

Field Guides that Focus on Long Island's Natural Environment

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Summary

The Museum of Long Island Natural Sciences, in partnership with the Mineral Physics Institute and the Center for High Pressure Research, has published three field guides to Long Island's natural environment. These booklets include background information, diagrams, illustrations and species descriptions, making them appropriate for use as formal educational tools and as identification guides. The Museum, in partnership with the Earth Science Educational Resource Center, offers educational workshops designed to promote the use of these guides in elementary and middle schools. The field guides were, in part, published with funding provided by the National Science Foundation in support of the education and outreach program of the Center for High Pressure Research.

Educational Use of the Field Guides

In order to form effective conceptual models of natural systems and the processes that apply to them, students are best served by engaging in activities that take them beyond rote memorizations of static content. They need to experience science as a process of discovery rather than as a collection of pre-packaged factual material. For this type of activity, the local natural environment can serve as a vast and diverse inquiry-based learning laboratory that is easily accessible to educators and students.

The publications and a summary of their contents are listed in tables 1, 2 and 3 (Springer-Rushia et al., 1996; Stewart et al., 1998; Richard et al., 2001). The beginning portion of each guide consists of background material, including ecological and geological information. Following these narrative sections are species descriptions with illustrations. A glossary of scientific terms follows the descriptions.

The background material presented in the narrative sections of the field guides is designed to present unifying concepts that create a context for inquiry-based learning. These concepts are reinforced through diagrams that illustrate spatial, temporal and phenomenological relationships. Figure 1 consists one of the diagrams that accompanies the background information on salt marshes from *A Field Guide to Long Island's Seashore*. The salt marsh diagram places vegetation zonation, tide levels and strata in a structured spatial and temporal context that helps students learn about sedimentological concepts, such as the Law of Superposition and Walther's law. It can also facilitate

understanding of the distribution of sediment in the salt marsh by tides as well as the relationship between physical geography and the distribution of biological species. However, in order to lend these concepts real meaning, educators need to have their students engage in inquiry-based activities in the field that provide them opportunities to test these concepts and to use them to discover new knowledge.

In figure 2, a group of teachers is using a peat auger to investigate the stratigraphy of the Flax Pond salt marsh. Figure 3 shows a sample of salt water peat collected using the auger. The data collected in this type of study can be used to test one of the hypothesis implied by figure 1, which is that a certain sequence of strata underlies Flax Pond and that a particular series of events occurred in the geologic history of the marsh..

Studies can also be directed toward investigating the relationships of vegetation to tidal datum levels. In order to conduct such a study, investigators must have access to material that aids in identification of plant species. Figure 4 contains a sampling of some of the vegetation species illustrations from *A Field Guide to Long Island's Seashore*.

The local natural environment also provides opportunities for studying dynamic phenomena such as food web relationships. Figure 5 consists of a food web diagram from the seashore guide. Students can easily study the behavior of birds in order to learn what they eat, and they can use this data to draw diagrams of their own. With a bit of additional patience and guidance, they can also study food web relationships of other organisms. Figures 6, 7 and 8 consist of sample illustrations of animal species from the seashore guide.

Catalogued reference collections of specimens of natural objects can serve as teaching tools that accompany the use of the field guides. In fact, students can learn a great deal about the natural environment by creating their own collections during their research projects. Collecting of live material may require permits and could damage the environment, but an interesting collection of shells can be assembled without harm to live organisms.

The *Field Guide to Long Island's Woodlands* and the *Field Guide to Long Island's Freshwater Wetlands* also contain background information, diagrams and illustrations that can support inquiry-based investigations of the natural environment. With the set of all three field guides, teachers have a wide choice of subjects on which to base student research projects.

