

An Illustrated Field Guide for the Local Flora and Fauna of the Long Island Sound (Greater New Haven Region)

by

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Abstract

Many of the marine-based educators around Long Island Sound only have access to huge textbook-sized keys that are too heavy and cumbersome to bring out into the field and also run the risk of getting ruined. The objective of this project was to create an accurate, up-to-date, waterproof, inexpensive and easily utilizable field identification guide for some of the most commonly-encountered plants and animals within the Long Island Sound estuary. Field collections of plants and animals were undertaken throughout the late spring-early summer. All collected organisms were brought into the laboratory where they were photographed. Organisms were then placed in seawater and a series of pencil sketches were made of each organism. All organisms were identified down to species level using existing hardbound species identification keys. The sketches were reviewed and approved by scientific experts; after approval, the sketches were inked, scanned into a computer, and put into the final key layout. The keys were color-coded according to higher-order groupings, printed, and laminated for use in the field.

Introduction

Most scientific illustrations are used in written publications such as journal articles, grade school to college level textbooks, and identification keys (Hodges, 1989; Ridgway 1938). Identification keys, in particular, are very important in the biological sciences since they provide a tangible reference that helps in classifying collected specimens. Accurately illustrated guides provide a way to rapidly identify specimens, in both scientific and educational field work, allotting more time for the work at hand. An illustrated field guide can also provide students with a way to familiarize themselves with the most common organisms found in a particular area. However, most of these keys are printed in book form, usually with a large amount of pages; therefore they are often unwieldy, both physically and mentally, for field use.

Currently, many of the marine-based college-level educators around Long Island Sound, only have access to textbook-sized dichotomous keys that are too heavy and cumbersome to take into the field. These keys also run the risk of getting ruined by water and mud when brought out into the field and are very costly to replace. The objective of this project was to create an inexpensive and waterproof, scientifically accurate field guide that is easy to use.

Methods and Materials

Live specimens were collected in the field and brought back to lab where they served as

reference models for the illustrations. Specimens were collected from three different local areas: Bradley Point Park (West Haven, CT), Long Wharf Nature Preserve (New Haven, CT), and Banca Marsh (Branford, CT). Macroalgal specimens were floated in seawater in a white tray during the sketching process to get an accurate representation of how they look in the field. Additionally, close-up photographs of specialized structures served as additional source material for the sketches. All collected animals were brought to the lab and placed within deep bowls where they were photographed. These photographs then served as the primary reference material for the animal sketches.

All illustrations were initially sketched out on paper using pencil then finished off with felt-tipped pens after being reviewed by scientists for scientific accuracy. Appropriate labels and scales were affixed to each illustration. The basic information for each species was gathered from reference books and observations, written out, and placed next to its respective illustration. Finished illustrations were scanned into a computer and placed into position within the key's layout. The layout of the key was planned according to the nature of the specimen. For example, algae belong to one of three main groups – Red, Brown, or Green. Thus, the algae section of the key was color-coded accordingly. Microsoft Powerpoint program was used for

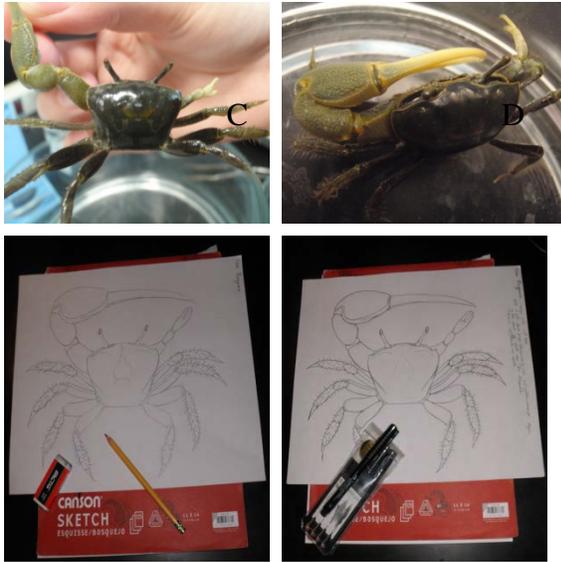


Figure 1: Animals, from reference photographs (top) to pencil sketches (bottom left) to finished inked illustration (bottom right)

the layout of each page. After all the pages were finished the key was printed out and laminated making it waterproof and appropriate for field usage.

Results

This project yielded a small, scientifically accurate, water proof field guide of common local macroalgae and marine invertebrates (Figure 2). The



Figure 2: Finished Guide

species included in the guide are

Macroalgae: *Chondrus crispus*, *Acrothrix gracillis*, *Ascophyllum nodosum* (Figure 3a), *Fucus distichus*, *Fucus spiralis*, *Fucus vesiculosus* (Figure 3b), *Ulva lactuca*, *Enteromorpha intestinalis* (now *Ulva intestinalis*), and *Codium fragile* (Figure 4).

