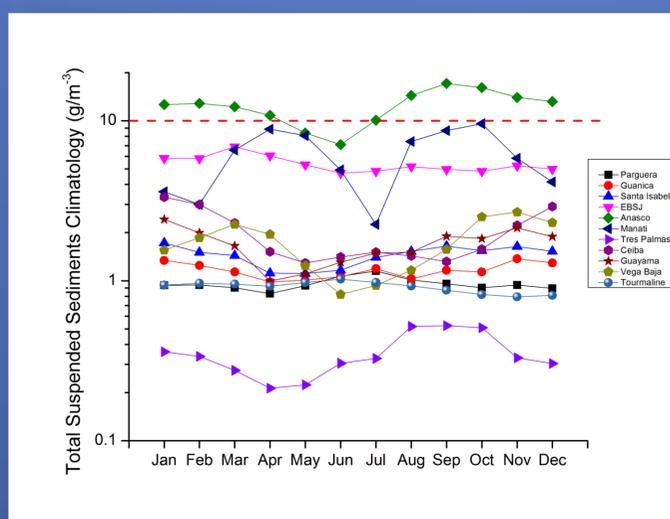


Figure 3. Stations TSS climatology (2005-2009).

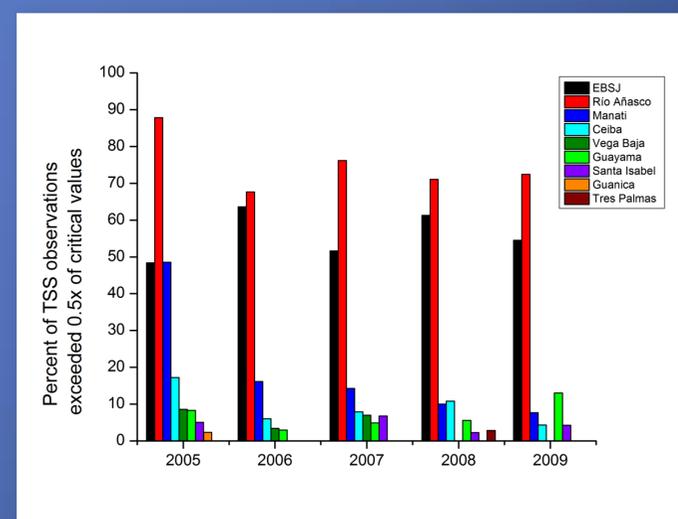


Figure 4. Percent of TSS observations from 2005 to 2009, exceeding 0.5X of the critical value.

Based on our initial evaluation, in order to safeguard sensitive tropical benthic communities, there is a need to improve or implement effective watershed management strategies and/or land conservation practices in the following areas:

- Coastal region impacted by the Añasco River plume - more than 50% of the observations exceeded critical TSS levels (Fig.3).
- Santa Isabel coastal area - near critical TSS levels were observed, therefore, extreme precipitation or disturbances of drainage basins caused by intense agricultural activity could increment TSS levels to critical.
- Vega Baja coastal area - approximately 10% of the observations during regular conditions showed TSS values considered near critical (Fig.4). *Acropora palmata* (Elkhorn coral), a threatened coral species, has been reported at this site.
- Guayama Reef – increments in near critical TSS levels were observed since 2006.

Other areas identified in our assessment as near critical TSS levels are being evaluated for near future recommendations

Figure 2. Sites classification by TSS concentration (2005 to 2009).