Table 1. *A Field Guide to Long Island's Woodlands*

Publication Date	Authors	Listing of Contents
1996	Linda Springer-Rushia Pamela G. Stewart Illustrations: Maria T. Weisenberg	Introduction <ul style="list-style-type: none"> • Forest Origins • Geologic History • Soils

- Soil Moisture
- Climate
- Animal Interaction
- Human Interaction
- Fires
- Succession
- Ecotones
- Forest Stratification

Forest Types

- Oak-dominated Woodlands
- Pine Barrens
- Maritime Forests
- Swamp Forests

Plant Species

- Trees
- Shrubs, Wildflowers and Vines
- Ferns
- Clubmosses
- Saprophytic Plants
- Fungi
- Lichens

Animal Species

- Mammals
- Birds
- Reptiles
- Amphibians
- Invertebrates

Glossary

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Table 2. *A Field Guide to Long Island's Freshwater Wetlands*

Publication Date	Authors	Listing of Contents
1998	Pamela G. Stewart Linda Springer-Rushia Illustrations: Maria T. Weisenberg	Introduction

Introduction: Glenn A. Richard

Plant Species

- Trees
- Shrubs and Wildflowers
- Sedges and Grasses
- Ferns
- Horsetails, Bryophytes, Clubmosses
- Parasitic Plants and Fungi

Animal Species

- Vertebrates
 - Mammals
 - Birds
 - Reptiles
 - Amphibians
 - Fish
- Invertebrates
 - Arthropods
 - Flatworms
 - Mollusks

Glossary

Additional Sources of Information

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Table 3. *A Field Guide to Long Island's Seashore*

Publication Date	Authors	Listing of Contents
		Introduction
		Coastline Geology
2001	Glenn A. Richard Linda Springer-Rushia Pamela G. Stewart Illustrations: Maria T. Weisenberg	Seashore Ecology
		Human Interaction
		Plant Species
		<ul style="list-style-type: none">• Trees• Shrubs and Wildflowers

- Aquatic Marine Plants
- Grasses
- Rushes
- Seaweeds

Animal Species

- Invertebrates
 - Sponges, Coelenterates
 - Ctenophores, Bryozoans, Annelids
 - Mollusks
 - Pelecypods
 - Gastropods
 - Echinoderms
 - Arthropods
- Vertebrates
 - Fish
 - Reptiles
 - Birds
 - Mammals

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Idealized Cross Section of a Long Island Salt Marsh

