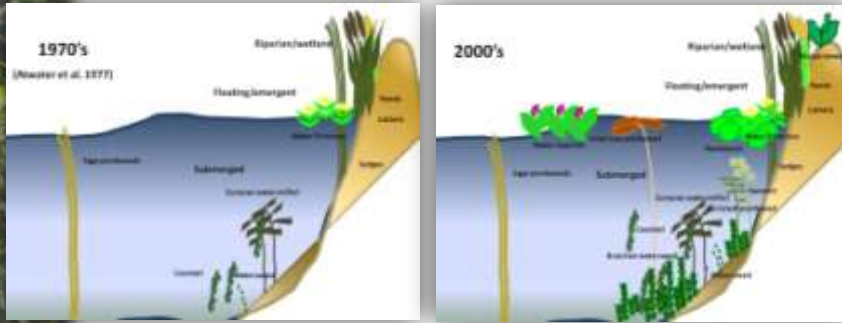


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The California Department of Boating and Waterways is the lead agency in the control of a major non-native invasive submersed plant – *Egeria densa*. CDBW acquired hyperspectral image over the Sacramento-San Joaquin river Delta from 2003 to 2008 to map and assess the dynamics of the invaded submersed plant community.



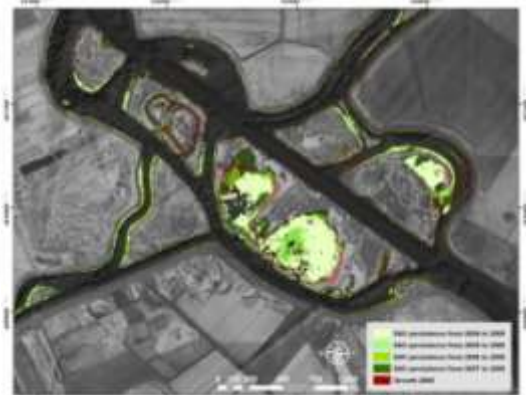
Changes in the Delta aquatic plant community

Since the 1970's there has been a massive invasion of the Delta brackish and fresh water with submersed, floating, emergent and riparian non-native plants. Synergistic effects of their presence have likely created a non-stable community.

Goal: Determine the distribution and dynamics of the submersed aquatic vegetation to guide management actions towards the maintenance of navigable waterways

We used image spectroscopy to produce yearly distribution maps of the submersed plant community and assess the dynamics of its spread and persistence. We considered persistence as the amount of vegetation that remained from year to year and spread as the yearly new growth.

Persistence



Persistence decreased with time in the system

Mean Reflectance All Species

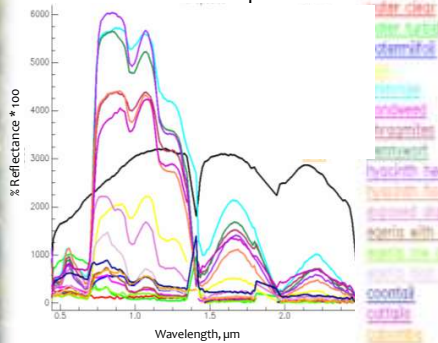
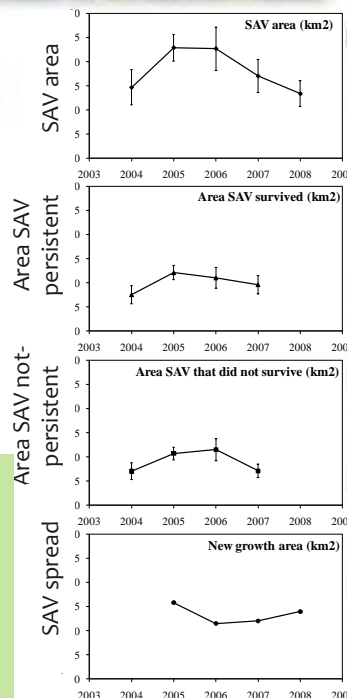


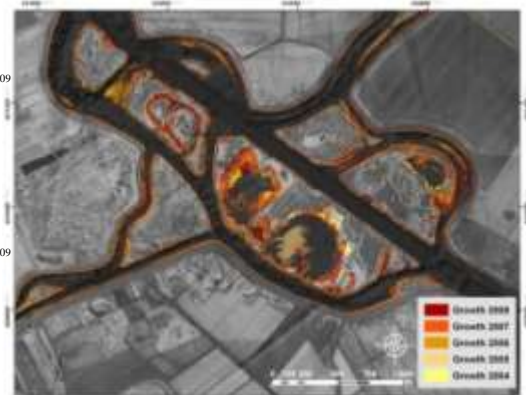
Image spectroscopy

Each plant and their constituents (chlorophyll, mesophyll, cellulose, etc.) interact differently with electromagnetic radiation from the sun, resulting in unique *spectral signatures*. Spectral measurements are quantities that can be used to detect mathematically species and communities distributions.



Changes in submersed aquatic vegetation area

Spread



New growth accounted for 40-60% of the yearly distribution