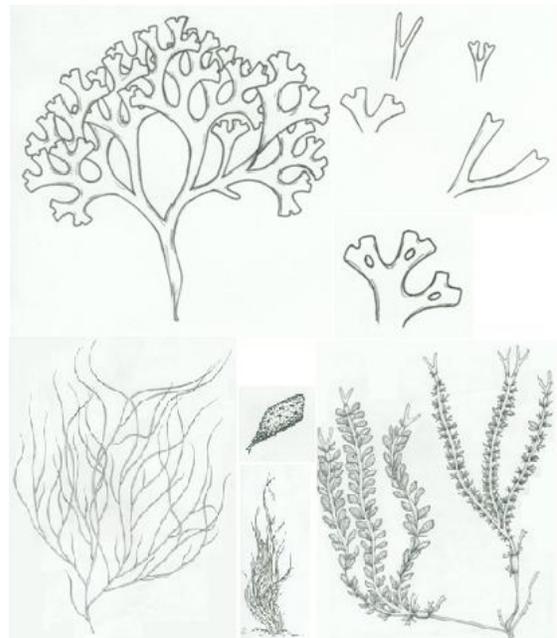


Figure 3a: *Chondrus crispus*, *Acrothrix gracillis*, *Ascophyllum nodosum*

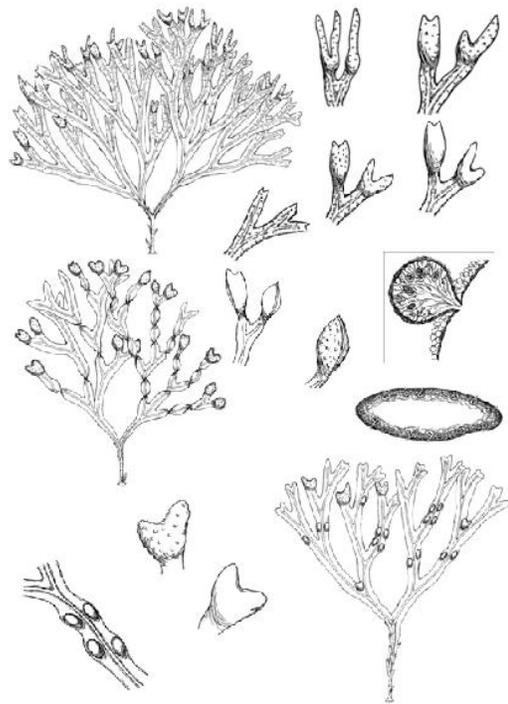


Figure 3b: *Fucus distichus*, *Fucus spiralis*, *Fucus vesiculosus*

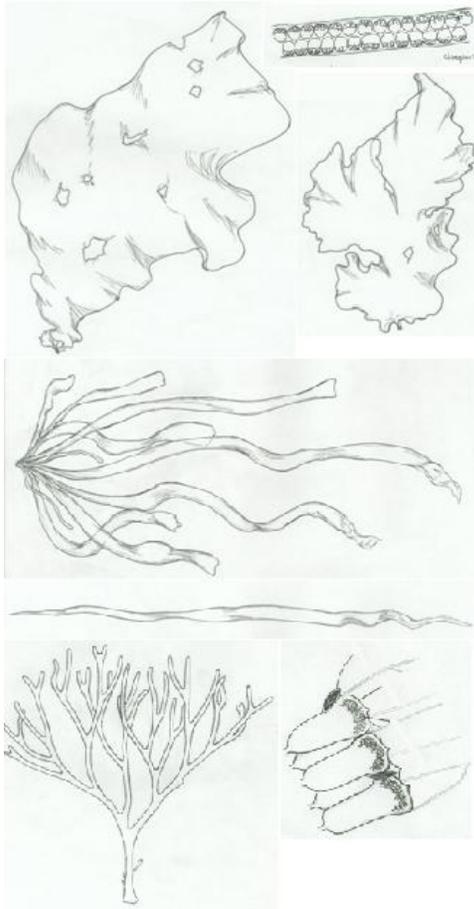


Figure 4. *Ulva lactuca*, *Ulva intestinalis* and *Codium fragile*

Invertebrates:

Crabs: *Uca spp.*, *Hemigrapsus sanguineus*, *Panopeus herbstii*, and *Dyspanopeus sayi* (Figure 5).

Bivalves: *Mercenaria mercenaria*, *Geukensia demissa*, *Crassostrea virginica* (Figure 6 on next page).