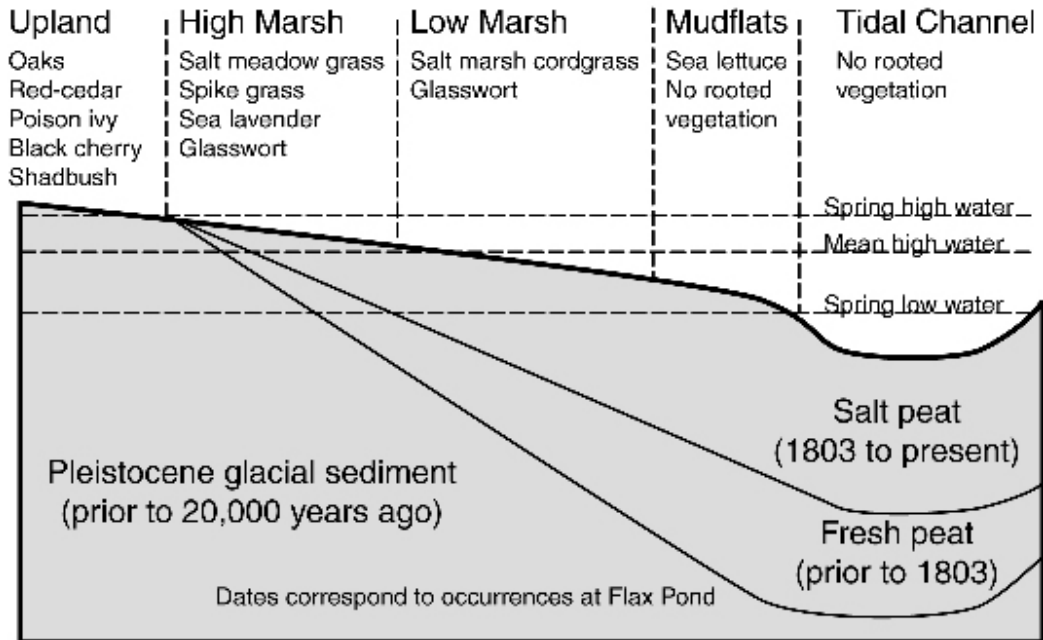


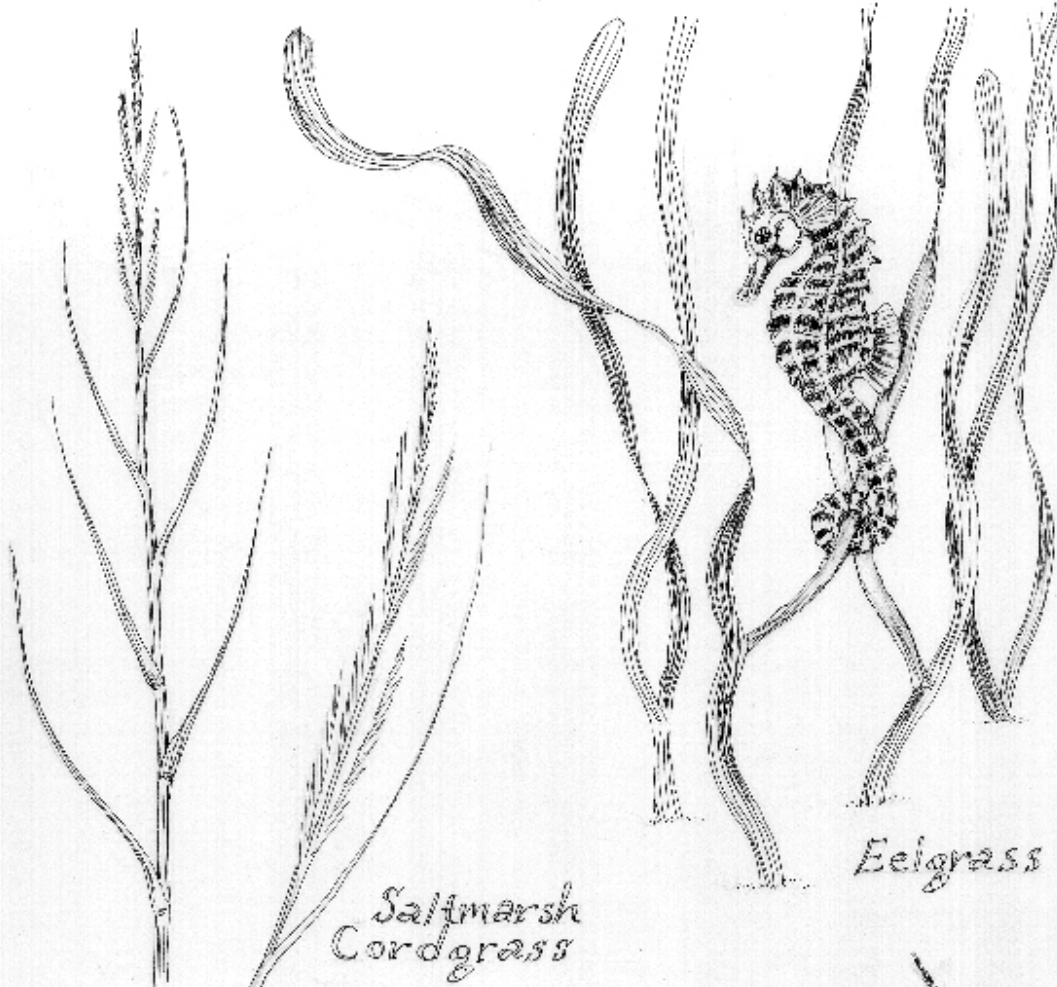
Figure 1. Salt marsh cross section from from *A Field Guide to Long Island's Seashore*



Figure 2. Teachers using a peat auger to collect sediment in a study of salt marsh stratigraphy

