Epiphytes and Wrack Algae:

These algae are two of the general groups of aquatic plants that are valuable components of the ecosystem when limited, providing structure, nutrient cycling and oxygen. However, they can become a problem when stimulated by the availability of nutrients in the water column. Specifically nitrogen from land uses in the watershed and acid precipitation stimulate excess growth of these as well as the microscopic plants that float in the water column, the phytoplankton.

A source of basic information on the issue of excess nitrogen (Nixon and Buckley, 2007) can be found at:
http://www.dem.ri.gov/programs/benviron/water/permits/isds/pdfs/spnload.pdf

The problem of eutrophication has become an issue in over 40% of the nation's coastal embayments and has been summarized by the President's Committee on Environment and natural Resources (2003). This document can be found at:
http://oceanservice.noaa.gov/outreach/pdfs/coastalhypoxia.pdf

Epiphytes:

Epiphytes include a range of microscopic and small algae that grow on the surface of other marine plants. Similar types grow on rocks, pilings and buoys. Those growing on hard surfaces are also called Aufwuchs. Excess epiphytic growth has been linked to the decline and loss of eelgrass beds and is driven primarily by the addition of nitrogen to a coastal water body. Eelgrass requires about 20% of the light level that is found at the surface in order to thrive but the leaf blades may become heavily coated with epiphytes that interfere with the sunlight necessary for the eelgrass to photosynthesize.

The organisms that make up this community include bryozoans, diatoms (Cocconeis), cyanobacteria and red, brown and green algae. The larger forms that may grow as epiphytes but are often found on hard surfaces include Ectocarpus, Cladophora and Polysiphonia. A shellfish raft is fouled with green epiphytic algae in Edgartown Great Pond in the photo below.

Wrack Algae:
These types are also called drift algae for their tendency to break loose easily from the shells or rocks that they attach to and drift into rafts of floating or submerged masses that may be swept up by currents and left in the wrack line on the beach. Many of the filamentous ones are not attached or only weakly linked to the bottom sediment. They are all classified as macroalgae along with the other more typical seaweeds such as rockweed. They include green as well as red and brown algae such as sea lettuce (Ulva), Enteromorpha (at least two forms), Cladophora, Gracilaria.

The growth of macroalgae is limited by nutrient availability rather than by light. Many of these are stimulated by nitrogen from acid rain, wastewater and stormwater because they can absorb it directly from the water column. Eelgrass typically obtains nutrients from its roots and is not as capable of absorbing nutrients directly from the water. As a result, macroalgae become the dominant marine plant where the availability of nitrogen is sufficient.

When nutrient loading is excessive, beds of eelgrass that is sensitive to available light will be smothered by these large algae and gradually disappear. When the wrack algae gather into large mats they may cause serious water quality problems during decay by removing oxygen from the water column and killing shellfish and fish that cannot escape. Large rafts of wrack algae were found in Edgartown Great Pond during 2007 as shown below. These algae are probably *Ulva clathrata* but include some filamentous green algae.

REFERENCES CITED

Nixon, S. & B. Buckley (2007) Nitrogen Inputs to Rhode Island Coastal Salt Ponds- Too Much of a Good Thing. University of Rhode Island Graduate School of Oceanography. A white paper prepared for the Rhode Island Coastal Resources Management Council.

National Science and Technology Council Committee on Environment and Natural Resources (2003) An Assessment of Coastal Hypoxia and Eutrophication in U.S. Coastal Waters.