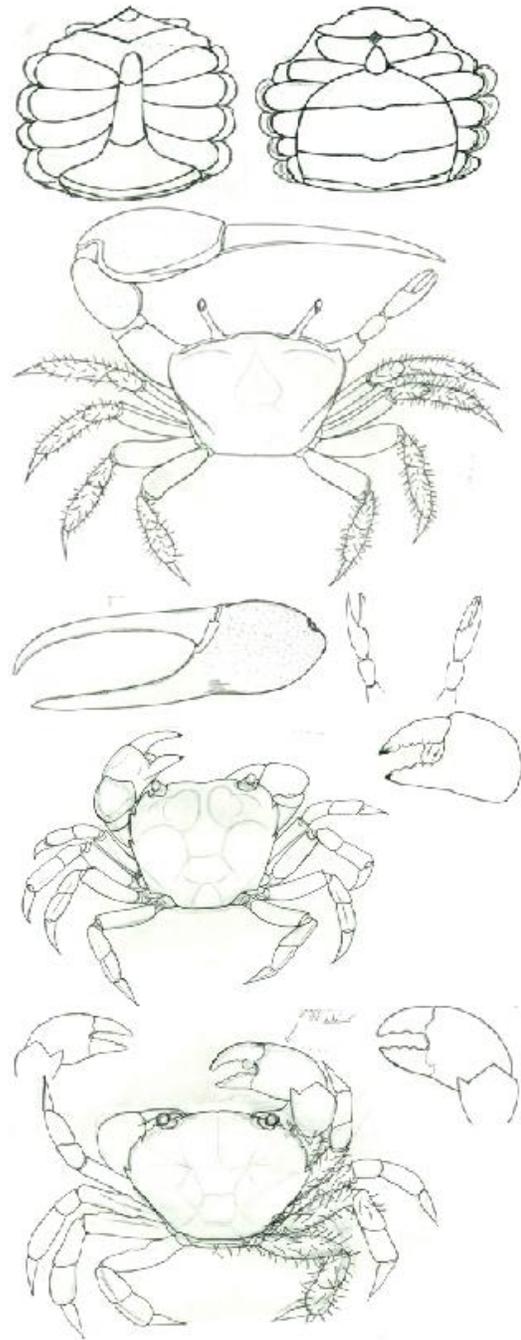


Figure 5: *Uca spp.*, *Hemigrapsus sanguineus*, *Panopeus herbstii*, and *Dyspanopeus sayi*

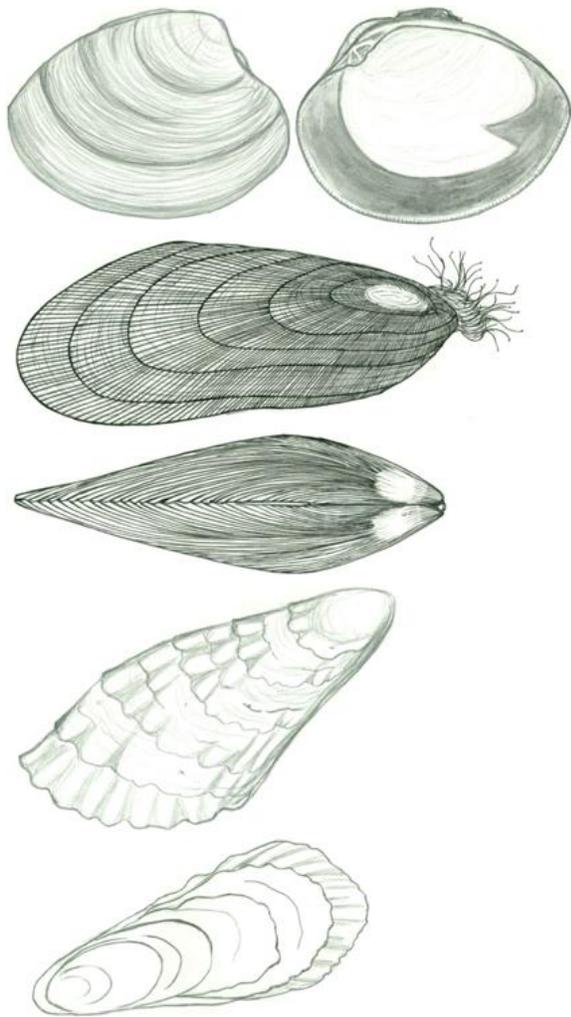


Figure 6: Bivalve Illustrations *Mercenaria mercenaria*, *Geukensia demissa*, *Crassostrea virginica*

Discussion and Conclusions

The field guide produced by this project can easily be used by both college level students, such as those in UNH's Marine Biology program and Fairfield University's Marine Biology class, as well as by high school level students, such as those at the Sound School, to familiarize themselves with some of the most common species of Long Island Sound. Scientists can also use it as a quick reference guide while out in the field. It can also be modified to be more suitable for middle and elementary school education.

This study has proven the feasibility of producing a local field-ready reference guide for Long Island Sound organisms. To that end, this project is presently being expanded into a larger set of field guides that will include the majority of floral

and faunal species found within the Western and Central basins of Long Island.

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References

- Hodges, E. R., 1989. Scientific Illustration: A working Relationship Between the Scientist and Artist, *Bioscience*, Vol 39 (2), 104-111.
- Ridgway, J. L., Scientific Illustration, Stanford University Press, 1938.
- Weiss, H. M., Marine Animals of Southern New England and New York, State Geological and Natural History Survey of Connecticut, Hartford, 1995.
- Van Patten, M., Seaweeds of Long Island Sound, Connecticut Sea Grant College Program, Groton, 2006.



Christina Machinski is a senior working towards graduating in May of 2013 with a B. S. in Marine Biology. She plans to pursue a career in scientific illustration. This project has given her a great piece to put in her portfolio.