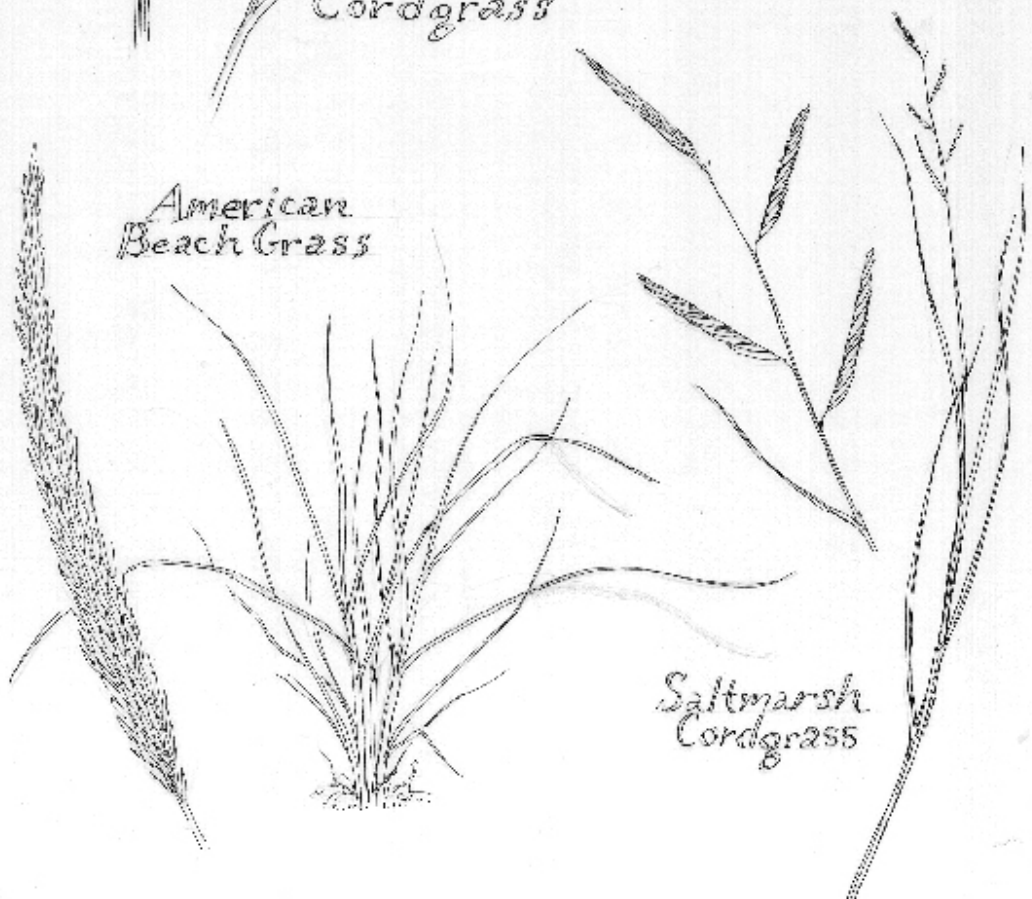


Figure 3. A sample of salt marsh sediment collected using a peat auger



*Saltmarsh
Cordgrass*

Eelgrass



*American
Beach Grass*

*Saltmarsh
Cordgrass*

Figure 4. Illustrations of salt marsh plant species from *A Field Guide to Long Island's Seashore*

