



DOCUMENTING 150 YEARS OF COASTAL CHANGE: REVISITING THE WORK OF AMATEUR PHYCOLOGIST ELIZA M. FRENCH

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Introduction

Any effort to understand ecological change in coastal habitats must begin with a record of what has previously existed in that given location. Macroalgal diversity and abundance patterns were documented by the amateur phycologist Eliza M. French along the coast of New London, Connecticut during the 1850s and 1880s. As revealed in her books of annotated pressed algal specimens, French highlighted changes in the algal assemblage during her thirty years of work at several sites. For example, she noted during the 1880s that species such as *Polysiphonia variegata* (now *Polysiphonia denudata*) and *Dasya elegans* (now *Dasya baillouviana*) were "not so common as formerly here," a trend that might be a reflection of the industrialization of New London during her lifetime. In this study, French's collecting sites are revisited to reveal patterns of change in this assemblage in the intervening 150 years.

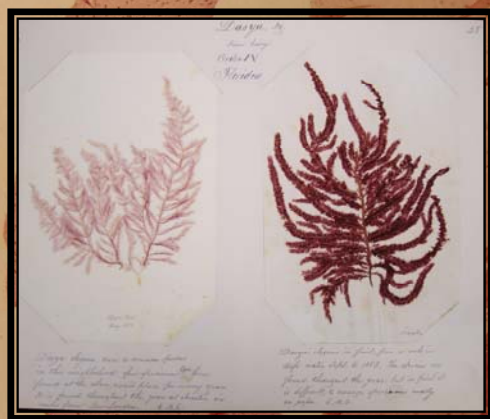


Figure 1. Two specimens of *Dasya baillouviana* collected by French in 1851 and 1883. It is noted that in 1883 the species is less common in New London than it was in 1851. The population density stayed consistent in Niantic, CT, six miles away (French, 1885).

Eliza M. French

French began to collect and press specimens of marine algae in 1849, at the age of forty-one (French, 1851). She was living in New London at the time and did much of her work in that area. The specimens she collected were carefully pressed until dry, and then compiled in bound books. These specimens are in excellent condition and can still be used for genetic analysis. Under almost all of the specimens French notes the species name and the date and location of its collection. This type of book was not unprecedented (Harvey, 1852). Such books were often sold as novelties or curiosities to locals and tourists at seaside towns. French produced hundreds of these books, one of which was purchased and inscribed by the entertainer P. T. Barnum. Some, but not all, of the books she produced went beyond these decorative purposes (French, 1851; Gage, 1885). At least two of the books have detailed information about the species, their reproductive habits, and localized notes on growth and distribution.

Collecting Sites

Historic maps of New London from the 1850's and 1880's were used to locate the collecting sites French noted in her books. This was critical because many of the landmarks she used to name her sites no longer exist in 2009. In these cases the historic maps were compared to modern maps in order to locate current sites which most closely approximate the locations of French's collections.



Figure 2. An 1850 map of New London harbor. The arrow points to the original French's Wharf collecting site that Eliza French frequented (Sidney 1850).

Figure 3. A 2009 satellite image of New London harbor. The arrow points to where the French's Wharf site used to be. South Water Street runs along what in 1850 was the water's edge. (maps.google.com)



Methods

The methods used to collect algae were designed to simulate French's techniques as accurately as possible. In some cases she wrote of specimens found washed up on shore or adrift at certain locations. When not noted specifically, assumptions were made about the probable collecting methods French used during the 19th century. Most collecting was done only of specimens that were accessible from shore or by wading into shallow water at low tide. French's identifications were updated and verified using Algaebase.org.

Table 1. Example of species occurrences in the 1850's, 1880's, and 2009 (early spring) collections at several of French's sites.

Location	Species	1850's	1880's	2009
Fort Trumbull	<i>Porphyra laciniata</i>	x		
New London Harbor	<i>Chondrus crispus</i>	x		x
	<i>Coccolithus truncatus</i>		x	
Thames River	<i>Acrocephalia arcta</i>	x		x
	<i>Polysiphonia fascioides</i>	x		x
	<i>Porphyra laciniata</i>	x		
	<i>Punctaria latifolia</i>	x		
	<i>Polysiphonia stricta</i>	x		
Osprey Beach	<i>Callithamnion corymbosum</i>		x	
	<i>Polysiphonia</i> sp.		x	

Results and Discussion

In this study, French's collecting sites are revisited to reveal patterns of change in this assemblage in the intervening 150 years. While the perennial brown (e.g. *Fucus vesiculosus*, *Ascophyllum nodosum*) and red (*Chondrus crispus*) species remain the dominants at her collecting sites, we noted some differences in late winter (March) and early spring collections. For example, *Neosiphonia harveyi*, only noted in French's summer collections, was collected during March, suggesting a warming trend in the river. In contrast, *Callithamnion corymbosum* was absent from our winter survey but listed among French's records as a common drift specimen. Of the eight species specifically noted by French as having been collected in the early spring months, only three were found to still exist in 2009 where they were originally found.

Summer collecting trips to French's sites are planned as that was the time of year when French did the majority of her collecting. Further work will reveal any patterns there may be with regard to changes in seasonality and the loss or gain of species diversity in the New London area. French's careful records of collections in the mid- and late-1800s offer a unique baseline to highlight long-term changes in coastal algal assemblages, some that might be linked to human-induced effects.

Acknowledgements

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