**Title** Spatiotemporal patterns of invasive Devilweed *Sargassum horneri* in beach-cast seaweed wrack on San Nicolas Island, California

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**Abstract**

**Intro**

**Methods**

We assessed the presence of Devilweed in the wrack at # sites on San Nicolas Island, California (SITES). To determine the relative contribution of Devilweed to beached wrack, we surveyed large wrack piles deposited on beaches and rocky shorelines measured the proportion of the wrack pile surface area Devilweed represented (as in DeSantiago et al. 2024). This qualitative metric of Devilweed prevalence allowed us to quickly and instructively sample large amounts of wrack at various sites along the coast. We selected all wrack piles (>1m length) we encountered along a haphazardly placed 50 m transect, identified the dominant seaweed species, and measured the surface area. To determine the surface area of wrack piles, we measured the depth at the center, the longest length, and width of the pile. These measurements were used to calculate the surface area of a half ellipsoid, using equation ######. For each Devilweed individual encountered on the surface of the pile, we measured its longest length and width to calculate the area using the equation for an ellipse (*A=πab*), where “a” and “b” are one half the length and width. For a single pile, we calculated the sum area of all Devilweed individuals and divided it by the surface area of the pile to estimate the proportion of wrack that consisted of Devilweed. Using this method, the relative contribution of Devilweed to wrack for a large pile could be estimated in minutes as opposed to hours (DeSantiago et al. 2024).

**Data Analysis**

**Results**

Wrack piles are more consistent in September at all sites. The highest wrack area was in May at tender beach. Tender continues to have the highest input of wrack fragments than other sites throughout most of the year. Highest fragmented seaweed occurs in December. More occurrences of s horneri fragments occur at red eye and tender in September. Mean fragment size seem to be centered around 32mm – 64 mm occurrences of s. horneri only really showing up in September. More S. horneri per unit time found in March and may, some found in December but none in September.

**Figures**

T**otal surface area of wrack piles larger than 1m in length by species by site per sampling trip**

**A graph with different colored squares

Description automatically generated**

**Total number of beached seaweed fragments found per 50m of beach by site per sampling tripA graph with different colored squares

Description automatically generated**

**A graph of different colored lines

Description automatically generated with medium confidence**

**A graph with different colored squares

Description automatically generated with medium confidence**

**Discussion**