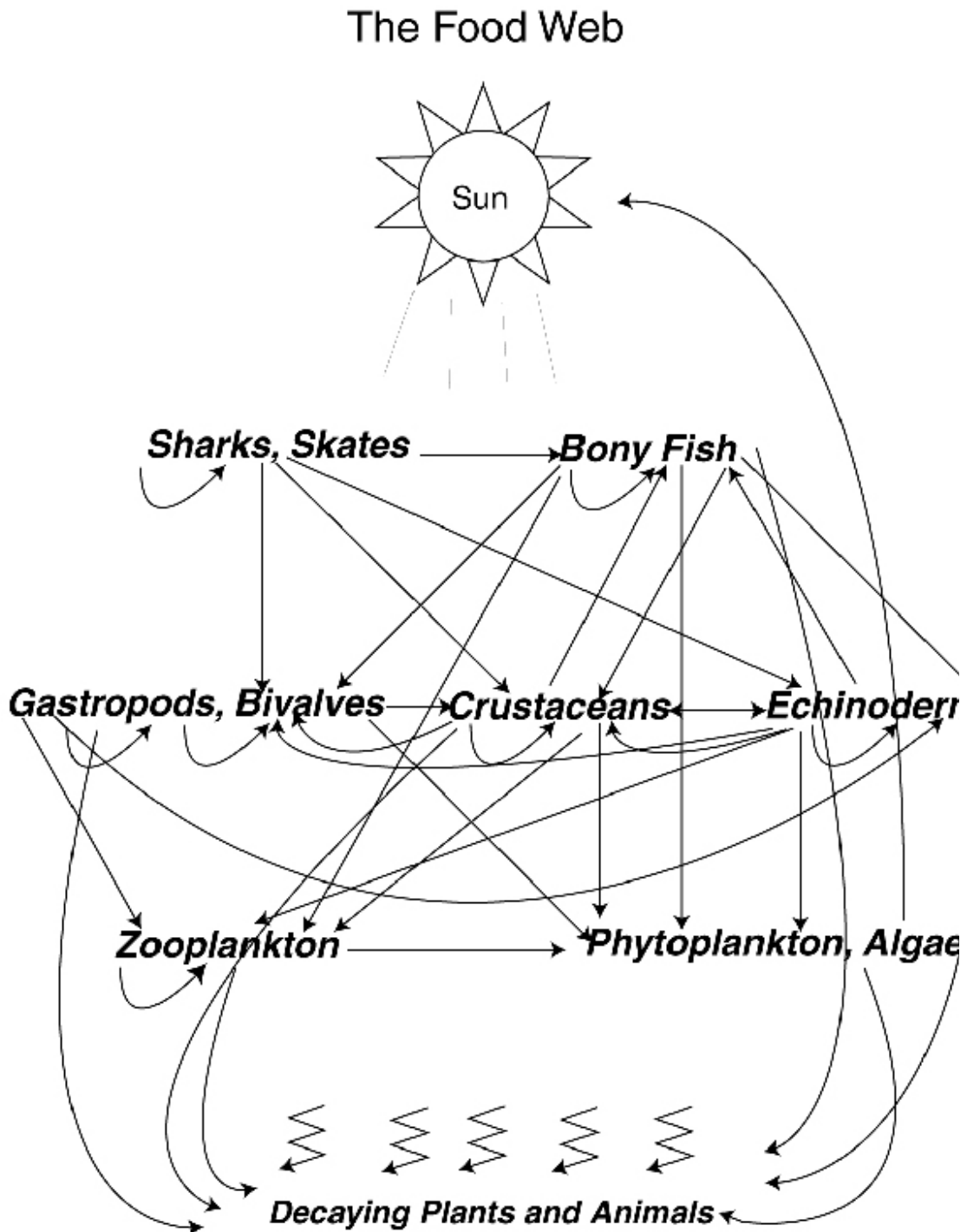
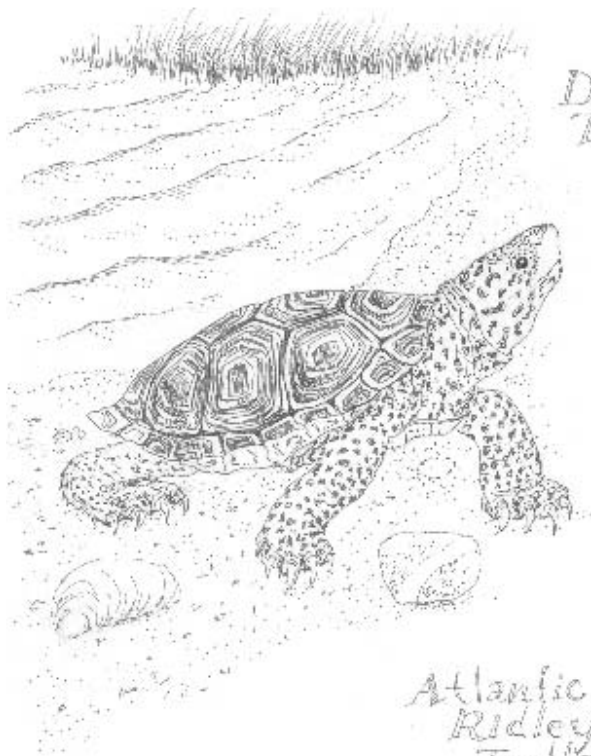
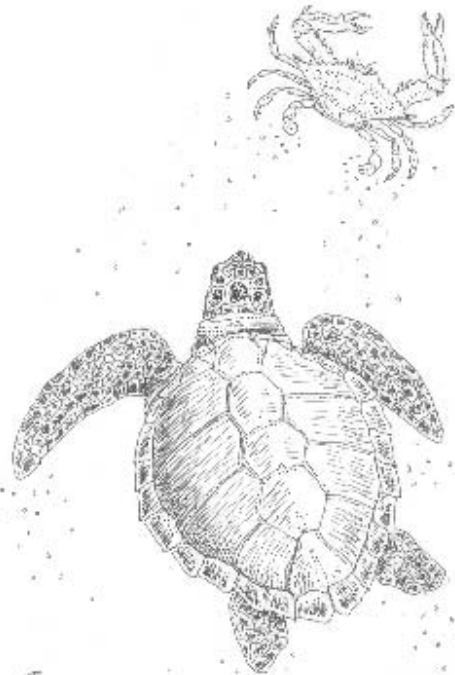


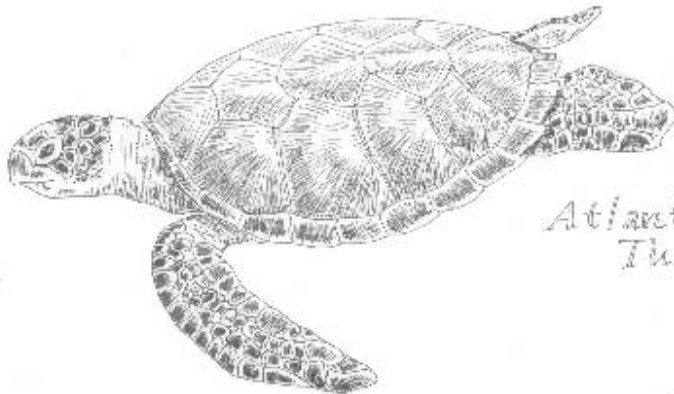
Figure 5. Food web diagram from *A Field Guide to Long Island's Seashore*



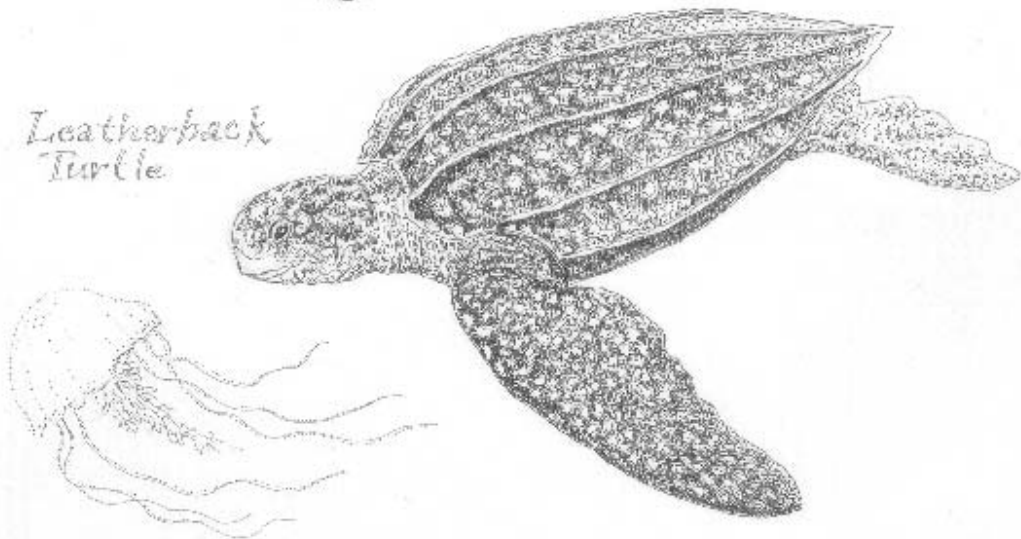
*Diamondback
Terrapin*



*Atlantic
Ridley
Turtle*



*Atlantic Green
Turtle*



*Leatherback
Turtle*

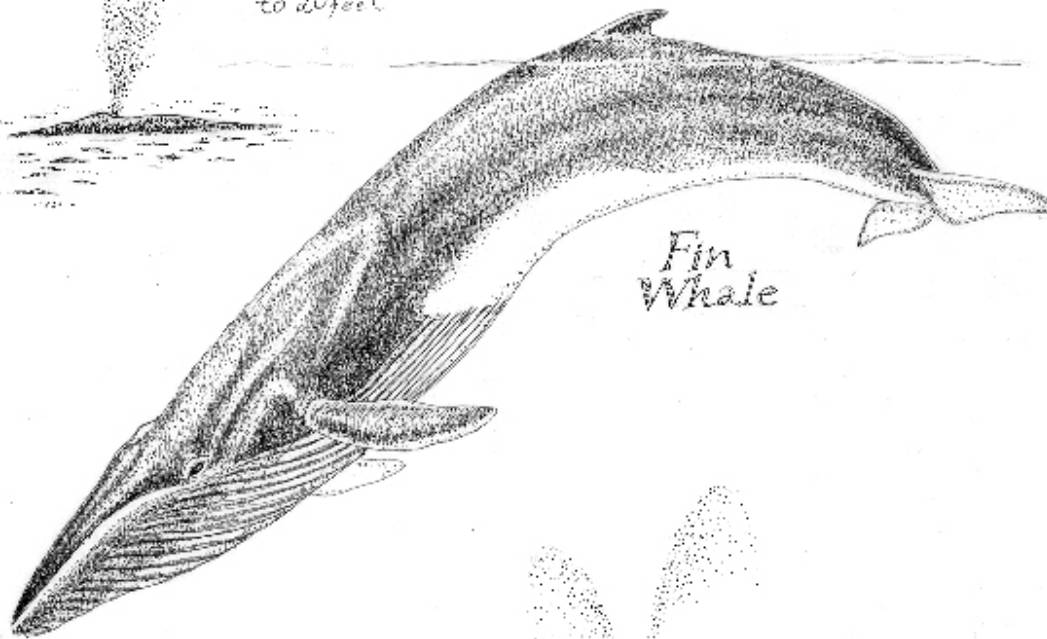
Figure 6. Illustrations of sea turtles from *A Field Guide to Long Island's Seashore*



Harbor
Seal



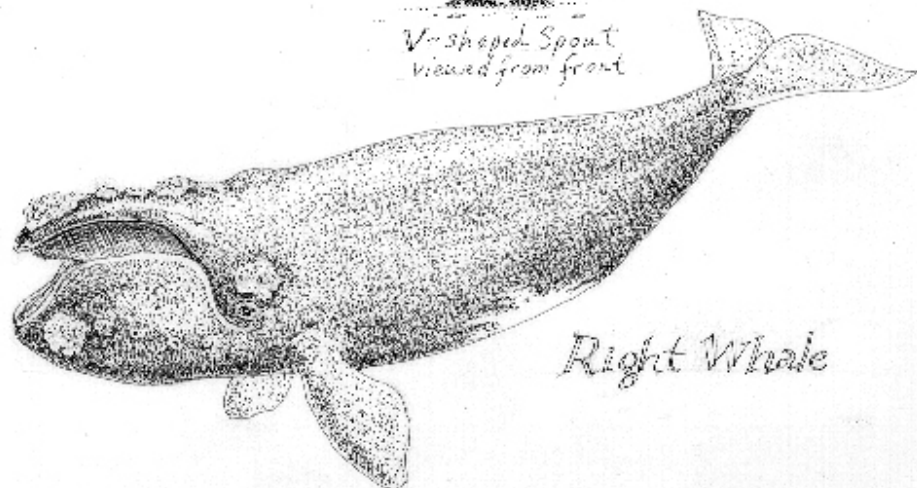
Fin Whale Spout
to 20 feet



Fin
Whale



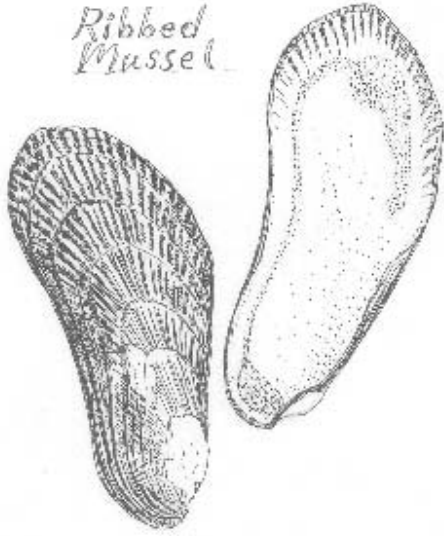
V-shaped Spout
viewed from front



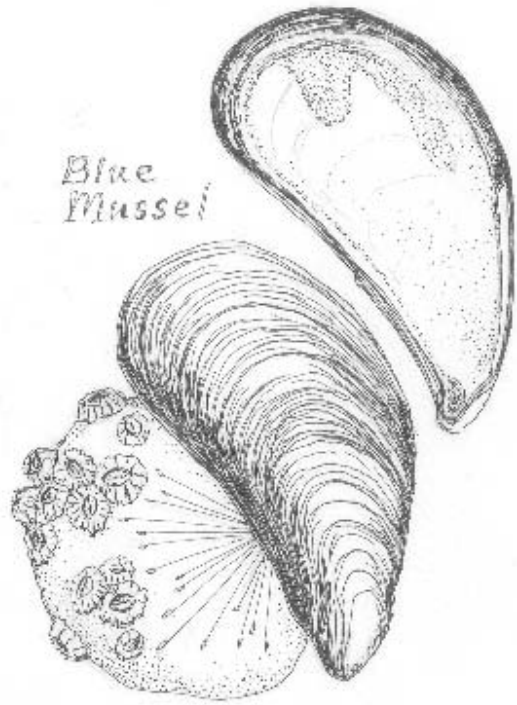
Right Whale

Figure 7. Illustrations of mammals from *A Field Guide to Long Island's Seashore*

*Ribbed
Mussel*



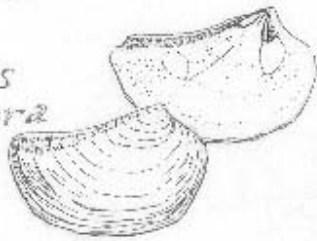
*Blue
Mussel*



*Eastern
Oyster*



*Gould's
Pandora*



*Northern
Quahog*

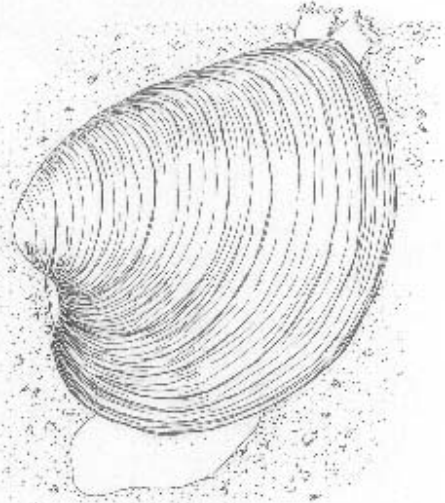
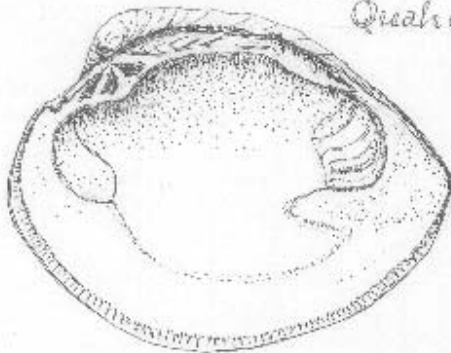


Figure 8. Illustrations of bivalves from *A Field Guide to Long Island's Seashore*

References Cited

Springer-Rushia, L. and Stewart, P.G. (1996) *A Field Guide to Long Island's Woodlands*. Museum of Long Island Natural Sciences: Stony Brook, NY.

Stewart, P.G. and Springer-Rushia, L. (1998) *A Field Guide to Long Island's Freshwater Wetlands*. Museum of Long Island Natural Sciences: Stony Brook, NY.

Richard, G.A., Springer-Rushia, L. and Stewart, P.G. (2001) *A Field Guide to Long Island's Seashore*. Museum of Long Island Natural Sciences: Stony Brook, NY.